



MINISTERUL CERCETĂRII,
INOVĂRII ȘI DIGITALIZĂRII

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Romanian Inventors Forum (FIR), as a professional association of dialog and representation, has the purpose to support, stimulate, develop and valorize the scientifically, technically and artistically creativity. Under the aegis of FIR, Romanian Inventors have participated at more than 80 World Invention Exhibitions, where their creations have been awarded with orders, prizes and medals. The performance of Romanian inventics is renowned in the whole world, which is the reason why FIR became member in different international clubs, associations and federations, with special contributions.

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FORUMUL INVENTATORILOR ROMÂNÎ

Forumul Inventatorilor Români (FIR), este o asociație profesională de dialog și reprezentare a inventicii românești în context internațional, care are drept scop sprijinirea, stimularea, dezvoltarea și valorificarea activităților de creație științifică, tehnică și artistică. Sub egida FIR, inventatorii români au participat la peste 80 de saloane mondiale de invenții, creațiile lor fiind apreciate cu numeroase ordine, premii și medalii. Performanța inventicii românești este recunoscută în întreaga lume, motiv pentru care FIR a devenit membru a diverselor cluburi, asociații și federații internaționale de profil, unde are contribuții deosebite.

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“Gheorghe Asachi” University of Iasi is an excellent choice for the highschool graduates, who wish to embrace a carrier in the attractive field of engineering. The eleven faculties of the university are well equipped and have renowned specialists.

The Faculty of Materials Science and Engineering at the "Gheorghe Asachi" Technical University of Iasi has the mission to train specialists for the materials engineering, mechanical engineering and industrial engineering fields, through a 4-year programme (B.Sc.), Master Courses and Ph.D. Programmes. Also, our faculty is involved in the scientific research programmes, as well as in life-long education programmes for professionals that wish to extend their expertise. Besides the formative activity, research in various fields, focused to multi-disciplinary national and international co-operation is highly valued.

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UNIVERSITATEA TEHNICĂ “GHEORGHE ASACHI” IAȘI Facultatea de Știința și Ingineria Materialelor

Universitatea Tehnică din Iasi este o alegere excelenta pentru absolventii de liceu care s-au hotarat sa imbratiseze o cariera in domeniul provocator al ingineriei. Cele unsprezece facultati ale universitatii sunt dotate cu laboratoare si echipamente de ultima ora, unde isi desfasoara activitatea specialisti recunoscuti pe plan european si international.

Facultatea de Știința și Ingineria Materialelor din cadrul Universității Tehnice "Gh. Asachi" din Iași, are ca misiune pregătirea specialiștilor pentru domeniul ingineriei materialelor, ingineriei mecanice și ingineriei industriale, prin programe de licență (4 ani), masterat și doctorat. De asemenea, facultatea este implicată în proiecte de cercetare și în programe de perfecționare pentru specialiști. Valoarea personalul academic din cadrul facultății aduce o notă distinctivă predării ingineriei materialelor. Pe lângă activitatea de formare și de cercetare în diverse domenii de activitate, apreciable sunt și cooperările multi-disciplinare naționale și internaționale.

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The Alexandru Ioan Cuza University of Iași (UAIC) is the oldest higher education institution in Romania. Since 1860, the university has been carrying on a tradition of excellence and innovation in the fields of education and research. With over 25.000 students and 800 academic staff, the university enjoys a high prestige at national and international level and cooperates with over 250 universities world-wide. The Alexandru Ioan Cuza University became the first student-centered university in Romania, once the Bologna Process was put into practice. Research at our university is top level. For many years, UAIC is placed on top in the national research ranking, having also several fields of research in top 500 Shanghai. Striving for excellence, the university takes unique initiatives to stimulate research quality, to encourage dynamic and creative education and to attract the best students to academic life.

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Universitatea "Alexandru Ioan Cuza" este cea mai veche instituție de învățământ superior din România continuând, din anul 1860, o tradiție a excelenței și inovației în educație și cercetare. Cu peste 25.000 de studenți și 800 de cadre didactice, universitatea se bucură de un important prestigiu la nivel național și internațional, având colaborări cu peste 250 de universități din străinătate. Universitatea "Alexandru Ioan Cuza" este membră a unora dintre cele mai importante asociații și rețele universitare: Grupul Coimbra, EUA - Asociația Europeană a Universităților, Rețeaua Utrecht, IAU - Asociația Internațională a Universităților, AUF - Agenția Universitară a Francofoniei și RUFAC - Rețeaua Universităților Francofone. Acestea permit schimbul de experiență, mobilități ale studenților și profesorilor și realizarea în comun a unor programe academice, de cercetare sau strategice.

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Universitatea de Medicină și Farmacie „Grigore T. Popa” din Iași a fost fondată în 1879, fiind una dintre cele mai vechi și prestigioase instituții de învățământ superior din România. UMF Iași face parte din Grupul celor 12 Universități de Cercetare Avansată și Educație. Toate programele de studii universitare de licență și masterat aparținând celor patru facultăți – Facultatea de Medicină, Facultatea de Medicină Dentară, Facultatea de Farmacie și Facultatea de Bioinginerie Medicală – sunt acreditate de Asociația Română de Asigurare a Calității în Învățământul Superior (ARACIS) iar managementul educațional instituțional este certificat de forul european de evaluare European University Association (EUA) și de Consiliul Internațional al Decanilor Facultăților de Medicină de Expresie Franceză (CIDMEF). Universitatea este membră a Agenției Universitare Francofone (AUF) și clasată în Top Shanghai 500, Times Higher Education, Top 25 U-Multirank. Peste 9,000 de studenți din peste 70 de țări studiază în cele patru facultăți ale universității , ceea ce face ca Universitatea de Medicină și Farmacie „Grigore T. Popa” din Iași să fie cea mai cosmopolită instituție de învățământ superior din sud-estul Europei. Reputația internațională de care se bucură UMF Iași este întărită și de prezența absolvenților Universității în renumite spitalele ale lumii, precum și în cele mai importante centre de cercetare. Raportul de evaluare al European University Association (EUA) - Institutional Evaluation Programme (IEP) califică Universitatea de Medicină și Farmacie “Grigore T. Popa” din Iași drept lider regional și național în domeniului învățământului superior.



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The „Grigore T. Popa” University of Medicine and Pharmacy of Iasi was founded in 1879 and is one of the oldest and most prestigious institutions of higher education in Romania. The University is proud to be part of the 12 Universities of Advanced Research and Education in our country. The four faculties - Faculty of Medicine, Faculty of Dental Medicine, Faculty of Pharmacy and the Faculty of Medical Bioengineering - are accredited by the Romanian Association for Quality Assurance in Higher Education (ARACIS) and its institutional management is certified by the European forum for evaluation - European University Association (EUA) and by Conférence Internationale des Doyens et des Facultés de Médecine d'Expression Francaise (CIDMEF). The university is member of Agence Universitaire de la Francophonie (AUF) and high ranked in Top Shanghai 500, Times Higher Education, Top 25 U-Multirank. Over 9,000 students from over 70 countries around the world study in the four faculties of the University, which makes "Grigore T. Popa" University of Medicine and Pharmacy of Iasi the most cosmopolitan institution of higher education in south-eastern Europe. The University's international reputation is also sustained by the presence of the graduates in important hospitals in the world and even in the most important research centers. The evaluation report of the European University Association (EUA) - Institutional Evaluation Programme (IEP) describes the "Grigore T. Popa" University of Medicine and Pharmacy as a regional and national leader in higher education.

THE ORGANIZERS

The National Institute for Research and Development in Environmental Protection (INCDPM)

INCDPM is an institution with over 60 years of experience in the environmental protection field. INCDPM, through its activities, that involve the concept of sustainable development, ensures the development of win-win preventive solutions, adopted in an environmental friendly manner. The development of new monitoring and evaluation methods for various fields (environmental quality, habitats - avifauna and ichthyofauna) generates, develops and maintains the necessary knowledge for the elaboration of solutions that ensure the conservation status of nature and biodiversity. The institute also uses the most advanced techniques and research equipment, and develops partnerships with prestigious international institutions and with public and private national institutions. The research portfolio includes assessing and reducing the impact of natural and technological hazards, assessing climate change impact, numerical simulations and forecasts, renewable energies, etc.



INCDPM

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Institutul Național de Cercetare și Dezvoltare pentru Protecția Mediului (INCDPM), reprezintă o instituție cu peste 60 de ani de experiență în domeniul protecției mediului. INCDPM, prin intermediul activităților pe care le desfășoară, coroborate cu conceptul de dezvoltare durabilă, asigură elaborarea unor soluții preventive de tip câștig-câștig, prietenoase cu mediul. Astfel, prin dezvoltarea de metode de monitorizare și evaluare pentru diverse domenii (calitatea mediului, habitate-avifaună și ihtiofaună) se generează, dezvoltă și se mențin cunoștințele necesare elaborării de soluții care să asigure starea de conservare a naturii și biodiversității. De asemenea, institutul utilizează cele mai avansate tehnici și echipamente de monitorizare, având direcții și arii de cercetare conexe, dezvoltând parteneriate cu instituții de prestigiu din străinătate și instituții naționale, din sectorul public și privat. Portofoliul de cercetare cuprinde evaluarea și reducerea impactului hazardelor naturale și tehnologice, evaluarea impactului schimbărilor climatice, simulări și prognoze numerice în domeniu, energii regenerabile etc. Pe lângă acestea, monitorizarea traseelor de migrare a sturionilor, generează o bază de date unică la nivel mondial.

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AWARDS LIST

Euroinvent GRAND PRIZE

**The Youngest Inventor Award
The Woman Inventor Award
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The Green Environment Award
The Medicine Award
The Best Design Award
The Exquisite Award
The AgroFuture Prize
The CyberLife Award
The Popularity Award
Special Prize**



**Gold Medal
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Bronze Medal**

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Prize of Malaysia - Universiti Malaysia Perlis
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Prize of Poland - Eurobusiness Haller
Prize of Poland – Association of Polish Inventors
Prize of Thailand - ATIP
Prize of Iraq – Iraqi Inventors Forum
Prize of Indonesia – INNOPA
Prize of Canada – TISIAS
Prize of Moldova - AGEPI Chisinau
Prize of Moldova - Academy of Science of Moldova
Prize of Moldova - Technical University of Moldova
Prize of Romanian Inventors Forum
Prize of Europe Direct Iasi
Prize of „Gheorghe Asachi” Technical University of Iasi
Prize of „Alexandru Ioan Cuza” University of Iasi
Prize of POLITEHNICA University of Bucharest
Prize of Stefan cel Mare University of Suceava
Prize of Banat USAMV, Timisoara
Prize of Technical University of Cluj-Napoca
Prize of Lucian Blaga University of Sibiu
Prize of Arheoinvest Platform
Special Prizes from Participant Institutions**

EXHIBITS CLASSIFICATION

1	Environment - Pollution Control
2	Energy and sustainable development
3	Agriculture and Food Industry
4	Medicine – Health Care – Cosmetics
5	Industrial and laboratory equipments
6	Mechanical Engineering – Metallurgy
7	Buildings and Materials
8	Aviation, car industry and transportation
9	Chemical and Textile Industry
10	Information Technology and Communication
11	Printing and advertising
12	Safety, protection and rescue of people
13	Sports, Games and Leisure
14	Other
X	Innovative Research

P R E A M B L E

The Inventions' exhibitions and shows, national or international ones, represent one of the exogenous determining factors, with multiple effects on the creative process. The system is one of the most encouraging, an interactive manner to disseminate inventions, a competitive background generating innovative ideas, while as an evaluative scientometric system, allow attracting the potential applicants or inventions' owners. It is the best medium for negotiating, conveying or transferring inventions, the place where the complete new results are exhibited.

The past 30 years experience, a time in which many Romanian inventors took their new releases in international exhibitions and were rewarded with numerous medals, orders, distinctions and diplomas, situated each time Romania, in unofficial statistics, on the first places. The honours list of the Romanian inventions create a paradoxal result of the two very close fields, the technological or applied research and on the other hand the fundamental or scientifically research. If the scientific output, represented by papers published in ISI Thomson acknowledged journals, situate Romania dragging behind the second league, in compensation, the patented awarded inventions turn it in one of first countries. So much more we should focus especially on the organizing of this kind of shows which offer real opportunities to many inventors to see their dreams come true by putting their results into a competitive-interactive system of evaluation.

Interdisciplinarity of inventics as a science is approached today in a connected, integrated way (education-research-production), with both educative and research functions, carrying great attractivity for the young generation and increasing standards both for inventors and for their products. In this respect, it is necessary to pay a special attention to the inventics schools, as they have, beside the role to form characters, professions, as well as vocations and talents, the mission to stimulate the technical creativity. We should underline the fact that after 1990 we noticed a slight lowering of the Iași inventics school contribution in its aim to form young inventors. Meetings and workshops in the inventions exhibitions should put light on and find

solutions to turn the inventics schools in institutions and to improving and harmonizing the laws regarding the intellectual propriety and the industrial one.

Another serious, upsetting and alarming aspect which I want to put light on is the fact that about 60 to 70% of the Romanian specialists with international output accepted to work abroad, where they are appreciated and stimulated according to their value. We should as well attract them and offer the opportunity to reevaluate them selves at home and participate to such representative competitions.

A peculiar notice is the fact that many Romanian inventors of success, internationally acknowledged, are invited in organizing committees, in international juries and are active members or founders of associations or professional clubs. The Romanian delegations created a tradition in the international exhibitions, to organize a Romanian event, the so-called “The Romanian Inventors Day”, where they present in a festive atmosphere their inventions, their contributions and offer diplomas and small gifts to the hosts and the other participants.

This edition of EUROINVENT sent invitations to inventors associations from many countries. A big number of institutions and individual inventors are participating from Romania, a remarkable fact being to have here many young inventors (from schools or universities) as well as older inventors. Considering the pandemic time and the geopolitical situation, this show is exhibiting more than 640 inventions and research projects from over 30 countries.

With pleasure and gratitude, acknowledgements to all the persons, institutions and organizations who participate to EUROINVENT, to the partners, Romanian Inventors Forum, EUROPE-DIRECT Iasi, “Gheorghe Asachi” Technical University of Iași and “Alexandru Ioan Cuza” University of Iasi and all the partners for all their support and efforts to organize the events.

Prof. Ion SANDU – Honorary President of Romanian Inventors Forum

ORGANIZERS



Romanian Inventors Forum



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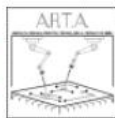


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Fundația Dan Voiculescu
pentru Dezvoltarea României
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Cine suntem?

Fundația Dan Voiculescu pentru Dezvoltarea României este o organizație non-guvernamentală, apolitică, înființată în anul 1990, care prin activitatea sa, urmărește valorificarea capitalului uman prin descoperirea, antrenarea și promovarea inteligenței și a excelenței

Ce facem?

Susținem Excelența – organizația noastră a susținut și susține tineri extraordinari din diverse domenii de activitate

Antrenăm Inteligența – peste 5000 de copii au participat, de-a lungul timpului, la cursurile gratuite organizate de noi

Promovăm inovația – oferim inventatorilor și cercetătorilor români sprijinul de care au nevoie pentru a-și continua cercetările





30

de ani de activitate

* peste 6.000 de tineri cu performanțe remarcabile au beneficiat de programele FDVDR, numai în ultimii 7 ani

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Membru al European Council for the High Ability

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2000

de premii

* cel mai mare premiu individual din istoria recentă a României, în valoare de 300.000 RON, decernat, în 2007, inventatorului Justin Capră

* premii pentru inventatorii români care participă la Euroinvent și Salonul Auto București

* recunoașterea adevăratelor valori naționale prin acordarea de premii de excelență pentru: Radu Beligan, Gabriella Ficz sau Tudor Gheorghe

For over 10 years, the Scientific Senate of the Dan Voiculescu Foundation for Romania's Development has supported the scientific community by fostering actions meant to contribute to the support and promotion of research and innovation in Romania.

The Scientific Senate has focused its activity since 2019 on the field of food research and longevity because these fields are trying to respond to a pressing need of modern society, namely to increase its life expectancy and quality.

We want to accelerate the transfer of research in the field of laboratory longevity in medical practice and we are interested in developing partnerships with organizations outside Romania that can contribute to the dissemination of information about longevity.

General Manager Scientific Senate

Trisi Cristea

OUR PROGRAMS



INOVAGING is the Scientific Senate's programme promoting and supporting longevity by way of funding research and development at an early stage of medical solutions which might contribute to prolonging the healthy life duration and to developing gerontology facilities and services on active ageing. We set out to develop partnerships with longevity institutes around the world for the purpose of qualitatively accelerating the longevity industry.

INOVAGING programme is comprised of 2 projects:

The Longevity and Gerontology Conference, a biannual event bringing Romanian specialists closer to expert visionaries of longevity around the world, introducing innovative research on the study of ageing.

The International Call for Projects in Gerontology and Longevity, launched to researchers in the gerontology, longevity, molecular biology and medical bioengineering fields in Romania and abroad.



Senatul Științific

al Fundației Dan Voiculescu pentru Dezvoltarea României

INOVALIMENT

The Scientific Senate's programme dedicated to food research aiming at developing new and sustainable foods.

INOVALIMENT is comprised of 3 projects:

The Inovaliment Invention and Innovation Fair, the only fair in Romania dedicated solely to food research which promotes trends and innovations in the food industry.

The Inovaliment Conferences - with an educational role.

The Early Nutrition Education Programme,

a paediatric nutrition education programme and observational studies on the role of early nutrition in the life of the future adult.



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Oficiul de Stat pentru Invenții și Mărci (OSIM) își desfășoară activitatea ca organ de specialitate al administrației publice centrale, având autoritate unică pe teritoriul României în asigurarea protecției proprietății industriale, în conformitate cu legislația națională în domeniu și cu prevederile convențiilor și tratatelor internaționale.

Atribuții specifice ale O.S.I.M. conform obiectului său de activitate:

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- editează și publică fasciculele brevetelor de invenție;
- administrează, conservă și dezvoltă, întreținând o bază de date informatizată;
- efectuează, la cerere, servicii de specialitate în domeniul proprietății industriale;
- desfășoară cursuri de pregătire a specialiștilor în domeniul proprietății industriale;
- atestă și autorizează consilierii în domeniul proprietății industriale, ținând evidența acestora în registrul național.



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The State Office for Inventions and Trademarks (OSIM) operates as a specialized body of the central public administration, having sole authority in Romania to ensure the protection of industrial property, in accordance with national law and the provisions of international conventions and treaties.

Specific responsibilities of the O.S.I.M. according to its object of activity:

- registers and examines the applications in the field of industrial property, issuing protection titles that confer to the holders exclusive rights on the Romanian territory;
- is the depositary of the national registers of the submitted applications and of the national registers of the protection titles granted for inventions, trademarks, geographical indications, designs, topographies of semiconductor products;
- edits and publishes the Official Bulletins of Industrial Property on the sections: patents, trademarks and geographical indications, designs;
- edits and publishes the bundles of patents;
- manages, preserves and develops, maintaining a computerized database;
- performs, upon request, specialized services in the field of industrial property;
- conducts training courses for specialists in the field of industrial property;
- certifies and authorizes the advisers in the field of industrial property, keeping their records in the national register.



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The State Agency on Intellectual Property of the Republic of Moldova (AGEPI) is an administrative central authority subordinated to the Government, responsible for promoting and implementing activities in the field of legal protection of intellectual property.

Through AGEPI you can effectively protect your intellectual property (IP) in the territory of the Republic of Moldova:

- Inventions, plant varieties, topographies of integrated circuits, product and service trademarks, industrial designs, geographical indication, appellations of origin, traditional specialties guaranteed;
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AGEPI issues titles of protection for IP objects, provides information and legal advice about protection and enforcement of IP rights, publishes the Official Bulletin of Intellectual Property (BOPI), promotes and propagates intellectual property, organizes the attestation of patent attorneys, conducts trainings and professional development courses, provides IP pre-diagnosis and other related services.

Since 2015, it is possible to validate European patents in the Republic of Moldova through the European Patent Office (EPO). The single procedure for issuing European patents provides for simpler and more cost-effective protection of inventions in the EPO Member States but also in extension and validation states, including in the Republic of Moldova.

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- Opere literare, artistice, științifice, programe pentru calculator, alte obiecte ale dreptului de autor și drepturilor conexe.

AGEPI eliberează titluri de protecție a obiectelor de PI, informează și oferă consultații juridice ce țin de protecția și realizarea drepturilor de PI, editează Buletinul Oficial de Proprietate Intelectuală (BOPI), promovează și popularizează proprietatea intelectuală, organizează atestarea mandatarilor autorizați, cursuri de instruire și perfecționare a specialiștilor în domeniu, acordă servicii de prediagnoză a PI și alte servicii aferente.

Din 2015 este posibilă validarea brevetelor europene pe teritoriul Republicii Moldova prin intermediul Oficiului European de Brevete (OEB). Procedura unică de eliberare a brevetelor europene asigură obținerea printr-o modalitate mai simplă și cu mai puține costuri a protecției invențiilor în statele membre ale OEB, dar și în statele în extindere și validare, inclusiv în Republica Moldova.

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WIIPA Family

World Invention Intellectual Property Associations

Introduction

In 2010, it was founded by Mr. Hsieh Hsin-Ming. At the moment, 50 member countries and partners have joined the "WIIPA Family" with the goal of promoting invention, innovation and intellectual property rights around the globe.

Founder

Since 1993, Mr. Hsieh Hsin-Ming has formed "TIIPA" Successfully, opened up a way for Taiwan's products to be in line with international standards and also laid the foundation for the establishment of WIIPA.

History

In 2000, Mr. Hsieh Hsin-Ming felt that the main axis of TIIPA is limited to Taiwan. With a vision to gain access in the international stage, he dedicated his time and effort to gather transnational forces to put his vision at work.

Fueled with a vibrant ideology, he continued to open doors of opportunities for young and talented inventors to a global level and thrived on gaining international attention for the establishment of WIIPA as a multinational organization.

Our Goal

WIIPA upholds the spirit of globalization and extends its vision across the globe. With technology, using network interface allows a fluid communication pattern for a more innovative exchange of ideas and information among stakeholders.

Members

WIIPA member states span across continents. The member countries in the "WIIPA Family" currently has 50 member states and partners.

WIIPA put great emphasis on "common concept" and "substantial participation". WIIPA members have certain privileges other associations aspire for. One of them is taking part in WIIPA meetings, conferences as well as exchange activities from time to time to have a full understanding and mastery of the development and complexity of international inventions.



World Invention Intellectual Property Associations

WIIPA Family Create Your Minds Explore Your Life



www.wiipa.org.tw



2022/4/25

On behalf of World Invention Intellectual Property Associations (WIIPA), I would like to advance my appreciation to Romanian Inventors Forum for the great deal of effort they have devoted to organizing a big event such as the 2022 European Exhibition of Creativity and Innovation in Romania which continue to thrive in the culture of innovation for eighth consecutive years.

Romanian Inventors Forum is truly one of the biggest to be held in Romania. Their dedication to bring inventors and entrepreneurs together while facilitating innovation in marketing, licensing and manufacturing of products is truly remarkable. WIIPA supports this event as well as WIIPA's honorable member Romanian Inventors Forum, and urges all of the inventors as well as invention association, entrepreneurs, industry representative and manufactures to take the best advantage of this milestone in the trade show and play a significant role in the success that such event will bring about.

Sincerely Yours,

Manli Hsieh

President

World Invention Intellectual Property Associations (WIIPA)



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Romanian Inventors Forum



2003 – 2022
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Romanian Inventors Forum (FIR) is a professional association which aims to support, stimulate the development and valorization of scientific and technical creative activities, and cultural - artistic, but also copyright problems of its members, diversification of research and technological development, design, scientific investigation, micro-production etc.

Research and development institution **certified** by the National Authority for Scientific Research (ANCS), according to HG. 551/2007, Decision ANCS no. 9708/29.07.2009.

FIR was established in 2003 by a group of university professors, elite inventors and researchers from the University Center in Iasi.

www.afir.org.ro



Universiti Malaysia Perlis (UniMAP) is Malaysia's 17th public institution of higher learning. It was approved by the Malaysian Cabinet on May 2001. Originally known as Kolej Universiti Kejuruteraan Utara Malaysia (KUKUM), or Northern Malaysia University College of Engineering, it was renamed as Universiti Malaysia Perlis (UniMAP) in February 2007. The first intake consisted of 116 engineering students who started classes on June 2002. Currently, UniMAP has approximately 15,000 students and a workforce of more than 1,900 academic and non-academic staff members. It offers 21 undergraduate programs that lead to Bachelor in Engineering, one undergraduate programs that leads to an Engineering Technology degree and two undergraduate programs that lead to a Bachelor in Business. We also offer six Diploma in Engineering programs and 13 postgraduate programs that lead to the Master of Science in Engineering and PhD degrees.



Center of Excellence Geopolymer & Green Technology (CEGeoGTech) lead by Vice Chancellor Universiti Malaysia Perlis (UniMAP), Professor. Dr. Kamarudin Hussin. CEGeoGTech located at the School of Materials Engineering, Kompleks Pusat Pengajian Jejawi 2, Taman Muhibbah, 02600 Arau, Perlis. CEGeoGTech has been established on July 2011 with the intention to induce innovation in green material technology among researchers in Universiti Malaysia Perlis. CEGeoGTech are able combining their expertise and skills in various fields to support the academic structure in the generation of human capital that contributes to the development of high quality research. This center also can become a pillar of academic activities, especially regarding research, development and innovation. CEGeoGTech have 8 fields of research includes:

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- ☐ Polymer Recycling
- ☐ Electronic Materials
- ☐ Ceramic
- ☐ Electrochemistry Materials & Metallurgy
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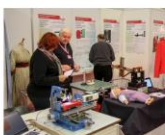


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COMPLEXUL
MUZEAL
NAȚIONAL
MOLDOVA
IAȘI



Complexul Muzeal Național „Moldova” Iași are sediul central în Palatul Culturii, unde se află patru muzee de talie națională:

- ▶ Muzeul de Istorie a Moldovei;
- ▶ Muzeul Științei și Tehnicii „Ștefan Procopiu”;
- ▶ Muzeul de Artă;
- ▶ Muzeul Etnografic al Moldovei.

Din cadrul Complexului face parte și

▶ **Centrul de Cercetare și Conservare-Restaurare a Patrimoniului Cultural.**

Complexul are în subordine și obiective muzeistice de pe teritoriul orașului Iași și, respectiv, al județului. Acestea sunt:

- ▶ Muzeul Memorial „Mihail Kogălniceanu” Iași;
- ▶ Muzeul Unirii Iași;
- ▶ Muzeul „Poni-Cernătescu” Iași;
- ▶ Palatul Memorial „A.I. Cuza” Ruginoasa;
- ▶ Muzeul Arheologic de sit din Cucuteni;
- ▶ Muzeul Viei și Vinului din Hârlău.

Palatul Culturii a făcut subiectul unui amplu proces de restaurare, finalizat în ianuarie 2016, desfășurat în cadrul Programului Guvernamental de reabilitare a monumentelor istorice.

În data de 27 aprilie 2016, Palatul Culturii a fost redeschis publicului larg, cele patru muzee care își au sediul aici inaugurând fiecare expoziții temporare ce pun în valoare doar o parte din colecțiile muzeale.

RecMine

Environmental footprint reduction
through eco-friendly technologies of
mine tailing recycling



RAW MATERIALS FOR THE SUSTAINABLE DEVELOPMENT
AND THE CIRCULAR ECONOMY

Coordinator



Partners



The aim of this project is the **valorisation of high-volume mineral residues from mining** and different industrial residues (such as coal combustion by-products (CCP) and demolition waste (DW)) for the development of (i) **new geopolymers** with low **CO₂ footprint**, and (ii) **advanced refractories**, suitable for **3-D printing** applications.

This will be done through the development of two innovative processing techniques that will be able to make the **mine tailings** and the **industrial wastes** suitable for replacing the concrete based on Ordinary Portland Cement (OPC), **reducing** the requirements of primary **raw materials**, the waste generation and landfilling. It will be ensured that the developed materials (the geopolymers and the refractories) match the technical and environmental criteria for its use in steel industry or civil engineering applications and develop appropriate business models to secure profitability and sustainability.

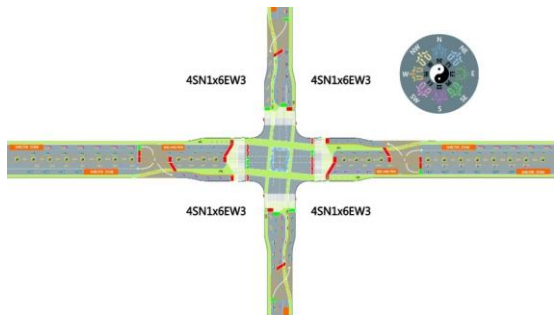
Accordingly, the **overall objective** of the project is to use wastes from **five different European countries** (Romania, Bulgaria, Portugal, Turkey and Spain) for the obtaining of **new green materials**, considering the advantages introduced by **3D printing** method. Therefore, it is expected to obtain **technological progress** in the manufacture of geopolymers and refractories which use mine tailings and industrial wastes (CCP and/or DW) as raw materials, due to the presence of a SME as end-user. Moreover, knowing that the synthesis of the materials with similar characteristics (Ordinary Portland cement-based materials) involves consumption of virgin raw materials (kaolin, limestone, sand, gravel, clays) or high temperatures for curing or calcination, the project aims the improvement of currently developed materials by obtaining **ambient cured geopolymers** with **100% recycled raw materials** and **self-flowing refractories** (high-temperature ceramics) with low or ultra-low cement content that are suitable for 3D-printing.

INTERNATIONAL EXHIBITORS

Australia, Bosnia and Herzegovina, Bulgaria, Cambodia,
Canada, China, Croatia, India, Indonesia, Iran, Japan, Korea,
Lebanon, Macau, Macedonia, Malaysia, Moldova,
Philippines, Poland, Saudi Arabia, Taiwan, Thailand, Turkey,
Ukraine, United States of America, Vietnam

Australia

AU.1	
Title	SYNERGISTIC RECONFIGURABLE TRAFFIC INTERSECTION
Authors	INV. VALIANT YUK YUEN LEUNG
Institution	SYNERGISTIC TRAFFIC
Patent	AU2019101728(A4), AU2019200133(A1), ZA(2020-06447), AU2020202001(A1)
Description EN	<p>SYNERGISTIC RECONFIGURABLE TRAFFIC INTERSECTION targets the worldwide congested urban traffic cross and star intersections with intersecting roads comprising with 4 and 5 lanes or more. Existed road spaces are rearranged synergistically with centrally located reconfigurable lane/s. By reducing the time-costly red traffic-light phase/s without losing any function, the congested volume will then be reduced proportionally. The flexibility of the centrally located reconfigurable lane/s will meet the dominant needs at any-time easily from any starting point to any destination. Independent bicycle flows are integrated harmoniously without disturbances to the system by providing a novel receiving bicycle lane and right hook-turn bicycle waiting islands. It utilises a displaced left turn, which facilitates a 2-phased signal control of a traffic signals. When incorporate with other traffic management techniques, it enables multi-model usability and safety, whilst enabling the use of reversible lanes which can be allocated to prioritise a specific direction of traffic flow. This allows the traffic intersection to best utilise spatial resources & enable continuous movement for future Autonomous vehicles, without discriminating against legacy vehicles. Human operated drivers can quickly adopt to improve efficiency and mobility, whilst lowering the conflict points at a traffic intersection and the chances for potential accidents.</p>
Class no.	8



Bosnia and Herzegovia

BiH.1
Title
**FLEXIBLE THERMAL-ACCUMULATION
CONVECTIVE EMITTER**
Authors

Fikret ALIĆ

Patent

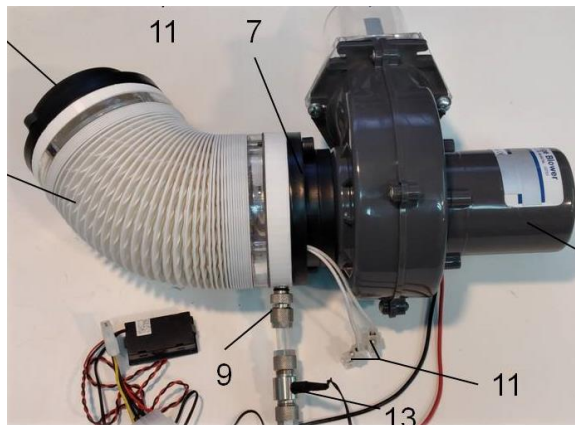
BAP 203361 A; 14-I-2020.

Institution

AIBIH

Description EN

This convective emitter is intended to forcedly but efficiently warming of different fluids circulating thru a flexibly distensible conduit, consisting of an external and internal ribbed housing. Fluid circulation is enabled by pump, compressor or ventilator. This device is mostly used by hydraulic and pneumatic plants. The conduit being flexible, the de/compressed air is used to ensure its frequent extension-contraction movements. It can be connected to several similar devices, in process or civil applications, parallelly or serially. The conduit's length is by itself adapted, in function of working parameters, temperature and fluid flow. Thanks to this invention, number of divers devices with diverse dimensions and forms can be produced. Its installation and dissembling can be simply and quickly done, given that the electric current is used for fluid warming.



BiH.2**Title****UNDERWATER GASEOUS OR LIQUID MEDIA CHARGER****Authors**

Zoran DUJAKOVIĆ

Patent

BAP 213447 A; 1-XI-2021

Institution

AIBIH

Description EN

This charger consists of a compressor, high pressure vessel or tank, connected via a duct or stirrup contact to a transducer which delivers the working medium via a high pressure hose to a closed high pressure valve. When the high-pressure transmitter and the high-pressure receiver with the irradiator are connected by dyne or stirrup contacts, the valve opens. The irradiator valve opens so that high air pressure, or some other medium blows water out of the system, and when it closes, the valve opens, who lets air through a non-return valve to the diving bottle or high pressure vessel. After refilling the diving bottle, the valves are closed. The releasing valve is opening to let off the excess air pressure or some other liquid medium

**BiH.3****Title****INSTANT SHAKE DRINK****Authors**

Zoran DJOKOVIĆ

Patent

BAP 203360 A; 5-VI-2020

Institution

AIBIH

Description EN

The mixture for this shake consists of different species of fruits and vegetables, with additives in order to obtain wanted aroma or color. It can be produced as juice, gruella and creamy, in bottles, bags, sacks, packets and any other ordinary, suitable receptacles

**BiH.4****Title**
**CYLINDRICAL TOOL FOR THIN
CEMENTITIOUS MATERIALS SAMPLE
GRINDING AND POLISHING**
Authors

Dragana JANKOVIĆ

Patent

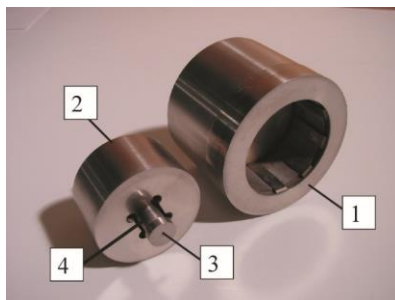
BAP 213413 A; 26-V-2021.

Institution

AIBIH

Description EN

In order to prepare a sensitive thin sample surface of cementitious materials for the observation of microstructure under the electron microscope (ESEM), a cylindrical three-part tool made of stainless steel, is constructed. The tool enables sample grinding and polishing to the desired thickness of the sample and below, thanks to: a) Rotational circular plate with a handle placed in the cylinder center; b) Scale, placed at the opposite end of the sample location; c) Safe sample holding device: opening in the inner cylinder. Thanks to this sample surface preparation, the created digital images in ESEM are extremely clear and sharp, which enables qualitative Digital Image Analysis. The cylindrical tool is multipurpose, easy to use and maintain.



1) Outer cylinder; 2) Inner cylinder; 3) Circular plate; 4) Plate handle

BiH.5**Title**

MOULD FOR THIN SAMPLE CASTING

Authors

Dragana JANKOVIĆ

Patent

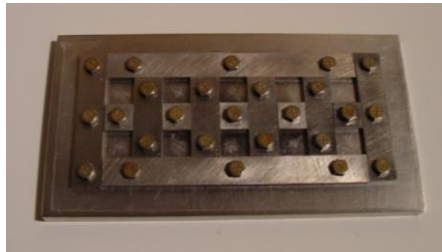
BAP 213414 A; 26-V-2021

Institution

AIBIH

**Description
EN**

: In order to investigate shrinkage and micro-cracking of samples ($D = 1 \text{ mm}$) made of concrete and other cementitious materials, in the electron microscope (ESEM), in the sample early age (min 2-3 days old), when samples are still soft and breakable, mould is created. The mould is made of stainless steel. It consists of the bottom plate, the thin (2 mm thick) surface plates, which are fixed to the bottom plate with screws. The thickness of surface plates determines the thickness of casted samples. For experiments in ESEM, where a large number of thin ($10 \times 10 \times 2 \text{ mm}$) samples is needed, the constructed mould contains 10 cells. If needed, the shape and size of casted samples can vary by removing a certain number of plates. The mould is multipurpose, very easy to handle and maintain.

**BiH.6****Title**

CNC CUTTER FOR POROUS MATERIALS

Authors

Husnija KAPIĆ

Patent

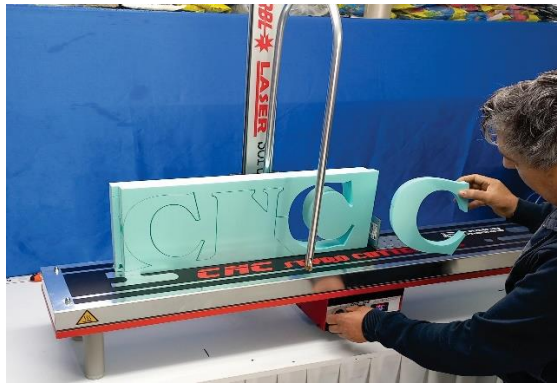
BAP 223463 A; 26-I-2022

Institution

AIBIH

**Description
EN**

First feature of the proposed machine is seen in its quality to shape the fragile porous materials such as stiropor, sponge, foam products... Elaboration of an object is done by moving thin warm wire in all senses ordered, programmed directions! The wanted (form of) object can be especially created by purchaser-designer, or chosen from authorized digital programs. Besides its above said executing features, this device consists of lower number of components, it's lighter and easier to displacing and reassembling

**BiH.7****Title****Authors****Patent****Institution****MACADAM ROADS TORRENT WATER DUCTS**

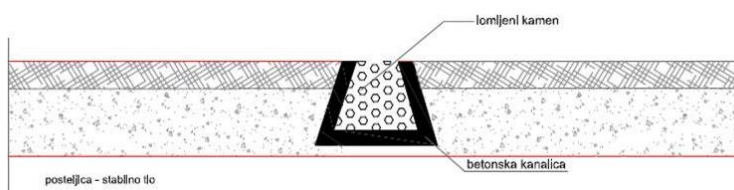
Pero PETROVIĆ

EP 3 519 631 B1; 5-V-2021

AIBIH

Description EN

This idea is seen in trapezoidal draining ducts, installed transversally up on the sloped macadam paths, at distances of same 40 m, in order to absorb and decelerate the flooding surface's waters. In sectional view the ducts have trapezoid appearance without higher, shorter horizontal side; just these openings serve to receive and decelerate the overflowing current. The ducts are filled by coarse sand and precisely crushed stones parcels, dimensioned in function of average flood in given roads region



Bulgaria

BG.1

Title

Plant available potassium and phosphorus in arable soils: a comparative study of methods of analysis

Authors

Lyudmila Angelova, Andriana Surleva

Patent

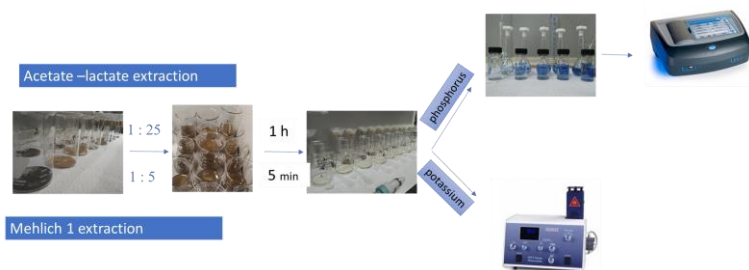
-

Institution

University of Chemical Technology and Metallurgy, Sofia, Bulgaria

Description EN

Modern sustainable agriculture asks for adequate approaches for diagnostic of soil fertility status based on soil testing results. A line of methods for simultaneous determination of plant available potassium and phosphorus could be found in the literature each of them designed to assure data for plant available P and K in different type of arable soils. As different extraction method combined with different instrumental detection techniques have been proposed, the comparison between the available data is very difficult. Moreover, analytical characteristics of the testing methods and uncertainty of result is rarely presented. The aim of this project is detailed study of factors which govern the analytical behavior of methods for determination of P and K in arable soils, estimation of analytical characteristics, and assessment of uncertainty of the results. The expected results could contribute to more detail understanding the methods for soil testing, revealing the sources of uncertainty of the obtained results, as well as enhancement of the comparison between data.



Cambodia

Norton University

KH.1.

Title Angkor Smart Bike

Authors Dr. So Sokuntheary, Mr. Chuop Sopheak

Institution Norton University

Patent NO

Description

The main location will take place in a heritage town that could be discovered in the northwestern Cambodia in Siem Reap province. The Angkor Smart Bike will enable passenger to rent the bike and explore the spectacular view of Angkor Wat temple. Back in the early 19th century, bicycle was only spotted with an ordinary two wheels which was influenced from the outside country and made its way to Cambodia which then has its own local design. Since bike was a convenient way to transport, people often use them to travel to far places for businesses and other purposes. However, throughout the history, vehicles have been developed to fits the requirement of people such as a more comfortable seating and a faster speed which was made possible with the installation of machine and engine to motorbikes and cars. As vehicles are getting more advance, the number of people in Cambodia who uses bicycle deteriorates. Although, in recent days, it is visible that people often prefer to ride bicycle to sightsee and as a way to exercise instead of transportation. (max 250 words)

KH.2.

Title KHMER TRADITIONAL MONASTERY WITH QR INFORMATION SYSTEM

Authors Dr. So Sokuntheary, Mr. Chuop Sopheak

Institution Norton University

Patent NO

Description

Monastery is an important architecture role of Cambodian's Buddhism. The main building in the pagoda which call Vihara, where erected the Buddha statue, is built in the center of the compound with a special decorative roof and opens in all four directions, opening wide to the east. It is an architecture providing of histories concerned with Buddha

INTERNATIONAL EXHIBITS

life in painting and a place for keeping the mind clean and keeping morals, especially on the full moon day monk gathering and pray with the Dharma of the Buddha or read Jataka. The purpose of the project is want to create a system which store all information in monastery of monastery by scanning QR and we want also applies all information of each building inside the historical monastery. We plan to put the QR next to building. So when the tourist come and visit they no need someone to tell the information but they just scan the QR and it appear all the information about the building.

KH.3.

Title	NU Child Tracking
Authors	Mr. Suon Sivatha, Mr.Keo Samneang, Mr.Chansamedy Prum, Mr. Koy Mengly, Mr. Then Dyna
Institution	Norton University
Patent	NO Technology devices at a minimal price. This allows users, especially parents, to track their children via the mobile application connected with a cutie writs strap. The app will alert notifications to the parent when their children who are wearing the strap safety far away from them in a particular range. Also, the strap device has a simple physical piece of information containing the contact info of the child's parent. In case of the child getting lost somewhere, people will be able to seek and find the child's parent faster.
Description	

KH.4.

Title	NU Self-Driving Detection
Authors	Mr. Seng Noeurn, Mr. Sour Sakada, Mr. Long David, Mr. Horn Sphat, Prof. Luy Mithona
Institution	Norton University
Patent	- We desire to invent Software Self-Driving Detection that has ability to calculate and detect colors of the traffic light. In addition to that, there will be an alert and notification in sound to driver in order to prevent them from risky and traffic accident.
Description	

KH.5.	
Title	The Classic Khmer House “Rongdeung”
Authors	Dr. So Sokuntheary, Mr. Chuop Sopheak
Institution	Norton University
Patent	NO
Description	<p>The idea of making “The Classic Khmer House, Rongdeung” project was intended to lift up Khmer Vernacular house once again to all new generation of Cambodia citizens and help keeping Khmer cultural heritage also.</p> <p>The traditional Khmer house was constructed and designed by Khmer people since ancient time and passed down the structural method through generations. Obviously, our country grows toward a better stage of life living in the golden age of technology development and greater architecture buildings appear around every places. Therefore, we have inserted the Khmer Rongdeung house project accessible with technology and sustainable materials.</p>

KH.6.	
Title	The Jayavarman Smart Station
Authors	Dr. So Sokuntheary, Mr. Chuop Sopheak
Institution	Norton University
Patent	NO
Description	<p>Jayavavrman Smart Station is renovation of the lodge with the addition of technology to accommodate travelers, locals, scholars and local officials. We build a small building that allows people to rest and protect from the weather. We are equipped with information systems to inform passengers and provide power for charging and clean drinking water. the station put a system is for locating, identifying, and summarizing the history of ancient temples that have been discovered and setting up locations for tourist destinations.</p> <p>Developing a curriculum the use of the environment to complement the urban environment.</p>

KH.7.	
Title	Vernacular Khmer House with Sustainable Rohat Teck (Water Wheel)
Authors	Dr. So Sokuntheary, Mr. Chuop Sopheak
Institution	Norton University
Patent	NO
Description	Rohat Terk in Khmer means "Water Wheel" that is one of

attractive decorative device also use to drain water.
 As we observe that nowadays Rohatt seems to be gradually losing its popularity and function.
 One of Water-Wheel in Siem Reap that was built in 60s repaired by the (APASA Authority) and has some difficulty with function. That's cause us then create and it is an idea to inspire for new design Khmer Traditional Water-Wheel that be based on the ancient and can also produce electrical appliances. Then use that electric to apply in vernacular Khmer house also equipped with new technology that can control any electronic devices.

KH.8.	
Title	NU Share Destination
Authors	Mr. Poch Kimlong, Mr. Chhoy Ra, Prof. Luy Mithona, Prof. Rachana Chhoeung, Prof. Suon Sivatha
Institution	Norton University
Patent	NO
Description	NU Share Destination is a ride-hailing app that provides a fairer service to both drivers and riders. Using the "Share Destination" feature allows passengers to share the ride with other passengers who go in the same direction. This gives advantages of lowering the ride coast, reducing energy-wasting, pollution factors, and traffic jams.

KH.9.	
Title	NU Website SAKKAL
Authors	Mr. Sreng Ramo, Mr. Nheng Makara, Mr. Theng Soyannpich, Mr. Channy Neat, Prof. Ung Yean
Institution	Norton University
Patent	NO
Description	Our website providing accurate information and research on detailed disciplines from within the university to present accurate, clear, and reliable information. All students can access information quickly and easily, which can reduce expenses and avoid time wasting.

Canada

by

Toronto International Society of Innovation & Advanced Skills (TISIAS)

CA.1.

Title

Write Right

Authors

Mohammadkhaled Feizi, Nezameddin Kharazmi,
Farahnaz Farahmand Mohammadi, Zohreh Masserati
Namini, Maryam Abdollahpour

Institution

WR Edukit Inc. (Write Right)

Patent no.

Patent Granted

Description

Write Right is the completely innovative educational aid based on "Struggling Letters," introduced globally. It is in 2 forms physical package and tech-based Application. This tool aims at resolving the children's writing and reading problems. In this method, kids' mental and psychological states have been considered, and all learning styles are covered. This new approach is gathered in 4 packages and supports young learners learning the alphabet to make sentences. Please visit and download our application on <https://www.write-right.ca/application>



CA.2.

Title

Exclusive machine translation software application for financial services and documentaries

Authors

Chakameh Shadloo, Golnaz Fakhrkazemibajestani, Reyhaneh Delfrouz Abdolmaleki, Elham Garaylikorpi, Seyedeh Atefeh Sadati Sorkhi

Institution

Invesigma Company

Patent no.

Patent Granted

Description

We intend to provide real-time translation software automatically updated for accuracy and transparency, covering cross-language translation. Our application offers accurate translations to avoid regulatory and legal problems. Invesigma has specialized translation services for financial documentaries, contracts, real estate, marketing, and investments. It also helps businesses and customers to extend their markets globally with secure translation. Invesigma acquires Artificial Intelligence and Machine Learning, covers multiple languages, and provides accurate and technically analyzed translation and interpretation without human involvement. This is the only application especially and individually designed for economical, financial, and business-related contexts. We have designed our application to be individually focused on specific financial and economic details and qualities. Invesigma can be used in many markets, such as Banks, business institutes and academies, individual business contracts, real estate agencies, etc. Our software, in general, will provide a comprehensive, accurate, interpreted translation for official financial documents and contexts at an affordable price. We are currently working on other aspects, options, and qualities of our application to make it more practical. Due to the high statistics of business partnerships and real estate sells in Canada with foreign countries worldwide, our software will be used worldwide widely.



China

CN.1.
Title
A driver safety driving system based on the Internet of things
Authors

LIN GUANLUI

Institution

School of Foreign Languages, Guizhou University

Patent

Pending

Description

During many times taking taxis and online appointments, I found that some drivers made many uncivilized behaviors while driving, which seriously affected the safety of passengers and others. In view of this situation, I designed the civilized driving supervision system.

The system is mainly divided into driver side and monitoring side. The driver side is mainly responsible for the collection of video images from network cameras and voice reminder function. The monitoring side is mainly used to monitor the driver side of the car. When the driver is found to have uncivilized or illegal driving behavior, voice reminder is given to him, and when necessary, photograph is taken. Or video evidence collection. The driver's collection function is accomplished by the intelligent network camera. The driver's monitoring terminal is monitored by the intelligent device under Android platform, with a reminder button, which can be remotely reminded by clicking on the button and using the Internet. In addition, the driver can not drive at high speed without wearing seat belts, and voice prompts the driver. In addition, the system automatically recognizes and gives voice warning when the driver tries to hide the camera from surveillance.



CN.2.

Title	Innovative Design of Environmentally-Friendly Electronic Firecrackers
Authors	Siya Wang, Chun-Ying Lee
Institution	International Institute of Knowledge Innovation and Invention
Patent	X
Description	High voltage electricity is utilized to crack and split the air open to create the sound of a gas explosion. This design aims to replace the traditional firecrackers and the original method of applying electronic fire to ignite the electronic firecrackers with built-in oxygen cylinders and gas cylinders.

**CN.3.**

Title	A kind of probiotic protein feed produced by using turmeric and method thereof
Authors	REN YIBIN
Institution	MyDooDoctor Pet Supplies (Shanghai) Co., Ltd.
Patent	ZL201310422512.2
Description	The present invention provides a method for producing probiotic protein feed by using turmeric, comprising the following steps: 1) separation of turmeric fiber and starch; 2) fermentation of turmeric fiber; 3) liquefaction and saccharification of turmeric starch; 4) preparation of

probiotic protein feed. Firstly, the starch and fiber in turmeric are separated by mechanical method, and fiber residue containing cellulase and bacterial protein was obtained by using solid state fermentation. After liquefaction and saccharification, the turmeric starch milk is used to cultivate probiotics—— *Saccharomyces boulardii* and *Lactobacillus acidophilus*, then the cellulose fermented product and the probiotic cultures are thoroughly mixed to obtain a cellulase-containing probiotic protein feed. The probiotic protein feed obtained by the above method is applied to producing pet food, and the obtained full-price cat food not only helps pets to digest and absorb, but also protects intestinal health, improves the production efficiency of turmeric, reduces emissions and pollution during the process of turmeric saponins.

CN.4.	
Title	Qudingzhi, development and industrialization of an antibacterial and antiviral loquat leaf extract and key ingredients
Authors	Dandan Mao, Fenfen Huang, Yongnan Fu, Xiao Wang
Institution	Shanghai Likang Biological Hi-tech Co.,Ltd.
Patent	ZL201110321847.6 CN201680015847.4
Description	For COVID-19, how to establish effective protective barrier of individual upper respiratory tract in early stage is very important. Qudingzhi means to prevent viruses from absorbing cell mucosa, reduce the number and activity of viruses, and eliminate viruses contaminated on the mucosa. The key ingredient of this project is triterpenic acids from loquat leaf. Its preparation method is simple, low preparation cost, conform to the requirements of the industrialized mass production, and the preparation of triterpenic acid extract can reach more than 60%, and the color is light yellow. Sumieling, containing triterpenic acids from loquat leaf, can quickly remove and reduce the accumulation of various pathogenic bacteria in oral cavity and nasal cavity, and have a long-term bacteriostatic effect. It can comprehensively adhere, capture, filter and clean the inhaled air particles in nasal cavity, and at the same time relieve inflammation and reduce the infection rate of virus and bacteria.

CN.5.	
Title	Youluoshaxing Exploding pearl mouth fragrant pills
Authors	Yongnan Fu, Fenfen Huang, Dandan Mao, Xiao Wang
Institution	Shanghai Likang Special Medical Pharmaceutical Co., Ltd.
Patent	ZL201410168022.9
Description	To practice the concept of "preventing disease", a new concept of eliminating oral <i>Helicobacter pylori</i> from the mouth and stomach was proposed to eliminate the breeding site of pathogenic microorganisms and cut off the transmission route, so that infection could be controlled from the source.
CN.6.	
Title	Youluoshaxing Oral antibacterial gel
Authors	Dandan Mao, Fenfen Huang, Yongnan Fu, Xiao Wang
Institution	Shanghai Likang Biological Hi-tech Co.,Ltd.
Patent	ZL201410168022.9 ZL201410168319.5 ZL201410168303.4 ZL201610703301.X
Description	The antibacterial rate of the product to <i>Escherichia coli</i> and <i>Staphylococcus aureus</i> is >99%. The product contains herbal antibacterial ingredients: (1) Glycyrrhizin: it has good antibacterial activity to <i>Escherichia coli</i> and <i>Staphylococcus aureus</i> . (2) Tea polyphenols: it can regulate immunity and inhibit <i>staphylococcus aureus</i> and <i>Escherichia coli</i> . (3) Ocymen-5-ol: it has the function of anti-dental plaque, refreshing breath and keeping gingival health.
CN.7.	
Title	Youluoshaxing oral spray
Authors	Yongnan Fu, Fenfen Huang, Dandan Mao, Xiao Wang
Institution	Shanghai Likang Special Medical Pharmaceutical Co., Ltd.
Patent	CN201510300920.X, CN202010574273.2 CN202111263649.9
Description	The process of this product is a food-grade oral spray, containing three important ingredients: natural menthol, licorice extract, sodium hyaluronate. It can freshen breath, remove bad breath and avoid social embarrassment, inhibit inflammatory reactions, soothe gums, repair oral mucosa and improve oral environment.

Croatia

Represented by
CROATIAN INVENTORS NETWORK

HR.1.

Title
Authors
Institution
Patent no.

HEEL AND FOOT REPAIR BALM with Shea Butter
MIRJANA BRLECIC
PRIRODA LIJECI d.o.o.
trade mark: HR - Z20131494

Deeply moisturises and regenerates the skin. Helps remove dead skin cells (hardened skin on heels and feet). Also suitable for dry skin and can be used by diabetics. Absorbs instantly.

Health and beauty advice
MASSAGING YOUR FEET WITH THIS BALM WILL RESTORE ENERGY AND ALSO LEAVE YOUR TOES FEELING RELAXED AND SOOTHED.

Description

Use

Before going to bed, apply a thin layer to clean, dry feet, paying special attention to areas prone to calluses and hard skin. Hard skin, calluses, dead skin cells and various forms of thick skin on heels and feet not only look unattractive, but they also prevent you from feeling relaxed.

Result

Soft feet, hydrated skin. Reduced calluses and hard skin.



HR.2.

Title AR Smart Name Tag
Authors TOMISLAV BRONZIN
Institution CITUS d.o.o.
Patent no. Patent application

Description

Innovative IT platform that provides information about any person in a room/hall/playground etc. without the need for them to wear a visible name tag. The mobile application provides a name tag in augmented view on a screen of a mobile device (phone, tablet, smart glasses, etc.) and, if that person allows it, it does not provide only the name of the person, but much more (registration, COVID 19 status, classified information, fields of interest, etc.). AR Smart Name Tag can be combined with a wireless tag to enable the guidance to a person's location in a room with the small cloud/flag (above that person's head) containing the person's name or showing all the people belonging to a specific group (speakers, security, press, dentists, etc.).

Class

10

**HR.3.**

Title MEASUREMENT EQUIPMENT AND METHOD FOR THE SIMULTANEOUS DETERMINATION OF THERMAL RESISTANCE AND TEMPERATURE GRADIENTS OF LAYERS OF CLOTHING COMPOSITES

Authors DUBRAVKO ROGALE, SNJEZANA FIRST ROGALE, ZELJKO KNEZIC

Institution University of Zagreb Faculty of Textile Technology

Patent no. Industrial property P20211208A

INTERNATIONAL EXHIBITS

The thermal properties of clothing in most products are still not designed according to engineering science for most products due to the lack of simple and acceptable measuring equipment and methods, so the number of layers of clothing, the type of thermal insulation material and their thickness are chosen empirically. A new measuring device and method for simultaneous measurements in determining the thermal resistance in one or more layers of clothing compo-sites and temperature gradients of composite layers are presented, as well as the theoretical principles of operation and practical results.

Description

Clothing technology does not have a long tradition of measurement and metrology techniques needed to test the properties of materials required for the technical design of garments. Therefore, the introduction of a new measurement method for the simultaneous measurement of thermal resistance and temperature gradients is an important novelty for the field of clothing engineering. The novelty is that the measurements of two important parameters for the design of the thermal properties of clothing and of composite clothing (thermal resistance and values of temperature gradients) are carried out simultaneously with one measuring system.

Class

9



HR.4.

Title

THE BOOSTER FOR REMOVAL OF SPECIFIC STAINS FROM TEXTILES

Authors

TANJA PUSIC, KATIA GRGIC

Institution

University of Zagreb Faculty of Textile Technology

Patent no.

Patent Application

Description

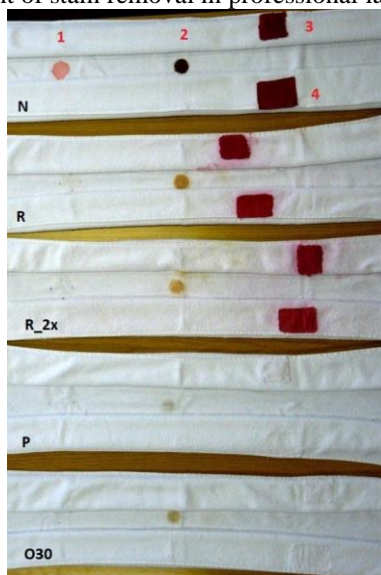
Numerous agents for stain removal from textiles in professional and household conditions are represented on the market. The offered range of products does not meet the

expected requirements in removing of specific contaminants from body care products, UV creams and shower gels containing polyquaternium. It is not possible to remove them with regular washing procedures at temperatures from 20 to 90 ° C. Additionally, the intensity of soiling from the mentioned multifunctional preparations in the washing is deepened. Their removal requires post-treatment with special reductive agents, of which powdered sodium dithionite ($\text{Na}_2\text{S}_2\text{O}_4$) powder is most commonly used at elevated temperatures.

Given that modern washing technology is based on lower temperatures and the use of liquid agents, a liquid booster based on sodium dithionite with specific properties has been developed, which is reflected in the stability and efficiency at lower temperatures. The effectiveness of liquid booster in laboratory conditions on stubborn specific stains from shower gels, UV cream, iron-rich soil, wellness mud and red shade on cotton textiles is presented.

A novelty is the innovative and stable booster for after-treatment of cotton textiles with specific stains, which has the potential for application in professional conditions.

Improvement of stain removal in professional laundries.



HR.5.

Title **MV-3 - COUNTER TERRORISM ROBOTIC SYSTEM**
Authors VJEKOSLAV MAJETIC
Institution **DOK-ING d.o.o.**
Patent no. Patent Application

Description

The MV-3 is a multi-mission vehicle intended for support in counter terrorism, hostage and other crisis tasks and missions. Counter terrorism interventions pose significant threats to tactical teams due to limitations of personal ballistic protection. MV-3 gives the tactical team possibility to use the system with or without the tactical team, which allows the flexibility and modular approach without necessity to put tactical members in harm's way.

<https://youtu.be/4mFk0fwCAWA>

Class

4

**HR.6.**

Title **MD – LOCAL MUST**
Authors KRESIMIR CICKOVIC
Institution **OPG Kresimir Cickovic**
Patent no. Industrial Design

Description

Must is a fresh non-alcoholic, non-carbonated beverage obtained by pressing healthy and mature grape beans. It is characterized by a special fullness and harmonious taste. This quality sweet drink is considered extremely healthy due to the richness of ingredients since the grapes abound in

numerous medicinal substances that remain preserved in the must even after pressing.

Grapes as a berry fruit of the vine represent a food of great nutritional and dietary values and are recommended in the diet of all age groups. Being distinctly nutritious food, grapes are also a great source of various minerals and vitamins and since they contain about 20% grape sugar (average amount), they are considered an energy-rich food.

Considering that the essence of bean grapes is in the bottle of homemade must, we might say that a liquid elixir of youth and beauty is found in the heart of Slavonia's Golden Valley (Vallis Aurea).

Enjoy it with all your senses! Best served cold! Store in a dark and cool place! Gluten free and vegan friendly!

Due to the process of making – COLD PRESSING – Must Domestic is a freshly pressed and naturally sweet* grape juice. *No sugar added. No water added.

Class

3



HR.7.**Title** **ELECTRIC GLOVE STUN GUN****Authors** Author: DOMINIK DESPOT, Mentor: Danijel Eskericic**Institution** **School of Electrical Engineering Zagreb****Patent no.****Description**

An electric stun gun is a type of non-lethal weapon designed to deliver a direct electric shock to an attacker in order to temporarily disable them. It has a wide range of uses, but it's mostly used for self-defense. The electric glove stun gun is designed to work covertly hidden inside a glove, activated by pushing the middle and ring fingers together when the main power switch is down. Upon activation, an electric arc breaks down air and creates lightning which takes the voltage up from ~3.7V (supplied from a lithium-ion 18650 battery) to around 20kV. While active, it produces rapid electric pulses of 20kV and is very effective against flesh targets. The voltage is stepped-up by a flyback transformer circuit.

Class

12

HR.8.**Title** **REACTION SPEED TRAINING DEVICE IN MARTIAL SPORTS****Authors** Author: TIN STANISAK, Mentor: ZELJKO SITUM**Institution** **Faculty of Mechanical Engineering and Naval Architecture Inventors Organization****Description**

A technical device has been developed to train the speed of reaction to visual stimuli in martial arts, which is especially important for taekwondo competitors. The beginnings of martial arts according to ancient records go back to the distant past and their primary purpose was self-defense through the application of fighting techniques only with bare hands, without using any type of tool or weapon. In recent decades, martial arts have become very popular because of their commercial potential through competitive forms of entertainment for the general public. Improving motor skills in early childhood through goal-oriented play activity such as reaction speed, agility, strength, precision and endurance in martial arts can be achieved using a technical device that practitioners use during training. The device uses impact surfaces randomly actuated by pneumatic actuators, and due to the compressibility of the air, the risk of injury to fighters

INTERNATIONAL EXHIBITS

is reduced.

Pneumatic high-speed cylinders and solenoid valves were selected for the realization of the training device, and the Arduino Uno microcontroller was used to control the valves. The program code can be easily changed and adjusted, which gives the device additional flexibility in the application of training in sports halls.

Class

13

HR.9.

Title

ELECTRIC GLOVE STUN GUN

Authors

Author: DOMINIK DESPOT, Mentor: Danijel Eskericic

Institution

School of Electrical Engineering Zagreb

Patent no.

Description

An electric stun gun is a type of non-lethal weapon designed to deliver a direct electric shock to an attacker in order to temporarily disable them. It has a wide range of uses, but it's mostly used for self-defense. The electric glove stun gun is designed to work covertly hidden inside a glove, activated by pushing the middle and ring fingers together when the main power switch is down. Upon activation, an electric arc breaks down air and creates lightning which takes the voltage up from ~3.7V (supplied from a lithium-ion 18650 battery) to around 20kV. While active, it produces rapid electric pulses of 20kV and is very effective against flesh targets. The voltage is stepped-up by a flyback transformer circuit.

HR.10.

Title

VALORIZATION OF SALT SLAG FROM ALUMINUM RECYCLING

Authors

assist. prof. Marin Kovačić, PhD; prof. Ana Lončarić Božić, PhD

Institution

University of Zagreb, Faculty of Chemical Engineering and Technology, Zagreb

Patent no.

Description

Salt slag is a by-product of aluminium recycling, classified as a hazardous waste (10 03 08), consisting mainly of chloride salts and alumina. Effective reuse of salt slag has economic and environmental benefits. Herein we present a sustainable technology based on the selective extraction of the salt slag constituents in suitable liquid phases and

recovery of heat and chemicals used in the process.

Advantages:

Valuable resources are extracted from salt slag, which can be reused in the production of secondary and primary aluminium. The amount of hazardous waste is significantly reduced. The liquids used to extract salt slag constituents can be effectively recycled and the heat used for their recovery can be recuperated for continuous operation. By means of effective heat and chemical recycling, the operating costs are significantly reduced and are only a fraction of aluminium recycling.

Purpose:

Reduction of hazardous waste, recycling, production of secondary and primary materials, circular economy.

Class

9

India

IN.1.
Title
AirBook
Authors

Srikar Rama, MD Azharuddin

Institution
AirBook / Sreenidhi institute of science and technology
Patent no.

-

Description EN

AirBook is a portal where students can access study materials like ppts, assignment questions, archived question papers up to course duration (Btech:4years, MBA:2years...etc). This portal helps the learner to learn more efficiently, effectively, flexibly and comfortably. Architecture flows along the hierarchy of roles i.e Super-admin, Admin (Head of Department), Co-ordinator, Faculty, Student. Data is uploaded by the faculties of a college. AirBook simplifies the individual workflow based on hierarchical roles. The student can view, download and share the study materials from the portal. AirBook leverages the cost benefit of a college by using each faculty's google drive of organizational email for storing the uploaded files, this is how the maintenance cost of the database is nullified. Portal can be used by N number of users and no restriction to storage limit. These features and service cost differentiate us from the other LMS (Learning management system) providers.

Class no.

10


 The logo for AirBook, with 'Air' in orange and 'Book' in black.

Indonesia

Represented by

Indonesian Invention And Innovation Promotion Association (INNOPA)

ID.1.

Title

“rempahnft.store” Marketplace of NFT Equity Crowd Funding for Herbal Ammunizer Covid 19

Authors

Zidni Kanzal Fikri, Muhamad Sofyan Sabili Rosad, Waqiatul Mubarakah, Saniatul Khafshoh, Muhammad Gilang Ramadhan, M. Bustanul Arifin Robitulloh

Institution

MA UNGGULAN SINGA PUTIH, INDONESIA

Patent no.

In Progress

Description EN

WHO declared Covid 19 as International Public Health Emergency and Transmission of 2019-nCoV has attracted global attention. The use of traditional medicinal herbs for health maintenance, disease prevention, and health care including during public health emergencies. Herbal (herbs) plants have long been shown to increase the body's year power against disease. Compounds of andrographolide, quersetin, xanthorizol, allicin, allylactic acid, pilatin, curcumin, 6-shogaol, limonene, cinnamaldehyde, and thymoquinone have been known to inhibit the growth of Covid 19. The booming popularity of NFT as a digital asset for works of fine art and design until the track record of social media as an entity transacted in the internet universe, lately quite popular. With a simple scheme to minting, developing wallets and exchanging transactions, this convenience occurs. This research aims to utilize NFT as a digital asset of stores that sell Indonesian spices that are needed in the world in the field of food and health as amunizer Covid 19. Especially 11 Nusantara's spices namely *sambiloto* (*Andrographis paniculata*), *kelor* (*Moringa oleifera*), *temulawak* (*Curcuma xanthorizol*), *bawang putih* (*Allium sativum*), *strawberry* (*Fragaria virginiana*), *meniran* (*Phyllanthus niruri*), *kunyit* (*Curcuma longa*), *jahe* (*Zingiber officinale*), *jeruk bali* (*Citrus maxima*), *kayu manis* (*Cinamomum burmanii*), and *jinten hitam* (*Nigella sativa*).

Class no.

4: W Medicine - Health Care - Cosmetics



ID.2.**Title**

Clove Leaf (*Syzygium aromaticum*) Essential Oil : A Novel Alternative Treatment for Diabetes Mellitus

Authors

Aizar Vesa Prasetyo, I Gede Krisna Arim Sadeva, Putu Sinta Elix Wahyuni, I Gede Aswin Parisya Sasmana, Putri Ayu Wulandari, Desak Made Wihandani

Institution

Udayana University

Patent no.

-

Description EN

DiaClove, an alternative medicine for diabetes mellitus in the form of local ingredients, essential oil from clove leaves in capsules and drops. Clove leaves are obtained and selected directly from tropical clove farms in Bali, Indonesia to ensure the best raw materials in making the product. The clove leaves are then processed and the essential oil isolated. These essential oils are rich in ingredients that are beneficial for the body, including eugenol as an anti-diabetic agent. The potential of eugenol in clove leaf essential oil in lowering blood glucose has been investigated in this study using alloxan-induced type 1 diabetic Wistar rats as the sample. In addition, this product has also been tested to repair the destruction of pancreatic beta cells, thereby contributing to increased insulin secretion. This essential oil is then processed and formed into a suspension with the antacids in DiaClove. This suspension can increase the comfort and safety of the user in consuming it in terms of smell and taste because of the potential for antacids that can reduce the acidity of the essential oil without reducing the effectiveness of the essential oil. DiaClove is available in modern preparations that make it easier to use, both for children and adults. Preparations in gelatin capsules and drops have been formulated with adjusted dosages and contents. With its excellent potency plus modern and easy-to-use preparations, DiaClove is highly recommended as novel therapy from natural ingredients to lower blood glucose level in patients with type 1 diabetes mellitus.

Class no.

4



ID.3.**Title**

ULSC Website and App Prototype

Authors

Adil Tigo Abdillah. Dhifah Amaliyah

Institution

Fakultas Ekonomi Universitas Negeri Semarang

Patent no.

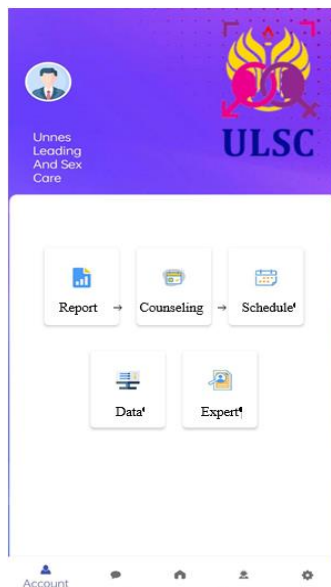
-

Description EN

Unnes Leading and Sex Care (ULSC) Website and App is to concern more about any harassment victim in the business and organization. Usually, the victim feels tougher as a worker and then explores it from the Human Resource Management field. So, this application will be useful for solving the incident that happened in the businesses and benefit both from the workers or victims, the board of committee, the science of human resource management, and another involved science that may need the data and research like psychology, IT, and Law. So that, other scholars now and in the future are able to improve and complete more the study about leadership, and can be used as indicators and decision-making tools for a manager or the board of committee to easier know and control if there is any toxic manager in the businesses

Class no.

10



Iran

By ANIA Association

IR.1.

Title	Laboratory diagnostic kit for cutaneous leishmaniasis with doorless microtubules
Authors	Mehran Bakhtiari , Alireza Salmani, Nazanin Jabbari Gizil Gechi, Mohammadmahdi Azizollahinemat, Milad Teimourian, Fatemeh Kamaei
Patent	104947- Date:2021-8-2
Description EN	<p>Laboratory diagnostic kit for cutaneous leishmaniasis is used molecularly for medical and parasitological tests, which is very fast, cost-effective. Cutaneous leishmaniasis (leishmaniasis) is considered as one of the health problems in the world, so that new cases affect more than one and a half million people annually and about 350 million people are infected. Is Leishmania. Due to the time consuming and also dangerous other methods of identifying this parasite, we decided to invent this kit. Nowadays, molecular methods such as PCR are widely used to determine the small amount of parasites in chronic Leishmania wounds and to determine the species. Leishmania detection kit by PCR method is a product that consists of several separate solutions. It is detected by PCR method and using these materials Leishmania is a cheap, safe, fast and accurate method for detecting Leishmania according to the work plan. This kit includes a vial of extraction material (copolymer styrene-de vinyl benzene sulfone) and a 4-channel microtube designed to hold distilled water and master mix and primer in the installed wells. The general feature of this kit and the innovation of this kit in their microtubes are To open the lid, all the solutions will be poured from the well to the bottom of the microtube due to the lack of vacuum conditions.</p> <p>High sensitivity; DNA purity; Short extraction time; High accuracy in performing experiments; High test speed and no reaction of materials in a long time; Do not use harmful substances</p>

IR.2.

Title	Design of Rehabilitation system with remote control capability
Authors	Hajar Sadeghi, Alireza Salmani, Seyed Reza Mousavi, Maedeh Fakhroddini, <i>Leyla Hasangholizadeh</i>
Institution	University of Social Welfare and Rehabilitation Sciences,

Patent	<p>Tehran University of Medical sciences, Ardabil Islamic Azad University, Iran University of medical sciences</p> <p>Patent application No. 14628408389487</p>
Description EN	<p>This invention is associated with power systems in different parts of the body, such as hands, feet, waist, knee, elbow and head, with heat therapy, cold therapy of temperature control, control of fingers, controlling fingers, magneto therapy and rush therapy and motion modification The finger is applied. Also, in order to prevent the complications of potential damage and control of these injuries in patients with sensory deprivation and other people such as tennis, gamers and ordinary in the community. One of the stages of treatment before complete recovery is rehabilitation or rehabilitation of the lost force, which is done in different ways. One of the major methods of rehabilitation is physiotherapy, which is widely used as a clinical unit to rehabilitate the lost force. The intelligent rehabilitation system, which is designed to be portable, acts like a physiotherapy center and rehabilitates the lost force. The smart system generally consists of a processor, monitor and rehabilitation elements, recharge ability, remote control and a user control panel that is portable and programmable. It is used to rehabilitate hand muscle strength and stimulate muscles, increase blood circulation and reduce inflammation in the area, which with the solution of this system can be effective in controlling these complications. With the mass production of this system, we can help patients to prevent and control problems in this field and the daily stresses of people to relieve daily fatigue and stress, both in patients and ordinary people in the community.</p>

IR.3.	
Title	Tools to stimulate and reinforce the muscles of the oral area
Authors	Seyed mohammad mahdi Zare, Donya Khoobani, Sara Abedini baghbadorani, Mohammad erfaneh Bagherian rafsanjanipour, Atefe sadat Masoumi, Seyed arash Dashti
Institution	-
Patent	In iran:105297
Description EN	<p>In the rehabilitation of people with swallowing disorders such as those who have had a stroke, people with cerebral palsy, TBI, etc., it is necessary to stimulate the intraoral senses and reinforce the muscles in this area. Due to the neuroplasticity of nerves, sensory stimulation improves intraoral sensations. It significantly reduces the risk of aspiration. In people with</p>

swallowing disorders, the muscles of the oral area are usually weak and need strengthening for a better swallow.

At present, sensory stimulation and strengthening of the muscles of the oral area are done with simple tools such as abslang and cause problems such as fatigue in therapists and clients.

The purpose of this invention is to integrate and automate these processes.

This device uses the heat module, the cold module, the interchangeable heads, and the vibrating motor to create sensory stimulation and improve the swallowing disorder of the clients.

Depending on the needs of the client, the therapist can select one of the interchangeable heads of devices and perform sensory stimulation with higher quality.

In strengthening the muscles of the oral area, using robotic arms, the therapist can perform the necessary interventions.

IR.4.

Title

Washing injuries device

Authors

Amin Shabanpour Moghaddam, Mahdi Mousavi Khosravi, Mahboubeh Zarei, Shila Yeganeh Vala, Seyed Ali Akbar Hosseini

Patent

In Iran 99537

Today, all around the world the wounds are washed by connecting Irrigator to Sodium Chloride-Irrigation by the hand pressure.

There are some problems with this method.

The flow rate and splash type according to the size of serum cannot be controlled. Moreover, the serum temperature cannot be controlled in city ambulances during cold seasons.

Furthermore, there is difficulty with washing wounds of people with neck and spinal column trauma.

Description EN

The device is made of two powerful Peristaltic pumps which are capable of steady pumping fluid to the last drop. (Flow rate is controlled). According to the place and depth of wound and foreign particles the type of splash is changeable to three modes (Spray/Jet/Mild jet). Serum temperature changes to the needed level by using a sensor, screen and heating elements.

Nozzle head can be separated from the device and wash individually. Multi-mode light of the device is used for lighting wounds at night.

Lithium batteries provide power bank in long operations.

The unique design of the device leads to the user's convenience

IR.5.**Title**

Device to Prevent the Protrusion of the Extensor Muscles and Maintain and Control the Range of Motion of the Head, the Spine and Shoulder Joints in Children

Authors

Elham Seihei, Alireza Mollaei Barejahri, Narges Seihei, Mohammad Hajizadeh, Zahra Fathiasl, Sajjad Fathiasl

Patent

In Iran: 74610

**Description
EN**

The protrusion of the jaw and tongue are the most common abnormal oral-motor patterns in infants and children. These patterns occur with the onset of movement in children and are followed by protruding extensor muscles. This problem is common in children with cerebral palsy, Down-syndrome, dysarthria and children with extensor muscle protrusions causes a lack of speech production, swallowing and eating dysfunction, drooling, and other disorders.

In order to use this device, the child should lean on it and maintain the device above their forehead and chin. It has two electrodes for electrical stimulation, which can help strengthen muscles through a functional faradic current. These electrodes are placed on the muscles of the head and neck. This action will strengthen the muscles and improve the autonomic movements of the head and neck. Two vibrators are placed on the upper part of the shoulders and both the neck. Additionally, the vibrators used in the device can generate electrical stimulation.

This device can have many benefits for both the doctor and the patient, such as Preventing the extensor muscles from protruding, maintaining and controlling the range of motion of the head, spine, and shoulders are possible without the presence of a therapist and... This device can prevent the protrusion of the extensor muscles and maintain and control the motion range of the head, the spine, and the shoulder joints in children, and can put the mind of many parents at ease.

IR.6.**Title**

The device of palpable and oral motor stimulations with capability of active and passive movements of tongue, thermal and vibrational changes at all ages

Authors

Ali Asghar Zabihi, Mahdi Zabihi

Institution

AVAAJANG GOSTAR SASUYEH

**Description
EN**

Nowadays, numerous people all around the world, due to the oral sensory problems, weakness and abnormal musculoskeletal, neuromuscular disease, developmental delays,

brain and spinal injury need to manual therapy and appliances for treatment of rehabilitation specialists into daily order or even several times during a day. The outbreak of covid-19 lead to reduce the number of patients referring to rehabilitation centers. Delays in treatment can increase problems such as dysphasia, apraxia, dysarthria and speech problems. This expression is used to strengthen and increase the resistance of the tongue muscle to swallow, chew and improve speech clarity in children and adults with neuromuscular problems and sensory-motor disabilities, etc. people with articulation disorders can learn the correct pronunciation of consonants of through several parts of these tools. This device has other parts for heat, cold, vibration stimulation, active and passive tongue, internal mouth muscles, lips, soft palate and hard palate. This tool is for people with stroke, speech production disorders, people with intraoral muscle weakness, stroke, spinal cord injuries, patients with motor neuron disease such as ALS, dysphagia, cerebral palsy, down syndrome, MS, speech and language delay, apraxia and Speech dysarthria, hearing loss, cleft lip and palate, etc. can be used. The device heads for any disorder are different according to the expert diagnosis. It can be used in rehabilitation clinics, hospitals, at home and telemedicine. This tool is light, compact, portable, reasonably priced and usable for all ages and is now produced and sold.

IR.7.**Title****Electromagnetism desalter****Authors**

Sajjad Khodayari, Roksana Poodat, Seyed Sajjad Fatahian, Mina Khodayari, Hossein Salmanvandi

Institution

Gachsaran Oil and Gas Exploitation Company, South Oilfields, Iran

Patent

139450140140003003640

Description**EN**

In the current method, the optimal desalination process requires very high costs. Including the import of chemicals such as suspension breakers, which are very difficult to prepare and costly in the current context of sanctions. Therefore, by designing and manufacturing this type of equipment, while separating saline water from crude oil, it is very cheap and uncompetitive compared to the current conditions. Other benefits include reducing chemicals consumption, fresh water, environmental harms, etc.

Iran

By IRTI – Iranian Top Inventors

IR.8.

Title

Synthesis of Diamondoids Through Recrystallization of Laminar Carbon Obtained by Renewable sources

Authors

Anita Setareh, Amirsoheyl Pirayeshfar

Institution

Solaleh High School, Karaj, Iran

Description EN

Diamond as one of the structures of Carbon, with high physical and mechanical properties which obtains as a mineral around volcanos during many centuries, have been using as an ornamental rather it would be used within industries such as stonecutting. Most popular diamondoids as most similar structures of Diamond are Adamantane, Diamantane, Triamantane that could be synthesized through acid and base solution. Natural synthesis of Diamond with lower weight than 1 carat and volume of 0.4-1(mmc) through nature could be as many years as a long process. But within this project, using graphite obtained by burnings of natural fibers to reach the graphene as a laminar structure of carbon and also recrystallization method as a template process like recrystallization of sugar hydrocarbons obtain to new carbon structures like diamondoids in a short process. Following the aim, during Hummer's Method, first graphene within ice bath using sulfuric acid changed to graphene-oxide which has high reactivity due to oxygen bounded groups on carbon layers. The product as a paste has also high electrical conductivity, therefore it can be used to produce batteries. However, recrystallization of paste under microwaves within 300-30,000 (GHz) radiation through microwave or induction ovens can change configuration of laminar carbon to polygon structure and increase of volume. Note that, precautions like using gloves, safety glasses and mask are very important due to burning characteristic of sulfuric acid and etc.

IR.9.

Title

Investigation of the Effect of the Catalyst with Two Types of Natural and Chemical Catalysts of Calcium Hydroxide in the Production Process of Biodiesel from Pine Cone Oil

Authors

Armita Kianimehr, Mahdiye Moradkhani, Narges Ahmadaghaei

Institution

**Solaleh High School, Karaj, Iran
Research Center Karaj Moallem1, Karaj, Iran**

Description

Due to the development of countries in the world, energy is

EN one of the most critical indicators in countries' economic cycles. Therefore, energy production and consumption in the world have also had an increasing trend. Current energy consumption in the world has faced human beings with two major crises of environmental pollution caused by fossil fuels and depletion of oil resources. Considering the above reasons, from an economic point of view, preserving existing resources and reducing environmental pollution, achieving renewable resources with less pollution instead of oil resources is essential. One of these alternative sources is biodiesel. Biodiesel is obtained from natural and renewable sources such as vegetable oils and animal fats. In this project, by producing a kind of biodiesel fuel, many damages that most fuels cause to the environment and humans are prevented, and also biodegradable fuel is produced by using pine cone oil and natural eggshell catalyst, and the impact Chemical and biological catalysts are examined in its production process. Also, due to the fact that pine cone is a waste and has no role in human nutrition, it is the best option for extracting oil compared to other plants.

IR.10.**Title**

Novel Synthesis of Glucosamine Nanoparticles from Shrimp Shell Waste

Authors

Mehrad Aghahakim, Radin Akbarisadat, Roham Sabet, Kiavash Naghib Lahouti, Seyyed Saber Mirhosseini

Institution

Atarod Elm High school, Tehran, Iran.

Description**EN**

D-glucosamine ($C_6H_{13}NO_5$) or 2-amino-2-deoxy-D glucose is an amino sugar naturally present in human body and crustacean shells. Glucosamine in the form of glucosamine sulphate, glucosamine hydrochloride, or N-acetyl-glucosamine is extensively used as a dietary supplement in the treatment for osteoarthritis, knee pain, and back pain, and a critical evaluation indicated that glucosamine is safe under current conditions of use and does not affect glucose metabolism. The use of chitin as raw material to obtain glucosamine hydrochloride at laboratory level was investigated. Chitin was extracted from shrimp shells by deproteinization, demineralization and depigmentation. The raw material was first submerged in 10% (wt) NaOH solution for 2 h with constant agitation to remove proteins. The deproteinized material was then demineralized using 5% HCl solution for 5 h and produced chitin. Afterwards, glucosamine hydrochloride was produced in four main stages: (1) acid hydrolysis of chitin with 37% hydrochloric acid using with

solid/liquid ratio of 1:20; (2) then combined with water and activated carbon filtration of the solution to discard solid impurities; (3) recrystallization of the product using 95% ethyl alcohol as solvent, and (4) filtration, washing and drying of final product at 50 °C. The FTIR spectrum of the glucosamine hydrochloride of 99.86% purity, was obtained. Although, it is possible to convert waste materials into valuable products such as glucosamine, more experimental work should be carried out to optimize the process.

IR.11.**Title**

Pharmaceutical Checker with the Ability to Prevent Medication Errors

Authors

Mohammadmasoud Mahmoudi, Fardin Rastegar, Parnia ToudehFallah, Pouyan Ghorbani, Dorsa Mardahi

Institution

Islamic Azad university of Semnan, Semnan, Iran.

Islamic Azad University of Qazvin, Iran/IRTI

IR 101244

**Description
EN**

Today, one of the biggest problems of the medical system in the whole world is medication errors that cause financial and human losses and prolong the duration of treatment and cause a waste of time and money. The purpose of designing a drug checker is to prevent these drug errors, their irreversible effects, and reduce the workload of the medical system. According to the designed memory, the patients' medication file is transferred from the hospital system to the device memory (It is Intra-network connection and also by Wi-Fi). According to the file, the drug is released from the drug container and by placing it in the places embedded by the sensors, the name, expiration date and dose of the drug are checked and then it comes out of the checker and placed in its special containers. Based on the drug database available on the memory, the device checks the patient file then appears the necessary points on the screen. Depending on the location of the fingerprint embedded on the screen, the person who is responsible for the drug is identified and actions are recorded in his or her name. Also, the shortage of drugs is displayed on the screen, and to replace medications, first the drug is checked by a barcode reader, and with flashing lights, the correct location of the drug is displayed and the mechanical lock of the desired location will open, so the drug is placed in its correct place. For emergencies situations such as power outages, an emergency power motor and a release key are also provided that allow easy access to medicines. In addition by installing an air conditioner, favorable conditions for storing medicine are also provided.

IR.12.**Title****Production of Preservative and Biodegradable Film Using Chitosan Nanoparticles and Marjoram and Thyme for Food Packaging****Authors**

Tara Sadat Fakhr Tabatabaei, Narges Sadat Hosseini, Mobina Moradi, Marziyeh Azadfalah, Zeinab Vafadari Mehrizi

Institution

Saba Highschool, Tehran, Iran

**Description
EN**

The food packaging industry is one of the most critical industries. Plastic packaging is more commonly used. These plastics are made from crude oil, which is a chemical, so they are harmful to packaged foods. Plastic also takes millions of years to decompose, causing environmental degradation and damage to the Earth's ecosystem. One of the most critical problems in today's world is the ecological crisis. One of the reasons for this crisis is the excessive use of non-degradable plastics. Scientists are trying to reduce the use of this harmful substance by replacing other materials with plastic. In this project, a preservative film was made using chitosan nanoparticles and extracts of thyme and marjoram plants. The film is biodegradable and does not damage the natural texture of the environment. Its antibacterial structure prevents the entry of contaminants; Efforts have also been made to make a high-strength film. First, equal amounts of thyme and marjoram were poured into separate Erlenmeyers and mixed with 40 ccs of 96% alcohol and some boiling water. Two containers on a magnetic heater for a few minutes. Next, to prepare the chitosan nanoparticle composition, 0.5 g of the nanoparticles were mixed with vinegar acid, diluted with distilled water, and stirred. To produce thyme and marjoram extract 2 grams of starch were poured into 50 ccs of water and placed on a magnetic heater until the mixture became clear. Then 1 g of PVA was mixed in 50 ccs of water. Extracts of thyme and marjoram were separated using a funnel and filter paper. In the last step, when preparing all the materials needed to make the retaining films, 5 Petri dishes were placed for the film samples, and each sample was numbered. Finally, all samples were exposed to the same conditions and temperatures and dried after two days. After the samples were dried, they were tested for strength, degradability, and antibacterial properties.

IR.13.**Title****Production Silica Nanoparticles with Appropriate Functional Features Using to Ash Obtained from Horsetail Plant****Authors**

Amirhossein Vasheghani Farahani, Arvin Ashjaee, Seyyed Saber Mirhosseini

Institution

Allameh Tabatabaei Junior Highschool, Tehran, Iran.

**Description
EN**

Today, need to produce ecofriendly nanoparticles using synthesis methods, without the need for poisonous and dangerous chemical matters. Several environmental Pollutions such as chemical and

physical can be caused as a result of So many chemical procedures which are required in producing Nano particles. In recent years in addition to the use of genetic engineering and production of pest resistant transgenic plants the synthesis of Nano metals using plants extract because of low risks on environment and biosafety. Plants extracts contain regenerative substances that when salt Metal is exposed to it, it reduces them to metal ions. One of the important metal oxide in industrial is silicon oxide. A number of plants, seaweeds and animals can store silica in their texture (Mainly in the form of nanostructures) this type of silica is known as bio genetic silica. On the other hand, biomass has the ability to accumulate large amounts of silica and therefore the biomass of plants can be Used to produce silica nanoparticles. The species of equisetum are known as plants with high accumulation of silica. These plants are compared to Many other plants store silica in the form of hydrated amorphous silica. Due to the presence of silica bumps on the body of these plants, equisetum species were used to polish metal plates and tin products in the past. It is possible to obtain silica with 25% of the plant's dry weight in these plant species and the amount of It depends on the climatic conditions and soil used for plant growth. In addition to being a suitable resource for extraction of silica nano particles, horsetails are also used for their anti pain, anti inflammatory, hepatic protection and anti fungous characteristics. Moreover, synthesizing Nano particles using plant extracts is inexpensive, simple and eco friendly.

IR.14.**Title**

Study of Corrosion Resistance Coating Reinforced with Carbon Nano Tubes (CNT)

Authors

Iliya Vahedi, Mohammad Hasannejad , Seyyed Saber Mirhosseini

Institution

Allameh Tabatabaei Junior Highschool, Tehran, Iran

**Description
EN**

Corrosion is a natural process that converts pure metals into more stable chemical forms such as hydroxides or sulfides. Uniform and galvanic corrosion are some kinds of this process. Galvanic corrosion happen when two different metals contact each other in corrosive environment, thus electrical current and potential difference cause corrosion of metal by less stable. Uniform corrosion occurred by chemical or electrochemical reaction between surface and corrosive solution. Although corrosion seems beneficial sometimes, it is usually a harmful process. Design improvement, change of metal or environment and coating are known as some corrosion protection methods. Carbon nano tubes (CNT) have good corrosion resistance due to high length / diameter ratio which made by carbon with nanometer diameter. Chemical vapor deposition (CVD) is one of method producing CNT. This method involves the catalytic growth of the carbon at high temperatures and metal nanoparticles used as catalysts. Doing this process usually leads to the simultaneous production of single-walled and multi-walled carbon nano tubes.

Iraq

IQ.1.	
Title	A new technique for detection of acidic, alkaline and neutral solutions
Authors	RABAB Mohammed ABBOOD, Ali Abd Al-Hussen , Aneoe abd Alwhab
Patent	4289 Data 12/4/2015
Description EN	It is a technique of extracting and purifying a natural dye from the black carrot plant , This dye is characterized by its red-black-green color change in acidic, basic and neutral solutions.... This detector is characterized by health safety, ease of manufacture, and low cost
Class no.	8
IQ.2.	
Title	A New Technique for Diagnosing Pathogenic Fungi
Authors	Omar Sdik Shalal
Institution	Medical Laboratory Dep. /College of Health and Medical Techniques /Middle Technical University
Patent	330 Data 2022
Description EN	The diagnosis of fungal infections remains a permanent problem for the detection of fungal diseases, especially in the immunocompromised patients. Candidiasis and aspergillosis can be a serious problem for immunocompromised with systemic fungal disease that need intensive care. Classical techniques used for identification and differentiation fungal infection, like culturing and biochemical methods are time-consuming. A new method depends on the use of specific antibodies loaded with a fluorescent dye that is specific for all pathogenic fungus, fungi will shining under ultraviolet lamp after applying on it without the need for a microscope.
IQ.3.	
Title	Patent title: Preparation of immunogens against Candida albicans yeasts
Authors	Nada Fadhil Abbas, Wafa Fadell Abass, Anamm Mahmmod Nagem

Institution	Al-Manara College for medical sciences
Patent	6372 Data 2019/7/18
Description EN	1. Two isolates of <i>C. albicans</i> were identified genetically by amplification of DNA and sequenced in Macrogen Company in Korea.
	2. One of these two isolates was used for preparation of two vaccines (cell wall fraction and whole cell fraction antigens) by using two different route (subcutaneously and intradermally) by using mice model Balb/c to evaluate the immune efficiency of humoral and cellular immune response represented by IgG, IL-4, and IFN- γ respectively.
	3. Results clarified that the two antigens were able to induce and stimulate humoral and cellular immune response by significant elevation in immunoglobulin G and IL-4. And decreasing in IFN- γ level.
	4. Results of histological study of primary and secondary lymphoid tissue revealed that the two antigens were capable to stimulate immunological changes in spleen and thymus gland. WCF was most efficient than CWF.
Class no.	6

IQ.4.

Title	Biodiesel production from some oleaginous fungi using industrial and agriculture wastes
Authors	Kadhim Fadhil Kadhim, Anamm Mahmmud Nagem
Institution	National University of Science and Technology, Nasiriyah, Iraq
Patent	6573 Data 4/13/2020
Description EN	Eight fungal species as sources of oleaginous fungi were selected according to enzymatic and pigmentation tests. In order to reach a more economical product, three fermentation media were used from industrial and agricultural wastes, which were represented cheese industrial waste, molasses dates industrial waste, and waste of harvested wheat (wheat straw). While the biomass of oleaginous fungi was estimated, the lipids were extracted and mycodiesel was produced by transesterification reactions. Subsequently, the FAMES were analyzed by (GC/MS), then Cetane Number (CN)

was calculated. In addition, the weight of the carbon residue (CR) and the sulfur content (SC) after produced mycodiesel combustion were measured by the Iraqi Ministry of Oil. The results were showed a significant difference between the three media that used for the growth of fungi, the highest biomass was recorded 40 and 16 g L⁻¹ by *L. corymbifera* and *A. terreus* respectively using cheese industrial waste, while the results of lipids accumulation showed high cumulative capacity reached 38% 13.2 g L⁻¹ by *A. terreus* . The results showed that the percentage for composites FAMEs ranged between 66.06 - 92.29 % as well as, the CN was reached between 52.6 - 59.8. On the other hand, the results of sulfur content and residual carbon of product mycodiesel were very low in comparison to petroleum diesel, where the value of the residual carbon and sulfur content was 0.04 and 0.0069 wt% respectively.

Class no.

4

IQ.5.**Title****Inginer Consultanta****Authors**

Husam Nayyef Sultan

Institution

Iraq Bagdad Al-Gzaleay

Patent

6928 Data 11/15/2020

Description EN

Silicate SiO₂ (such as glass sand, quartz and glass waste) is an important source of oxygen.

Oxygen constitutes 53.3% of its masses, with a density of 2.634gm / cm³, and oxygen is a chemical element whose symbol is O and atomic number is 8 and is located within the elements of the second cycle and at the top of the sixteenth group, which is a major group element . Oxygen is classified into nonmetals, and it is in normal conditions of pressure and temperature in the form of diatomic gas O₂. It has no color, taste or smell.

And the idea of the patent relies on utilizing silicates (SiO₂) as an important and environmentally friendly source to produce ultra-pure oxygen with a very valuable byproduct investment of ultra-pure silicon.

The raw materials of glass sand and quartz are available in very large quantities, in addition to what can be collected from solid glass waste

IQ.6.

Title	Natural nanoprotection technology
Authors	Azhar Mosa Mohammed
Institution	Al-Zayona 718, Baghdad - Iraq
Description EN	Through the use of the compound Harmalin extracted from the seeds of the rue plant It is extracted and converted into a nanocomposite through the sonnetter and is sprayed on any physical or vital part, where it generates a nano-layer that protects this part and is considered water-repellent and no part of fat, dirt, mud or bacteria sticks to this part It is a non-toxic natural substance
Class no.	4

IQ.7.

Title	Single step method for rapid isolation and identification of Mycoplasma pneumoniae from clinical specimens
Authors	Prof.Dr Ghaida'a Jasim Al-Ghizzawi
Institution	Prof.Dr Amin A.Al-Sulami, Prof.Dr Saad S.Hammadi.
Patent	Basrh University College of Education for Pure Science 2898 Data 2/5/2001
Description EN	A simple monophsic-diphasic culture set-up was developed to provide efficient isolation and identification of Mycoplasma pneumoniae .The set-up consisted of slant medium,the bottom covered with 1ml of broth,establishing a diphasic solid-liquid environment at the bottom of test tube surmounted by a monophasic solid one.The specimen was directly inoculated into the liquid phase, mixed, and tilted once or twice to cover the upper slanted portion prior to incubation. The method had several advantages over other techniques including rapid results, elimination of transport medium, and use of two separate environments to accomplish both the detection and identification of Mycoplasma pneumoniae
Class no.	4

IQ.8.

Title	Nano-Elisa kit to diagnosis of Brucella spp bacteria
Authors	Dr. Ali Abdulhussein, Danya Daferr Hammed, Suham Sabah Abad Allah
Institution	Middle Technical University

Patent	6834 Data 1/28/2021
Description EN	A new nanotechnology in the detection for Brucella bacteria by ELISA method, which was more accurate and highly sensitive. This new principle in the ELISA industry opens new technique for the detection of other pathogenic bacteria.. Through this new principle, the diagnostic kit can be made with high accuracy and at a lower cost, and we eliminate many errors associated with viral, bacterial and parasitic diagnoses... This patent has been applied to bacteria as an example to prove the quality and success of this scientific principle
Class no.	4

IQ.9.	
Title	New technique to Conversion of Blood Group(Rh) from Positive to Negative by Immuno-coated Method
Authors	Abdulameer Jasim Mohammed
Institution	Collage of Health and Medical Techniques / Middle Technical University – Baghdad Iraq
Description EN	Through this innovation, any positive blood type is converted into a negative blood type, regardless of the blood type, whether it is (O, A, B or AB), by encapsulating the Rh(D) immune antigens on the surfaces of red blood cells, which is usually present In the blood of people with a positive blood group, the idea is to break down the laboratory-made Ab antibodies against the Rh(D) antigen, and this antigen is broken down through a site dedicated to breaking down usually found on these antigens, known globally as (papain cleavage site), where the papain enzyme can be used. (papain enzyme) to break down the antigen. The Fab portion of the antigen is used to coat the surface of the Rh(D) antigen and is completely obscured from the body's immune identification, which converts the blood type from Rh(+ve) to Rh(-ve) without affecting the function of erythrocytes or being there. Any immune interference due to the cracking of the antibody and getting rid of the Fab fragment. This idea was applied in detail on red blood cells and blood type testing was conducted before and after the experiment and to ensure that the positive blood turned into negative.
Class no.	4

IQ.10.**Title****Authors****Institution****Use of *Bacillus subtilis* to self-healing concrete cracks**

Abdulameer Jasim Mohammed Azhar Mosa Mohammed
Bilad Alrafidain University College

Description EN

This study used bacteria *Bacillus subtilis* isolated from agricultural soils and dry soil, and has the cultivation and development in the selective medium SR-20, underwent tests, biochemical and diagnose bacteria and according to the (Bergys Manual & Medical Bacteria), where conducted laboratory tests preliminary to know the ability of these bacteria to address cracks concrete in terms of their ability to withstand factors existing in the form of concrete, including the pH baseband through development in the selective medium SR-20 with a pH baseband (pH = 10), and tolerance of salinity when planted in the precipitation medium SM-7 containing chloride Calcium, also was testing Preparation Material treat cracks for the deposition of calcium carbonate crystals .The results also showed that the best way to prepare material treat cracks concrete to precipitate calcium carbonate are using the method consisting of silica + bacteria, where results showed test ultrasound acoustic difference in the time it takes the wave to pass through cracks untreatment, and the time it takes the wave to pass through the cracks treatment in the experience of substance treatment consisting of silica + bacteria, where results showed that Article therapy were completely rigid in the last test.

The test results also showed scanning electron microscopic examination (SEM) createcalcium carbonate to treat cracks material consisting of silica + bacteria.

Class no.

4

Japan

JP.1.**Title****Applier Machine****Authors**

Yamaguchi Kotaro, Kakimoto Yuka

Institution

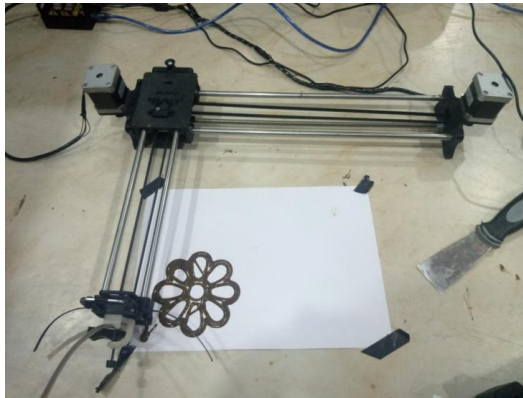
Toyosu trading co., ltd.

Patent no.

-

Description EN

Mehndi, also known as henna tattoo, is a traditional Middle Eastern art used to adorn the body for weddings and other special celebrations. Mehendi or henna is known for its medicinal properties. It has a cooling effect that aids in soothing stress, headaches and fevers. Only skilled people can design for a costlier price along with time constraint. To reduce time consumption and have a choice in multifarious designs, to replace the human effort a mehndi applier machine is invented.



Korea

*coordinated by TISIAS for
Korea University Invention Association (KUIA)*

KR.1.

Title **Artificial intelligence multi-purpose garbage disposal machine.**
Authors Jiwon Kim
Institution **Hanyoung foreign high school**
Description EN This machine is a multi-purpose garbage machine that recycles recyclable resources, maintains 20 functions of air around it at the same time as the seasons change, and discharges sterilized clean air.

1

KR.2.

Title **Artificial intelligence Anti-aging and Skin improvement Robots.**
Authors Kim, Seoyun
Institution **Kimball Union Academy**
Description EN In spring and summer, the skin often has too much moisture or oil, so it focuses on removing oil and cleansing cosmetics first, and in autumn and winter, it is a robot that supplies oil and moisture to the skin.

4

KR.3.

Title **AI Fire Fighter Drone Robot**
Authors 1. Andrew J Park | 2. Minseo Kwon
Institution **1. Paul Duke Stem High School | 2. Kennedy Catholic High School**
Description EN my AI fire robot uses a drive that is optimized for extinguishing fires, efficiently suppresses fires, and uses a fire-resistant water-cooled cooling system to continuously extinguish fires and spray water

Class

6

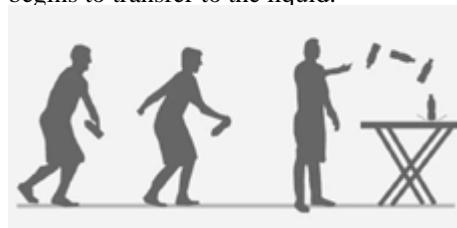
KR.4.	
Title	Home Virus care, cooling and heating system
Authors	1. Kim, Jinwook 2. Hwang, Jeongyeon
Institution	1. St. Thomas More School 2. The Woodstock Academy
Description EN	ingredients that are good for preventing hyaluronic acid infiltration and telomere reduction It has a tank of serum and cleansing cream, which is the main ingredient, so the part with the tank continuously automates the ultraviolet disinfection function to remove skin troubles caused by bacteria.
KR.5.	
Title	AI Sterilization, Fever, and COVID19 Incubator for Infants
Authors	1. Minsang Jung 2. Junwon Seo
Institution	1. Worcester Academy 2. The Woodstock Academy
Description EN	This is an incubator for infants to solve spatial problems and infectious diseases. In addition, in the event of a problem, it will be manufactured using various sensors and machine learning that connects the alarm to the nursing fact with Wife technology and immediately solves the problem.
KR.6.	
Title	The Design of Specialized Liquid soap dispensers for Autism Spectrum Disorder(ASD)
Authors	Lim Hyunjee
Institution	Columbia University
Description EN	We propose to develop a solution that can assist children with ASD with dispensing the appropriate amount of liquid from a container so that they can control their use of common liquid household solution will increase the independence of children with ASD
KR.7.	
Title	IoT smart food machine that effectively hygiene food for Homeless
Authors	Hyungkyu Kim
Institution	Pioneer Academy USA
Description EN	In this invention, various hygienic and nutritionally balanced foods are provided by variously heating or thawing food having excellent preservability by vacuum packaging, as well as an instant cooking function for food dispenser and dispensing function.

KR.8.**Title****A study on the Bottle Flip Physics****Authors**

Seo Young, Lee

Institution**Bishop Guertin High School****Description EN**

When the bottle is released, the angular momentum begins to transfer to the liquid.

**KR.9.****Title****The separation and analysis of microplastics in cosmetic products****Authors**

Jungyeon Wi

Institution**Korea International School, Jeju****Description EN**

if a general filtration device is used to separate such fine particles, a very large pressure is applied to the filter due to the blocking of the fine particles, so that the filter must be frequently replaced.

KR.10.**Title****The Physics of Aerodynamic effect around spinning ball****Authors**

Tae Junseo

Institution**Mercersburg Academy****Description EN**

The goal for this investigation is designing an experiment of how the air movement affects the movement of a ball and precisely measuring the force it receives.

KR.11.**Title****The Design of Eco-friendly Shoes using Korean traditional paper****Authors**

Jinhyeok Robert Choi

Institution**Chadwick International School****Description EN**

Personal Project was to launch a social enterprise that produces fashion products in a more sustainable and eco-friendly way.

KR.12.	
Title	Anti-Corona Mask using Non-contact Disinfectant and UV light with IR Sensing function
Authors	Ayden Kim
Institution	Fessenden School USA
Description EN	With its portability and chemical and physical design for sterilizing effect, “Anti-flu (+ common cold/respiratory diseases) Air Mask with Non-contact Disinfectant and UV” is very convenient and useful. The disinfectant cartridge can be replaced after use, and its light weight make it easy for users to carry around the neck.
KR.13.	
Title	The Research of the wage discrimination in Korea
Authors	Brian NaK Choi
Institution	Busan Foreign School
Description EN	Issues of changes in work designations as part of the IMF economic crisis, the polarization of the Korean workforce, and the lack of union representation for non-regular workers are discussed. A potential solution, namely increasing the minimum wage in South Korea, is discussed and further research is suggested.
KR.14.	
Title	Green Energy generation and Safety fence Buoy using wave power
Authors	Eunbin Cho
Institution	PCA Korea
Description EN	Crowned in his place - to move down there, if you make the move to electric energy as a recycled idea would be beneficial to study the role or fishermen and aquaculture development potential in the waves, the device will be used as a lighthouse.
KR.15.	
Title	A Study on the primary benefits of natural farming
Authors	Jennifer Kwon
Institution	SIS
Description EN	It is a smaller, more specific “branch” of Organic Farming, which mainly aims to minimize the human impact in the process of farming to allow the agricultural system to function somewhat naturally in its environment.

KR.16.**Title**

Water wave device responding to music and sound with Multi-solenoid valve

Authors

Jaeo Ban, Ella Choi

Institution

PCA Korea

Description EN

It is very effective to observe the water waves by the program based solenoid valves If you use these devices in physics classes, it helps to understand the waves.

Lebanon

Represented by
National Association for Science and Research

LB.1.	
Title	<i>Insect Monitor</i>
Authors	Hani Alloush, Hosein Harb, Yasmina Hayek, Ahmad Zoheir Harb, HOSEIN MROWE, Batool Daher
Institution	Almostafa high school
Patent no.	-
Description EN	<p>the project is a field smart digital system that takes images of a selective insects trap and sends them regularly as programmed by e-mails to the control center where the images are processed (the criteria is the number of insects trapped) to take the correct decision and notify via email or SMS the field controlling teams and other groups (farmers, other public or private companies...) the date and chemical to be used.</p>
Class	3
LB.2.	
Title	UV warrior
Authors	Ahmad ElMasri, Ali Chehab, Lana Al Fata, Maya Bdeir, Khaymakan Omar
Institution	Tariq Al Jadida third Intermediate Public School
Patent no.	1218
Description EN	<p>The UV warrior robot is used as part of the regular sterilization by UV light. It aims at preventing the spread of infectious diseases, viruses, bacteria and other types of harmful invisible microorganisms in the environment by breaking down their DNA/RNA structures. The robot is safe, reliable and eliminates human error. Furthermore, it is designed to be operated cleaning staff in institutions and facilities.</p>
Class	4

Macau

MC.1.

Title
Hollow Slab Formwork
Authors

Zhu Wuhao, Gao Yijia, Zhong Fucheng

Institution

Macao Innovation & Invention Association

Patent no.

ZL 2017 2 0095679.6

Description EN

The Hollow Slab Formwork was designed for buildings as a waterproof roof and soundproof slab. After join together the formworks, cast concrete on the formworks to create a continuous hollow concrete slab on the roof and slab. When raining, the water flow on the top of the hollow slab to the upper drainage. If any water leak into the hollow layer (of course this is only a few water) the water flow to the lower drainage.



MC.2.

Title

Research based on the impact of formaldehyde on home furnishing

Authors

KENG HANG TANG, TONG SENG HUANG, MENG IP LIU, UT CHIO KONG

Institution

Pui Ching Middle School

Patent no.

N/A

Description EN

As one of the most commonly used industrial chemical, formaldehyde is an important material of many indoor wood products, buildings and furniture. However, formaldehyde is damaging to the human body. It

damages the human body's nervous system and even increases the risk of getting cancer. So we decided to build a model to test the formaldehyde content with different environmental factors and use the best solution to maintain it at a safe level.

MC.3.

Title

Aircraft Fuel Tank Inspection Snake-arm Robot GR-20A Mk.II (Equuleus)

Authors

TSE Ping Shu Joseph

Institution

Garuda Robotics Limited

Patent no.

CN202120363014.5; CN202110169840.0;
CN202110382264.8 ; CN202110380189.1

Aircraft Fuel Tank and Engine Inspection

Garuda Robotics as significant experience within the aerospace sector. We have explored automated in-wing processes, such as swaging, sealing and inspection, using arms with a reach of up to 6m. we development of an all-electric swage tool that includes a stereo-vision system, used to identify the position and orientation of bolt tails. This tool ensures that the snake-arm can automatically account for any error in bolt position and orientation - if an error is found, the system re-positions and re-oriens automatically prior to performing a swaging operation.

Description EN

Our GR-20A Mk.II (Equuleus) snake-arm robots have also been deployed to support jet engine and fuel tank inspection. The self-supporting design and greater control offered by the snake-arm allows inspections teams to gather consistent data faster, reducing the overall maintenance burden.

Technical Specification

- Arm Articulated Length 1m – 6.1m
- Rigid Extension Length 0m – 6m
- Number of Links 12 Diameter (without / with sleeve) 125mm / 140mm
- Degrees of Freedom 24
- Total Cumulative Bend 225 degrees
- Bend Angle per Link (maximum) 27.5 degrees
- Bend Radius of Arm (configuration dependent) 160mm – 950mm
- Payload up to 10kg

INTERNATIONAL EXHIBITS

Macedonia

MK.1.
Title

Utilizing human hair waste as a way to clean oil-polluted water

Authors

Tuana Abush

Institution

Yahya Kemal College

**Description
EN**

The most used fuel in daily life is gasoline. Gasoline and fuel waste cause air pollution and water pollution. Gasoline also pollute drinking water. Water is the most important substance in our life. Thus, our sources for drinking water decreases, harming thousands of living organisms. I found out that i can clear the water from gasoline with hair that's why i take the action to decrease the water pollution. Gasoline is a mixture of volatile, flammable liquid hydrocarbons derived from petroleum/crude oil. The oil and gasoline that spills from millions of cars and trucks is the primary source of oil pollution in our waterways. Also, about half of the estimated 1 million tons of oil entering the marine environment, comes from land-based sources every year. Hair is simple in structure but has important functions in social functioning. Human hair is lipophilic material and it repel water but absorb oil. That's why hair is really effective material for cleaning up the oil spills in water. Materials that we need to use in this experiment are sea water, gasoline, hair, and cloth. My experiment began with filling the cloth with hair. After that, I filled the dish with water and mixed it with gasoline. The cloth with the hair was then placed in the mixture. After a while, I removed the hair from the mixture and noticed that the water has been cleaned of gasoline by hair absorption. We can see the hair waste left after hair cut as the main hero in this project to clean the gasoline.

MK.2.
Title

EPAF: Take Action to Prevent Reaction

Authors

Stefan Dishliovski, Enes Ago

Institution

Yahya Kemal College - Struga

**Description
EN**

As the Covid pandemic began, many people fled the cities and settled in the countryside. Both partners saw this situation and came to a conclusion. If the reason is lower density and cleaner nature, then with the settlement of people, villages will be densely populated and most likely the nature will be polluted. With the help of technology, we

have created a website and an Android application. The main use is to inform users about land pollution and how it will result in the future. We also offer two features that they can use. One is to report pollution and then organize by volunteering. Another feature is to share destinations for other users to visit. All this is done on our platform by uploading an image, selecting a location, scheduling a date and writing a description. Users can click if they are interested in participating in the cleanup or like the recommended location. The program is made on two types of devices to be more accessible to people and anyone can use it, because land pollution will become a global problem. Website link: <https://epaf-1.agoenes.repl.co/>

MK.3.**Title**

Absorption of CO₂ by Water and Dried Lavender

Authors

Dea Despotovska, Rejhan Kreci

Institution

Yahya Kemal College Skopje

The method aims to achieve complete combustion by firing fuel with only oxygen. High concentrations of CO₂ and small amounts of water vapor are formed during combustion. The carbon dioxide is separated from the water solution in a condenser. Flue gas may undergo superficial treatment to remove non-condensing gas, and to eliminate toxic components.

Separation of oxygen from the air is very energy-demanding. This corresponds to a 15% effect loss from the total effect. This will generate increased spending on energy suppliers, which will be reflected in higher electricity prices for customers.

**Description
EN**

The following reactions were investigated in the laboratory tests CO₂ reacting with:

1. Water, reaction (1.1) & (1.2)
2. Filtration with Dried lavender

We wanted in this experiment to see how much of CO₂ can we trap with a lavender filter in normal working conditions (room temperature and humidity). For that purpose, we decided and by guidance of the Environmental laboratory to use a glass jar that is more inert and does not react with the process and ingredients of the experiment. The jar was modified so that the CO₂ gas can be applied from one side in to the jar on to distilled water and a second opening was made in the lid of the jar so that the gasses can get out. The exhaust gas than it is put in to a gas analyzer and analyzed.

After the experiment was conducted, we analyzed the results gave our conclusion. It was quite an experience, very fun to do and exciting experience.

MK.4.**Title**

Wonder plants(walnut, chestnut, hazelnut shell (interior-exterior) that remove heavy metals from water

Authors

Vesa Neziri – Meryem Alkin

Institution

Yahya Kemal College - Skopje

**Description
EN**

A necessary substance to stay alive is water, especially clean and fresh water. Without water, there would be no vegetation on land, no oxygen for animals to breathe and the planet would look entirely different than how it looks today. This gift of nature makes up 70% of the surface of the Earth with only 1% of that as fresh water that is easily accessible and not trapped in glaciers and snow fields. This natural resource every day becomes less and less accessible, and its availability is big economic and social problem. Using the remains of Walnut, chestnut, hazelnut shell (interior-exterior), I talked to my friend to make this project. Our aim is to prove that with these natural resources walnut, chestnut, hazelnut shell (interior-exterior) we can make the quality of water way better, especially the quality of polluted water, and with that We can make better conditions for living. We will make better a environment, a future and make the people's lives better. Our earth is getting more polluted every day, we live in environment where we breathe toxic gasses, not oxygen. As our environment is getting polluted also the water is getting increasingly polluted every day. Some people like those in Africa don't have water even to drink, and yet we are polluting our water with heavy metals. For our project we chose the plants named as walnut, chestnut, hazelnut shell (interior exterior) because these plants are : easily accessible to everyone, low-cost and not harmful to nature .

MK.5.**Title**

Jolly Planet

Authors

Marko Ivanoski, David Stojcheski

Institution

Yahya Kemal College Skopje

**Description
EN**

Jolly Planet is an eco-friendly toy building brick company. We will produce educationally themed toy brick sets which will teach kids about saving the environment. They will be made of a fully organic, fully compostable and non-toxic

bioplastic, PLA, Polylactic Acid. It is made from starch extracted from plants such as corn, cassava and sugar cane. Instead of growing crops and using perfectly edible starch sources like corn, we will extract the PLA from the 50% green waste of all solid waste generated. We will collect food waste from municipal and commercial sources such as houses, restaurants, and hotels, then part of this food waste will be turned into plastic. Out of every 100kg of food waste, we will extract 7kg of PLA. And the 93kg of residue will be fully composted and sold to the landscape market. The toys will be delivered in a box, which can be reused as a brick storage when the kid has stopped playing, helping reduce the 40% of all plastic which is only used once. One of the final objectives of our business, **6%** of our profits will be donated to charities which fight for **stopping** world hunger. (max 250 words)

MK.6.**Title**

Detection and Purification of Heavy Metals in Water Using Kitchen Scraps

Authors

Drin Saliu, Ermir Bekteshi, Teodor Jovanovski

Institution

Yahya Kemal College Skopje

**Description
EN**

Using common household kitchen scraps such as fruit peels, vegetable skins and alike, we devised a method of using carbon dots to detect heavy metals in water. A byproduct of creating the carbon dots is activated charcoal which we then use to neutralise and purify the water from not only the detected heavy metals but also other free radicals such as poisons.

MK.7.**Title**

Cultivation of Spirulina (Arthrospira Platensis) in Controlled Environment

Authors

Gorjan Iliev, Ihsan Ozgurlu, Dea Georgieva

Institution

Jahja Kemal College, Karpos, Skopje, Republic of MACEDONIA

**Description
EN**

The project presents development of a tubular photo bio-reactor for production of Spirulina (Arthrospira Platensis) as a state-of-the-art technology for the microalgae cultivation. This technology overcome the problems of traditional production and allows obtaining of high quality Spirulina. The implemented bioreactor has a capacity of 7 liters and a system for monitoring and management of vital growth parameters based on Arduino technology. The obtained

Spirulina has been microbiologically analyzed as well as analysis for the presence of micro toxins by the University reference laboratory and results proved that it is be suitable for human consumption. Further research will be in the direction of parameters optimization and experiments with CO2 enrichment in order to increase productivity.

MK.8.**Title**

THE AVOCADO CLEANING METHOD

Authors

Emir Talha Tural & Marko Veselinski

Institution

Yahya Kemal College Karposh

Description

EN

Water pollution is one of those subjects that everyone seems to ignore despite its importance. Clean water nowadays seems to be more of a luxury than something everyone should have in their homes and overall, in their lives. It is clear that humanity has taken water for granted, the consequences are visible, but still few people tend to take action in making things better. Water gets polluted when water bodies get in contact with toxic substances, and the toxic substances dissolve in them. This leads to degradation of the water quality. Nowadays, a huge number of factories take part in polluting water, throwing toxic substances in it such as heavy metals, and making it deadly if used by living creatures. Our project includes an efficient, inexpensive, innovative and environmentally friendly way to clean polluted water, so it can be reusable in different ways such as drinking and technical purposes. Cleaning water using avocado fruit, which is easily available, inexpensive, and also cleans a great percentage of heavy metals from the water, is what we will try and demonstrate to you within our project. According to the results we've obtained from our experiments and their financial costs, compared with the ones used in water processing factories, this shows to be an easy, fast and inexpensive way to clean polluted water all around the world.

MK.9.**Title**

BEDOVLEY, Smart Pillow Equipped with Silent speakers, Microphone, Alarm, Zipper Pocket, Heating and Cooling system.

Authors

Alexsandar Minov Jakimovski, Matej Matevski

Institution

Bedovley/Yahya Kemal College

Description

EN

With the advancements of technology, we the consumers rely on technology to assist us. That's why we as students

from Yahya Kemal College thought of the Smart pillow which is specifically

designed to help people even with the smallest sleeping problems they may have.

The company BEDOVLEY came up with the idea of creating a technological pillow fitted in with silent speakers, a microphone, a zipper pocket, and a cooling and heating system.

- Silent Speakers

↳ Built-in silent speakers (The person next to you will not be able to hear the speakers, it will be the equivalent of the person next to you hearing the same sound as you may hear from headphones.)

- Microphone

↳ Built in microphone to record sleeping activity. Ex. Snoring, Talking in sleep, movements, etc. . (The hearing will be time recorded and be sent to your phone application where you will be able to see the timeline and be able to hear the moment of snoring, movements, etc.)

- Zipper pocket

↳ Built-in pocket with zipper on the side of the pillow to store cash, phone, and other items.

- Cooling and heating system

↳ Consist of material on each side one used for heating one for cooling. (Design of a fire emoji on the heating side ,On the cooling side a snowflake)

MK.10.

Title

FinSim

Authors

Vlatko Stojkoski, Aron Zekir, Daria Matevski

Institution

Yahya Kemal College Skopje

**Description
EN**

FinSim is a simple tool that can teach basic financial decisions without the need to spend real money. Through different digital algorithms we can simulate the users financial needs. The easy to use simulator is a way even for kids of a younger age to have fun while learning useful skills for their future.

Starting at the earliest of education levels, kids and students can be taught how to manage their money by the simplest means, such as teaching them that saving money is important. Intentionally, this is made to resemble real life, as we all start from the beginning or “level zero” and rise to

our prime by education, work and experience. FinSim offers great opportunity for kids, as its simple design and gadgets mean that it is easy for any person to have a clear understanding of how it works.

By introducing classes, or special projects in which students will be subject to deal with their own financial problems using our program, we personally believe that kids can benefit a lot.

Our primary goal with FINSIM is to educate underprivileged youths with little to no resources for financial education, on how to be financially stable and responsible in their

forthcoming years. We strongly believe that everyone deserves the chance to succeed and flourish in their career, without taking their social or economic background into relevance. All that is required for participation in our given simulator is one technological device. One device, one child and a worldwide change.

MK.11.

Title

NATURAL VASELINE

Authors

Mila Dimitrovska - Teodora Blazhevskva

Institution

Yahya Kemal College - Skopje

Although store-bought petroleum jelly based vaseline is useful for moisturizing the skin, several possibly dangerous effects of vaseline have been discovered, such as clogging of pores and containing potential endocrine disruptors. Our aim was to create a natural vaseline alternative with all natural and easily available ingredients, including beeswax and different types of vegetable oils.

Description EN

Before preparation of the vaseline alternative began, thorough research had to be conducted on the substituents of each ingredient, their benefit for the skin and their potential side effects. Our research led to the production of a non-comedogenic cream rich in antioxidants, vitamins and other nutrients. After the initial cream was produced, it was tested on a volunteer for its effectiveness and yielded positive results.

The main goal of our research was to test the effectiveness of our natural vaseline as a skincare product and as a functional, non-toxic substitute for petroleum jelly based vaseline.

Malaysia

Represented by University Malaysia Perlis

MY.1.

Title

E-FLEXI CONTAINER

Authors

CELESTE TRINITY ANAK NATHAN, GRACE LIEW JIA XUAN, DOUGLAS CHAI JING CHENG, LOUIS BONG CHENG YEE, FELICIA LEE YAN, JANET CHEE HUAN HUAN, CHUNG SZE MEANG

Institution

SMK LAKE, SARAWAK, MALAYSIA

Patent no.

-

Description EN

E-Flexi Container is a unique user friendly innovation of a versatile container that is suitable for storing your favourite food and other stuffs. The E-Flexi Container is made up by plastic material, acrylic, bolt and nut. It is a design with users in mind especially children, the elderly and those with special needs, providing them with easy to use container for storage.

The objective of this innovation is to build a device to ease the users in retrieving items such as food and other accessories from inside of a container.

The design concept of this innovation are: (i) The E-Flexi Container consists of two parts i.e. cylinder shape container with round shape acrylic base attached with bolt and nut. (ii) Underneath the acrylic base of the container is attached with a finger grip handle. (iii) The user can adjust the acrylic base which will bring out items from inside the container to surface. (iv) When the user turn the finger grip clockwise, the acrylic base shift accordingly to the top part of the container. (iv) When the user turn the finger grip anti clockwise, the acrylic base shift accordingly and return to its original position

The novelty of the E-Flexi Container is light and easy to use, versatile, convenient, and safe with quick mechanism to retrieve items from the bottom of the container.

MY.2.**Title****B-PeBust – BEst Pest Buster****Authors**

Nor Shafika Mohamad Ali, Nurul Nasirah Mohamad Nasir, Anurada Murugesan, Nirmala Devi Murugesan

Institution**SJK (TAMIL) LADANG BULOAH AKAR****Patent no.**

-

**Description
EN**

B-PeBust or BEst Pest Buster is an innovatively designed natural insects and rodentsbuster. This invention is an effort in controlling the pests in an environmentally friendly way without harming the little lives. Physical pest control involves trapping or killing pests such as insects and rodents. All of the methods are meant to kill the small lives. That's the main drawback of the current available system. B-PeBust is meant to protect the available food chain as it is an all-natural pest control substance which will chase away the pests just by its unique aroma treatment without killing them.

MY.3.**Title****Novel Kaolin Geopolymer Ceramic Composite Solder for Power Electronic Applications****Authors**

Mohd Arif Anuar Mohd Salleh, Mohd Mustafa Albakri Abdullah, Mohd Izrul Izwan Ramli, Nur Syahirah Mohamad Zaimi, Siti Farahnabilah Muhd Amlil

Institution**Universiti Malaysia Perlis (UniMAP)****Patent no.**

MY-169688-A and PI 2021001280

**Description
EN**

A novel geopolymer ceramic composite solder was invented using powder metallurgy microwave sintering technique. A lead-free solder Sn-based solder with reinforcing materials of kaolin geopolymer ceramics, formed a geopolymer ceramic composite solder. The main purpose of this invention is to produce a novel solder material that results in strong and robust solder joints for harsh environment applications such as high power electronics with cost effective materials and processing. Moreover, this invention also has developed a green solder material with non-hazardous contents (Restriction of Hazardous Substance-RoHS compliance). The solder material developed also can be widely applied in power electronic applications especially in a harsh environments without Pb consumption with an excellent properties. With this invention, a high reliability of

electronic devices/components especially for power electronics applications will be produced and making Malaysia as one of the leading hub for the production of electric/electronic devices in the region or world
Applications – Electronic device, Automotive and Military and aerospace electronics

MY.4.**Title****MaBox Kit****Authors**

Dr. Shazlyn Milleana Shaharudin, Nur Sabrina
Suhaimi, Murugan A/L Rajoo

Institution**Universiti Pendidikan Sultan Idris****Patent no.**

-

**Description
EN**

MaBox Kit is a teaching aid that can bring joy to students when learning a Plan and Elevations topic in a Mathematics subject which always considered boring by students. MaBox Kit can help students to remember 2 types of plan and elevation drawings, understand this topic well while playing and helps teachers during teaching and learning sessions as teaching aids. The topic of plan and elevation is a lesson topic (chapter 7) in Mathematics for form 3. Students with a high cognitive level really like this topic since it is easy to get marks and does not require formulas. This topic is closely related to the cognitive level of students because it requires a high level of visualization to draw plans and elevations from objects or vice versa. The purpose of building this kit is to attract students' interest in learning, especially in understanding the concept of Plan and Elevations topics. This kit is built to fulfill the hopes of the Ministry of Education Malaysia (KPM) call which encourages learning using teaching aids inside class. 21st-century skills such as collaboration skills, critical thinking skills, creativity and effective communication skills can be nurtured through activities such as problem solving and design innovation projects. The speciality of MaBox Kit is that teachers can easily present and teach students in class, make it easier for students to master the concept and according to *Dokumen Standard Kurikulum Dan Pentaksiran*(DSKP) form 3.

MY.5.

Title	Jom-Mudah Jawi Kit: Learning Jawi Kit For Malay Jawi Writing
Authors	Suhazlan Suhaimi, Ahmad Nurzid Rosli, Asma Haneef Ariffin, Nurul Adha Md Yatim, Mohd Helmy Abd Wahab
Institution	Universiti Pendidikan Sultan Idris, Sekolah Kebangsaan Seksyen 19 Shah Alam, Universiti Tun Hussein Onn
Description EN	Jawi is known as the Arabic alphabet or writing system used for Malay or related languages. Therefore, in this research work, we are proposing a “Jom-Mudah Jawi Kit” for teaching and learning the Malay Jawi writing. The development of the kit is mainly motivated by the issues of the Malay Jawi script was gradually replaced by the Romanised or Rumi writing. This scenario is very worrying and the heyday of the Malay Language in the Jawi script would soon gradually diminish in importance towards the end of the 20th century and early 21st century. To overcome the scenario, “Jom-Mudah Jawi Kit” is developed and integrated with Augmented Reality (AR) technology to help teach and learn Malay Jawi writings easily. “Jom-Mudah Jawi Kit” has two main module; (i) “Jom-Mudah Jawi Book and; (ii) “Jom-Mudah Jawi Apps”. We have employed non-linear Design thinking as our research methodology. It is an iterative involving five phases; (i) Empathize, (ii) Define, (iii) Ideate, (iv) Prototype and (v) Test. This method is mainly used to tackle problems that are ill-defined or unknown. It is also to understand users, challenge assumptions, redefine problems and create innovative solutions to prototype and test in developing the “Jom-Mudah Jawi Kit”. helps to provide early exposure and interest of students to learn Jawi and provide self-learning.

MY.6.

Title	Smart Rider Mobile Application
Authors	Shahidah Rosli, Suzi Iryanti Fadilah
Institution	Universiti Sains Malaysia
Patent no.	-
Description EN	This mobile application is developed to track the behavior of riders anywhere they go especially in case of emergency. The main function of this system allows rider to track speed, track location, detect weather and send an emergency alert using their mobile phone.

MY.7.**Title****CULTIVATION OF PITSTOP AND IMMERSIVE OF CUMAPP AS HEUTAGOGY APPARATUS****Authors**

Norhafizah Ismail, Nazid Sarji, Mohd Helmy Abd Wahab

Institution

Politeknik Mersing, Johor

**Description
EN**

Pitstop and Immersive of Curation Mind Mapping (CUMAPP) are germane as basic apparatus of heutagogy in educational technology. Nearpod, Edmodo, Wisemapping and Mindmeister are enthrall mechanisms adopted to embolden Digital Technology's flipped classroom experience. Notwithstanding, the features of this gizmos are still scarcity of engagement, cultivation and realization to ensure noteworthy double-loop acquisition. The objectives of this innovation development are to determine engagement towards double-loop acquisition according to Pedagogy Andragogy and Heutagogy (PAH) Continuum Model. Moreover, the innovation is to investigate the effect of curation on learner's cultivation and identify the effect of mind mapping on learners' realization among Cyber Law as well as System Analysis and Design learners in Semester of June 2020 at Department of Information Technology and Communication, Politeknik Mersing. In this project, PAH model approach is applied as framework which utilises three levels to evaluate learner's maturity in adopting apparatus of heutagogy. IBM SPSS and SEM AMOS are used for data analysis and model development. The findings conceded impressive adoption of CUMAPP tools to acquire knowledge among undergraduate Information Security's learners. All in all, this research yields benefit to educational entities namely instructors, learners, educational institution as well as stakeholders of Cyber Security Malaysia (CSM). In future, this heutagogy apparatus will be cultivated as splendid art to the computerized indigeneous engenderment.

MY.8.**Title****Smart Ticketing System for Rail Transports with Enhanced Security of QR Code****Authors**

Chen Seong Voon, Mohd Helmy Abd Wahab, Radzi Ambar, Syed Zulkarnain Syed Idrus, Norhafizah Ismail, Siti Fairus Nurr Sadikan

Institution	Universiti Tun Hussein Onn Malaysia
Patent no.	-
Description EN	<p>An Android mobile application designed for the rail transports passengers in Kuala Lumpur, Malaysia to purchase ticket for their trips with the implementation of QR technology. The security of QR ticket is enhanced by using phone authentication and AES algorithm to secure the QR code.</p> <p>The Android based ticketing system mainly consists of three parts, which are Android ticketing application, QR scanner application, and admin application.</p> <p>Android ticketing application</p> <ul style="list-style-type: none"> • An Android application developed for the passengers to purchase ticket. • Users have to register and login their account. • Provided an E-wallet feature for the users to make payment when purchasing ticket. • The trip ticket generated in form of QR code. • Users can view the tickets that has been purchased previously in Purchase History feature. • Users can view, edit, and update their profile details • A route guide feature consists of route map of the transport lines provided for the users as reference. <p>QR Scanner application</p> <ul style="list-style-type: none"> • Perform ticket validation by scanning QR code ticket of the users. • Check in and check out ticket . <p>Admin application</p> <ul style="list-style-type: none"> • View, edit, update users' profile • View, edit, update tickets purchased by the users • View the statistics with several categories, such as: <p>User Statistics – based on gender and age.</p> <p>Ticket & Transaction Statistics - based on amount of ticket purchased and transaction made.</p> <p>Check In Time Statistics – based on the check in time of the users with different time ranges.</p>

MY.9.**Title****Forecasting Day-time Surface Ozone Level using Predictive Modeling Technique****Authors**

Norazian Mohamed Noor, NurIzzah Mohamad Hashim, Ahmad Zia Ul-Saufie, Gyeorgy Deak, Mohd Remy Rozainy Mohd Arif Zainol, Mohamad Anuar Kamaruddin

Institution

Universiti Malaysia Perlis

Patent no.

Patent application No. PI2021005471/2021

Description EN

Surface ozone (O_3) is one of the important air pollution around the world due to its ability to cause adverse effect to human health and environment. Understanding the variation and association of O_3 level with its precursors and weather parameters is prominent for developing precise forecasting model. In this research, hourly air pollution data (O_3 , CO, NO_2 , PM_{10} , NmHC, SO_2) and weather parameters (relative humidity, temperature, UVB, wind speed and wind direction) covering the ten years period (2003-2012) in the 10 selected urban areas in Malaysia were analyzed. Three predictive models were developed which are Multiple Linear Regression (MLR), Feed-Forward Neural Network (FFANN), Radial Basis Function (RBFANN). The performances of the models were evaluated using four performance measures i.e. Mean Absolute Error (MAE), Root Mean Squared Error (RMSE), Index of Agreement (IA) and Coefficient of Determination (R^2). Surface O_3 level was best described using linear regression model (MLR). The non-linear models (FFANN and RBFANN) fitted the observed O_3 level well, but were slightly less accurate compared to MLR. Verification of the best model (MLR) was done using air pollutant data in 2018. The MLR model fitted the observed dataset very well with the range of R^2 values of 0.85 to 0.95. These indicate that MLR can be used as one of the reliable method to predict day-time O_3 level in Malaysia. Thus, it can be used as a predictive tool by the authority to fore-casting high ozone concentration in providing early warning to the population.

MY.10.**Title**

EcoFOAM Granules from EPDM Rubber Waste for Wet Pour Safety Surfacing

Authors

Zunaida Zakaria, Firuz Zainuddin, Luqman Musa, Hazmi Hilmi Saroni, Dias Linton, Sumeet Luddu

Institution

Geopolymer & Green Technology, Centre of Excellence (CEGeoGTech), Universiti Malaysia Perlis (UniMAP), Perlis, Malaysia

Patent no.

LY2022E00365

Description EN

New EcoFOAM granules from EPDM rubber waste is a promising technology to value-added industrial waste to the commercial value of the product. Tonnes of by-product of EPDM granules from grinded process at Fairmont Industries Sdn Bhd end up as a waste and consequently contributes to environmental problems and health issues. Therefore, EPDM rubber waste has been used as a filler with the target to achieve zero waste using an upcycled concept. Besides, the existing granules utilize high filler content, which will contribute to high cost and handling issues. To overcome this problem, blowing agent was utilized to produce foam structure to reduce the utilization of fillers, as well as provide sufficient impact absorption during services. With strategic collaboration action, a novel EcoFOAM granules for wet pour safety surfacing flooring were produced using EPDM waste and blowing agent. The EcoFOAM granules produced comply the international with extra advantages; can save up to 50% using of filler and increase the volume up to 50%. Furthermore, foam structure properties allow water to pass through when rained on and don't accumulate water making the playground inaccessible. Due to its excellence properties, it potentially can be used as wet pour safety surfacing for flooring system such as playground and jogging track. EcoFOAM granules also helps in the contribution towards a greener world by sustaining the usage of dumped EPDM waste and this this innovation is in line with Sustainable Development Goals of Malaysia which is under SDG 12 and SDG 13.

MY.11.

Title	Gecko-Inspired Interconnect Substrate Surface
Authors	Juyana A Wahab, Mohd Arif Anuar Mohd Salleh, Muhammad Firdaus Mohd Nazeri, Dewi suriyani Che Halin, Nurul Aida Husna Mohd Mahayuddin, Siti Faqihah Roduan
Institution	Universiti Malaysia Perlis
Patent no.	Application No. : LY20200036753/ Notification No.: CRLY00026298
Description EN	The nature's intrigue plans to create structures from nano-micro to mesoscale has inspired researchers to design artificial object with novel and extra ordinary properties. Recently, the advances in engineering and technology from nano- to micro-scale with new experimental and computational tools has provided the opportunity to constitute increasingly complex substrate for electronic interconnects. In this regard, learning lessons from efficient natural processes to design smart substrate, mimicking natural phenomena could revolutionize the electronic industry. In soldering, Gecko-inspired interconnect substrate is used to improve the wettability, mechanical interlocking and spreading behaviour of lead-free solder alloy. A surface modification approach inspired by nature resulting in an improvement in in performance of a variety of surface engineering areas including interconnect applications. The new features of this surface modified copper substrate will alter the surface tension, driving force and energy in order to create an excellent interfacial reaction between the solder and the substrate.

MY.12.

Title	Impregnated-Lightweight Aggregate based geopolymer with incorporation Palm Oil Boiler Ash (POBA)
Authors	Rafiza Abd Razak, Dickson Ling Chuan Hao, Mohd Mustafa Al Bakri Abdullah, Zarina Yahya, Wan Mastura Wan Ibrahim
Institution	Universiti Malaysia Perlis
Patent no.	WO2014/081277
Description EN	The artificial aggregate produced by using industrial waste materials (palm oil boiler ash POBA) can be used to manufacture concrete as construction material in the construction field. The shortening of natural resources of aggregates should be the focused of researchers. Due to excellent properties of geopolymer, thus

geopolymer is introduced in this research to improve the bonding mechanism of POBA to strengthen the paste formed as aggregate. The method used to produce artificial aggregate is cold-bonding geopolymer which not considering high sintering temperature, thus make it more economical. Further impregnation process of POBA geopolymer aggregate has improved the strength properties. The results showed the specific gravity and water absorption test of the POBA geopolymer aggregate is in the acceptance ranges to be used as lightweight aggregate. Aggregate impact value (AIV) and aggregate crushing value (ACV) of POBA geopolymer aggregate is less than 30% which considered as strong aggregate. The POBA geopolymer aggregate has the potential to be used as lightweight aggregate in lightweight concrete with good thermal properties.

MY.13.**Title**

Modern Organic Aquaponic Cultivation System

Authors

Shayfull Zamree Abd Rahim, Sim Kha Poh, Mohd Mustafa Al Bakri Abdullah, Mohd Nasir Mat Saad, Mohamed Faisol Mohamed Nor, Muhammad Faheem Mohd Tahir

Institution

Universiti Malaysia Perlis

Patent no.

PI2021003458 and PI2021001164

**Description
EN**

Aquaponics represents an interesting alternative to produce good quality products for the places with poor quality of the soil such as for deserted areas and the places that have soil-fertility issues. The system is of great interest to cultivate in cities and residential area. However, most of the designed and practiced devices used for multiple leveled planting of aquaponic system employ Polyvinyl Chloride (PVC) pipes. With the thin wall thickness and by applying cutting process and joining the pipes using glue and mechanical fastener, it results with a weak structure and is not robust. The setup time is long and requires high maintenance cost. The hole that allows water to flow from one level to another level is made by a drilling process using manual hand drill. It causes the quality of holes fabricated are not consistent and easy to clog. To overcome all of these issues, a new invention namely Multiple Leveled Planting for Aquaponic System has been invented and the patent has been filed on 04 March 2021 (Patent filing number: PI2021001164). In order to improve the rotating system of multiple leveled planting for aquaponic system (PI2021001164), a motorized mechanism has been introduced in this invention.

MY.14.

Title	Biomedical Polyethylene-co-vinylacetate (PEVA) Nanocomposite with Optimum Tensile and Fatigue Properties for Protective Layer of Implantable Devices
Authors	Azlin Fazlina Osman, Asfa Amalia Ahmad Fauzi, Tuty Fareyhynn Mohammed Fitri, Zaleha Mustafa & Asna Rasyidah Abdul Hamid
Institution	Universiti Malaysia Perlis
Patent no.	Patent application No. PI2021003907
Description EN	<p>Electronic-based implantable biomedical devices such as cochlear implant need biocompatible, high strength and tough protective layer of electrode array for long term functionality inside the body. However, currently used material which is silicone elastomer has insufficient mechanical properties for long-term implant application, high surface tack and has negative environmental effects due to its non-recyclable characteristic. Silicone rubber fabrication requires energy-intensive curing and post-curing processes, which contribute to global warming. This motivates the development of novel and better biomaterial for the protective layer of the implantable device. Poly(ethylene-co-vinyl acetate)(PEVA) is a recyclable rubber-like thermoplastic material that can be moulded into products using simple processing methods. PEVA is biocompatible, excellent optical clarity, barrier properties, and stress crack resistance. Montmorillonite (MMT) is cheap and abundant mineral filler. The combination of pre-swelling and surface modification method was applied to improve the compatibility of the MMT with the PEVA matrix, producing a nanocomposite material with improved mechanical performance. The pre-swelled MMT (Ps-MMT) has greater exfoliation and dispersion capability compared to the original MMT when being melt compounded with the PEVA copolymer. The good dispersion and exfoliation of the Ps-MMT nanolayers in the PEVA matrix can provide an effective reinforcing effect, allowing the achievement of optimum tensile and fatigue properties of the PEVA nanocomposite. This PEVA nanocomposite product is a very potent candidate to replace the non-recycle silicone elastomer for the implantable material due to its better mechanical performance, recyclability, ease of processing and low production cost.</p> <p>Application: Protective layer/encapsulant of the electrically active biomedical implantable devices.</p>

MY.15.	
Title	GMC, MEC & PMC as Alternative Materials for Rapid Tooling
Authors	Shayfull Zamree Abd Rahim, Mohd Mustafa Al Bakri Abdullah, Mohd Hazwan Mohd Hanid, Radhwan Hussin, Mohd Nasir Mat Saad, Muhammad Faheem Mohd Tahir, Nurul Hidayah Mohamad Huzaim
Institution	Universiti Malaysia Perlis
Patent no.	PI2021004403
Description EN	<p>The mold-making industry is currently facing several challenges, including new competitors in the market as well as the increasing demand for a low volume of precision moldings. The purpose of this research is to appraise a new formulation of Geopolymer Metal Composite (GMC), Metal Epoxy Composite (MEC) and Polyester Metal Composite (PMC) materials as a mold insert for Rapid Tooling (RT). The fabrication of mold inserts using GMC, MEC & PMC materials provided commercial opportunities and an alternative rapid tooling method for injection molding application. Addition of filler particles such as recycle metals such as aluminum, brass and copper fillers/powder would be able to further increase mold performance such as compression strength and thermal properties, which are essential in the production of plastic parts for the new product development.</p>
MY.16.	
Title	REDIVIVUS LARVA PAPER
Authors	Farah Nur Arina Mohd Helman, Nur Faqihah Insyirah Mohd Faizul, Nur Raihanna Farisha Reo Ezwin, Nur Ismahani 'Afifah Ismail, Adlan Zakwan Arnizan, Aniq Danish Azizad, Lisneza Roseli
Institution	SEKOLAH MENENGAH SAINS HULU SELANGOR
Description EN	<p>As mask pollution is increasing each day, Redivivus larva paper is an innovated wrapping paper made of used masks. It helps our environment by reducing the undisposed masks from oceans and landfills to be turned into an item that we can use in our day to day lives. This project is made to be of service to decreasing mask pollution. Our group is finding ways to abate face masks from polluting the planet</p>

MY.17.**Title****CINNAMONT CROWN TEA****Authors**

Nur Amanina Batrisyia Mahadzir, Nur Alya Batrisyia Azman, Nur Afrina Aishah Mat Zain, Rania Zahraa Muadzam, Dhiya Maisara Noor Aziz, Nur Diyana Kamilah Noraidil Azman, Lisneza Binti Roseli

Institution

SEKOLAH MENENGAH SAINS HULU SELANGOR

Patent no.

-

**Description
EN**

CINNAMONT CROWN TEA is a healthy herbal beverage created with god's crown, cinnamon, lemon, and peppermint. We built this product with two key goals in mind. One of them is to assist people who are diabetic. High blood sugar levels are a common side effect of this condition. The major ingredient in this product, god's crown, is recognised to help with high blood sugar levels. Cinnamon and lemon can also help to reduce blood sugar levels. Aside from that, this product was intended to locate a healthy caffeine substitute. Because all the ingredients are herbs and fruits, our product is more traditional and healthier. CINNAMONT CROWN TEA is a cost-effective, chemical free alternative to other online supplements suitable for people of all ages.

MY.18.**Title****FUSTY BUFFER****Authors**

Nur Elyssa Nadhea Tajul Ariffin, Aqilah Batrisyia Fauzi, Hana Karmila Halim, Intan Nurainin Syafira Mohd Norudin, Nur Alysha Noor Affandie, Siti Sarah Zahar, Lisneza Roseli

Institution

SEKOLAH MENENGAH SAINS HULU SELANGOR

Patent no.

-

**Description
EN**

Fusty buffer is an eco-friendly odor eliminator which mainly consists of bamboo charcoal and baking soda. In this project, we try to find ways to reduce odor when wearing socks so that the environment does not smell bad when the shoes are removed. The ingredients in this product, charcoal and baking soda, are known to help absorb odors. Charcoal is very effective in controlling odors. The incredible surface area of activated charcoal quickly absorbs unpleasant odors, not just covering them up. So, while other odor control techniques only cover the odor, charcoal actually

INTERNATIONAL EXHIBITS

removes it permanently. Baking soda, unlike most commercial air fresheners, does not mask the odor, it absorbs it. Baking soda neutralizes stubborn acidic odors such as the smell of sour milk. There are four aroma variants of this product namely roses, lavender, orange and mint.

MY.19.**Title**

Mechanical and Durability Analysis of Fly Ash Based Geopolymer with Various Composition for Rigid Pavement Application

Authors

Mohd Mustafa Al Bakri Abdullah, Muhammad Faheem Mohd. Tahir, Rafiza Abd Razak, Shayfull Zamree Abd Rahim, Ramadhansyah Putra Jaya, Mohd Rosli Mohd Hasan, Liyana Ahmad Sofri, Warid Wazien Ahmad Zailani, Meor Ahmad Faris Meor Ahmad Tajudin (Universiti Malaysia Perlis, Universiti Malaysia Pahang & Universiti Sains Malaysia)

Institution

Universiti Malaysia Perlis, Universiti Malaysia Pahang & Universiti Sains Malaysia

Patent no.

-

**Description
EN**

Ordinary Portland Cement (OPC) is a conventional material used to construct rigid pavement that emits large amount of Carbon Dioxide (CO₂) during its manufacturing process, which is bad for the environment. It is also claimed that OPC is susceptible to acid attack which increases the maintenance cost of rigid pavement. Therefore, fly ash based geopolymer is proposed as a material for rigid pavement application as it releases lesser amount of CO₂ during the synthesis process and has higher acid resistance compared to OPC. This current study optimizes the formulation which produces fly ash based geopolymer with the highest compressive strength. Next, the durability of fly ash based geopolymer concrete and OPC concrete in acidic environment is determined and compared. The results show that the optimum value of sodium hydroxide concentration, ratio of sodium silicate to sodium hydroxide and ratio of solid-to-liquid for fly ash based geopolymer are 10M, 2.0 and 2.5 respectively with maximum compressive strength of 47 MPa. From the results, it can be concluded that the durability of fly ash based geopolymer is proven to be higher compared to OPC concrete which proves that fly ash based geopolymer is a better material for rigid pavement

application where the percentage of compressive strength loss for fly ash based geopolymer concrete is 7.38% while percentage of compressive strength loss for OPC concrete is 21.94%. This current study contributes to the current field of knowledge by providing a reference for future development of fly ash based geopolymer for rigid pavement applications.

MY.20.**Title**

Alkali Activated Metakaolin as an Adsorbents for Copper Ions Removal

Authors

Wan Mastura Wan Ibrahim, Mohd Mustafa Al Bakri Abdullah, Masdiyana Ibrahim, Romisuhani Ahmad, Mohd Azreen Mohd Ariffin, Noorina Hidayu Jamil
(Universiti Malaysia Perlis & Universiti Teknologi Malaysia)

Institution

Universiti Malaysia Perlis & Universiti Teknologi Malaysia

Patent no.

P12020004793

**Description
EN**

The existence in industries of toxic metals created by mineral processing causes a significant threat to the water environment. Metal ions are often non-biodegradable products, and high amounts may cause damage to the human body, animal and ecological environment. Copper, nickel, lead, silver, and zinc are frequent heavy metals in industrial wastewater. Copper overdose to human body causes headaches, diarrhea, liver and kidney failure. Thus, removing copper metal ions from industrial waste to water is important to reduce heavy metal exposure. These products are from geosynthesis reaction from aluminosilicate precursor and alkaline activator solution that is a new technology of self-supported alkali-activated materials that have good physicochemical properties such as wide surface area and large porosity.

Moldova

Technical University of Moldova

MD.1.	
Title	<p>Project title: NATO Science for Peace and Security Programme (SPS) under grant G5634 „Advanced Electro-Optical Chemical Sensors” AMOXES</p>
Authors	<p>Research title: Sensing performance of CuO/Cu₂O/ZnO:Fe heterostructure coated with ultrathin hydrophobic polymer for battery application</p>
Institution	<p>ABABII Nicolai, MAGARIU Nicolae, LUPAN Oleg. Technical University of Moldova</p>
Description EN	<p>This study reports on a new type of gas sensor based on semiconductor oxides that is capable to solve the problem of the effect of high relative humidity on sensory performance with the possibility of application in the early detection of dangers to Batteries. Sensitive nano-materials of CuO/Cu₂O/ZnO:Fe heterostructures are grown by SCS approach developed at the Technical University of Moldova and subsequently coated with an ultrathin hydrophobic polymer film to protect the sensor from moisture. Surface chemistry, film formation and preservation of functional groups is confirmed by XPS and FTIR. It turns out that the hydrophobicity is retained even after annealing at 400°C, which is ideal for gas sensing. Compared to unprotected CuO/Cu₂O/ZnO:Fe the coated CuO/Cu₂O/ZnO:Fe exhibit a much better sensing performance at higher relative humidity as well as tunability of the gas selectivity. This is highly beneficial for the hazard detection in case of thermal runaway in batteries, because the sensors can be used under high concentrations of relative humidity that is ideal for real electrical battery applications.</p>
MD.2.	
Title	<p>AgroBot: Robotic system for crop maintenance</p>
Authors	<p>AXENTE Ion, ABABII Victor, SUDACEVSCI Viorica, MUNTEANU Silvia</p>
Institution	<p>Technical University of Moldova & Tekwill Academy Kids</p>
Patent no.	<p>Project No. 20.80009.5007.26</p>
Description	<p>This elaboration is part of the field of Intelligent</p>

EN Agriculture, in particular it is intended for the development of autonomous plant protection and care systems. The system is developed on the basis of a Jetson Nano Single-Board Computer, which implements an algorithm for acquiring and processing video images in real time, as a result of which the plants affected by pests are identified. Neural network models are used for image processing, which ensures a learning ability in the process of functioning. Plants identified as being affected by pests are individually processed by spraying protective chemicals. Image processing is performed by applying a series of filters made using the OPEN CV library.

The AgroBot system (Figure 1) shows a mobile platform (MP) on four wheels (W) that moves on the surface of the land subject to maintenance being driven by MX engines. The spray system (SS) is driven by the Delta Arm (DA) which, by translational movement, is positioned just above the plant to apply the protective chemicals.

The application of the AgroBot system in the maintenance process of agricultural crops will reduce costs by the efficient use of chemicals and reduce their negative influence on the quality of agricultural products.

Class no.

3 and 10

MD.3.**Title****PROCESS FOR DRYING BEER YEASTS WITH THE APPLICATION OF THE CONVENTION****Authors**

Țărnă Ruslan, Balan Mihail

Institution**Technical University of Moldova****Patent no.**

No.2268 2021.11.30

Description**EN**

The invention relates to a process for drying brewer's yeast with the application of convection, and can be applied to enterprises in the food industry, in research laboratories and research centers related to the drying process. The process of drying the brewer's yeasts with the application of convection, according to the invention consists in: feeding the dryer tub with yeast, taking the yeasts from the vat by the rotating drum, which has a rotation of 0.05 rpm. and which is immersed 1/3 of its diameter in the yeast tank; the thickness of the yeast layer on the surface of the rotating drum is 0.005 m; in the first stage, hot air with a temperature of 50°C and a flow rate of 740 m³ / h is blown inside the

rotating drum, which in turn heats the surface of the drum. so that by a rotation their humidity is reduced from 72% to 53%; thus the dry yeasts are removed from the surface of the rotating drum by a side-mounted squeegee, and also accumulated in the tank, from where, in the second stage, they are repeatedly taken by the drum and dried to 24% humidity, with a temperature regime of 58°C and a double rotation of the drum; the third stage involves the application of a temperature regime of 65°C and four rotations of the drum with the repeated taking of the yeasts from the tank, so the final humidity reaches the figure of 12%. During the drying process the flow of hot air remains constant.

Class no.

3. Agriculture and Food Industry

MD.4.**Title****MODULAR DRYING INSTALLATION****Authors**

Balan Mihail, Țislinscaia Natalia, Vișanu Vitali, Melenciuc Mihail, Țurcanu Dinu, Popescu Victor

Institution

Technical University of Moldova

Patent no.

No.2245 2021.09.27

**Description
EN**

The invention relates to the food industry, in particular to a modular drying plant, and can be applied to enterprises in the food industry, within peasant households engaged in growing orchards, as well as individually for the dehydration of agri-food products. The problem is solved by the fact that the drying of fruits and vegetables is ensured by a modular installation which consists of three modules, which being joined together form the drying chamber; Module A is connected by the low humidity air suction pipe, the mounting plates, the heating medium recycling channel, to which the wet air exhaust pipe, the linear hydraulic motor are connected, also by the module A is articulated mobile, the door supply, through which the trolleys with product in the installation are loaded; the mounting plates are firmly attached to module B; the mounting plates, the control panel, the electric heater, the fan block, the air connection are also securely attached to module C and the exhaust door is also mobilely articulated by module C, through which the product carts are removed from the system. The tightness between the installation modules is ensured by the joint padlock.

Class no.

3. Agriculture and Food Industry

MD.5.**Title****INSTALLATION FOR DRYING GRANULAR PRODUCTS IN A SUSPENDED LAYER****Authors**

Bernic Mircea, Țislinscaia Natalia, Balan Mihail, Vișanu Vitali, Melenciuc Mihail, Sandu Andrei-Victor, Țurcanu Dinu

Institution

Technical University of Moldova

Patent no.

Patent no. **MD 1558 Z** from 2022.03.31

**Description
EN**

The invention relates to a plant for drying granular products in a suspended layer, and can be applied to enterprises in the food industry, in research laboratories and research centers related to the drying process. The essence of the invention consists in the following: The installation for drying granular products in a suspended layer, allows to obtain a product with increased quality indices, due to the removal from the microwave area of influence of each particle when it has dried to final humidity. . At the same time, the air tube, where the product dries and moves, has a square cross section, which ensures a laminar flow of air flow inside the drying area, but also on the entire tube. This gives a uniform heat treatment for the product, which has a positive influence on its quality. Also, the drying quality of the finished product is positively influenced due to the possibility of adjusting the drying area, by moving the drying chamber vertically in relation to the middle area of the tube.

Class no.

3. Agriculture and Food Industry

MD.6.**Title****Precessional planetary transmission****Authors**

Bostan Ion, (MD); Dulgheru Valeriu, (MD); Malcoci Iulian, (MD); Bodnariuc Ion, (MD); Ciobanu Radu, (MD); Slobodeaniuc Stanislav (MD).

Institution

Technical University of Moldova

Patent no.

18269 MD. 30.12.2021

**Description
EN**

The technical result of the invention consists in the following:

- compensation of the execution errors of the transmission parts, which influence the position of the contact point in the gear (eccentricity of the inclined part of the crankshaft, eccentricity of the base surface of the satellite block,

eccentricity of the installation surface of the conical rollers of the toothed crowns etc.), by ensuring the possibility of micro-displacements in the three directions of the XYZ coordinate system;

- priming the shock loads on the gear by ensuring the micro-displacement of the units in the form of cells in the direction of the action of the normal force in the gear;

- reduction of slip friction losses by ensuring the micro-displacement of the cell-shaped units in the direction of the action of the friction force.

The precessional planetary transmission includes the housing (1), in which the satellite block (2) with the conical roller crowns (3) and (4), the fixed central gears (5), rigidly connected to the gearbox cover (6), and the furniture are located. (7) rigidly connected to the driven shaft (8). The satellite block (2) is installed on the bearings (9) on the inclined sector (10) of the crankshaft (11). The precession center O (10) is the point of intersection of the axes of the conical roller generators (3) and (4) with the axes of the crankshaft (11) and the inclined sector (12), on which the satellite block (2) is installed on the bearings (9). Due to execution and assembly errors, the precession center O can be moved with the value a , which generates the eccentricity e . A thin layer of plastic (14) is applied to the surface of the teeth (13) of the central gears 5 and 7 (14). with shock-initiating properties, consisting of rhombohedral cell units in rhombohedral structures, located with the possibility of microdeplacement in the three XYZ directions.

MD.7.

Title	Installation for orientation of photovoltaic panels
Authors	BOSTAN Viorel, MD; BOSTAN Ion, MD; DULGHERU Valeriu, MD; GUȚU Marin, MD, Ciobanu Radu, Ciobanu Oleg.
Institution	Technical University of Moldova
Patent no.	Patent nr. 4787 Y MD, of 31.01.2022.
Description	The "sunflower" photovoltaic installation refers to the photovoltaic solar energy conversion installations, ie to the photovoltaic installations with self-orientation in the southern and azimuthal planes.
EN	

The technical solutions proposed in the invention allow:

- automatic realization of the orientation of the

photovoltaic panel towards the Sun in the southern and azimuthal plane according to the natural model of the sunflower, by using relatively simple constructive innovative solutions;

- consideration of the seasonal factor through a relatively simple purely mechanical construction solution, which ensures increased conversion efficiency and low cost.

The technical result of the invention is to increase the conversion efficiency by automatically orienting the photovoltaic panel in the southern and azimuthal plane taking into account the seasonal factor according to the natural pattern of the sunflower, simplifying the construction and reducing the cost.

Class no. 2. Energy and sustainable development

MD.8.

Title

Increasing the competitiveness of precessional transmissions by developing and capitalizing on the gear with "conforming" contact of the teeth

Authors

Ion Bostan, Viorel Bostan, Maxim Vaculenco, Ion Bodnariuc, Valeriu Dulgheru, Sergiu Mazuru, Mihai Țopa, Radu Ciobanu, Oleg Ciobanu, Nicolae Trifan, Malcoci Iulian, Dumitru Vengher, Serghei Scaticailov, Valeriu Odainâi, Victor Pavelco, Alina Bregnova, Vasile Muntean.

Institution

Technical University of Moldova

Patent no.

-

Description EN

Creating contact between teeth with convex-concave geometry and small difference in curves. It was found that the absolute multiplicity of tooth engagement (100%) in compliance with the three defining conditions can occur only when using the variable convex / concave profile of the tooth flanks, usually the central wheels, depending on the values of conical axoid angles and notation the radius of curvature of the profiles of the teeth of the crowns of the satellite wheel, as well as the number of teeth of the Z wheels and their ratio.

The purpose of the stage:

- to identify the conditions for increasing the load-bearing capacity of the gearing A^D_{CX-CV} and $A^{D,b}_{CX-CV}$, and for decreasing the energy losses in the convex-concave contact of the multiparous teeth;

- determining the functional characteristics of the

kinematic precessional transmissions with gearing A^D_{CX-CV} and identifying the technical solutions to increase them.

The technical solutions mentioned above are the basis for the development of transmissions with precessional gearing.

Implemented at laboratory level, prototype inside the Technical University of Moldova.

MD.9.	
Title	<i>Structural analysis of the TUMnanoSAT microsatellite</i>
Authors	Viorel BOSTAN; Ion BOSTAN; Nicolae SECRIERU; Marin GUȚU; Vladimir MELNIC; Valentin ILCO; Alexei MARTÎNIUC.
Institution	Technical University of Moldova/Space Technologies Center
Patent no.	Project Nr. 20.80009.5007.09 "Development and launch of the series of nanosatellites with research missions on the International Space Station, monitoring, postoperating and promoting space technologies" Constructive-functional elaboration of the strength structure of the TUMnanoSAT microsatellite. Elaboration of the calculation model and computerized simulation of the load factors according to the operating criteria in the real space conditions; Development and manufacture of microsatellite assembly-transport and vibration testing devices according to the technical and technological requirements of the Japan Space Exploration Agency (JAXA).
Description EN	Results: <ul style="list-style-type: none"> • computer simulations based on virtual models have reduced material costs and resources and substantially reduced the terms of research-manufacturing-implementation of results; • elaboration of the technical documentation for the manufacture of the components and nodes of the microsatellite resistance structure; • manufacture of the physical model of the strength structure in accordance with the requirements and restrictions of precision and geometric deviations; the physical model was vibration tested in the specialized laboratory of the Institute of Space Sciences in Bucharest.
Class no.	

MD.10.

Title *Vertical Axis Wind Turbine With Power Control*
Authors BOSTAN Viore; DULGHERU Valeriu; CIOBANU Oleg; RABEI Ivan.
Institution Technical University of Moldova
Patent no. Decision nr. 16772, of 01.12.2021

The invention relates to renewable energy, namely to vertical-axis wind turbines with power control and can be used to transform wind energy into electricity.

Description
EN

The proposed technical solutions ensure turbine's power control and protection of its mechanical components from overload by aerodynamic and mechanical braking.

The technical solutions proposed in the invention allow:

The protection of electrical generator from overload through automatic power control;
 High reliability of the dynamic mechanical parts of the vertical axis wind turbine.

Class no. 2. Energy and sustainable development

MD.11.

Title **Transmission with precessional gearing**
Authors Viorel Bostan, Ion Bostan, Maxim Vaculenco.
Institution Technical University of Moldova
Patent no. Patent application, a 2020 0055, 11.06.2020

The technical result is an increase in load-bearing capacity and mechanical efficiency, as well as a widening of the kinematic and functional possibilities.

Description
EN

This result is achieved due to the kinematic scheme of the transmission, as well as the specificity of the gear of the gear wheels of the satellite wheels driven in spherospacial motion gearing with the teeth of the fixed central wheel and the teeth of the crown of the satellite wheel with the teeth of the movable conical central wheel.

Transmission with pre-gearing which includes a housing, crankshaft and coaxial driven shaft, two gear wheels with toothed crowns, movable and immobile central conical wheels, characterized in that the transmission consists of at least two kinematic satellite wheels connected consecutively by at least one intermediate crankshaft installed on the bearing bracket in the housing and which is fitted laterally with a notched offset from the notation angle \square to the

common axis of the center wheels, at the same time the first satellite wheel by means of a bearing mounted on the end of its half-axis is kinematically coupled to the crankshaft, and the second satellite wheel by means of a bearing mounted on the end of its semi-axle is kinematically coupled to the intermediate crankshaft housing offset from the notation angle \square to the common axis of the central wheels and conical crowns of the satellite wheels of immobile and movable conical central wheels conjugate between they multiply in convex-concave contacts.

Class no. 6. Mechanical Engineering - Metallurgy

MD.12.

Title **Process for obtaining yogurt from goat's and cow's milk**
Authors Cușmenco Tatiana, Macari Artur, Bulgaru Viorica, Sandulachi Elisaveta
Institution **Technical University of Moldova**
Patent no. MD 9972/2022

Description
EN

The result of the invention is that the addition of blanched fruit puree before the fermentation stage improves the composition of the substrate for the development and multiplication of lactic acid bacteria, positively influences the number of viable microorganisms, due to the presence of prebiotic and nutritional factors, reduces fermentation time and allows to obtain yogurt with increased biological value with high sensory and rheological characteristics and with multiple benefits for the human body. The synergism between lactic acid bacteria and biologically active substances in fruits prolongs the shelf life of yogurt, keeping under control the microorganisms of spoilage.

Class

3

MD.13.

Title **Functional clothing for premature babies - Ergonomic baby carrier**
Authors Victoria Danila, Stela Balan, Antonela Curteza, Marcel Vîrlan
Institution **UTM, Davitex Neo SRL**
Patent no. Nr. 8/238T

Description
EN

Functional clothing integrates with the fields of medicine to meet the multiple and complex requirements of the user. Functional clothing is specific to the user's requirements and

is designed to meet the user's performance requirements in extreme conditions.

This paper presents a functional product for the mother and the premature baby. This product is used in hospitals by applying the mother-child contact method called Mother Kangaroo.

This ergonomic baby carrier that is finally shaped into a pouch allows the baby to be in touch with his mother. There are many positive benefits associated with skin-to-skin contact during the scientifically proven newborn stage. This product provides the child with rapid growth and recovery, providing safety and comfort.

14

MD.14.**Title****THE MANUFACTURE OF BAKERY PRODUCTS FROM TRITICALE FLOUR****Authors**

Turculeț Nadejda; Ghendov- Moșanu Aliona; Sturza Rodica; Veverița Efimia; Buiucă Petr; Lupașcu Galina; Rotari SilviGore Andrei; Leatamborg Svetlana

Institution

Technical University of Moldova

Patent no.

MD 1512/30.11.2021

**Description
EN**

The process includes the preparation of dough from triticale flour, compressed yeast, salt, sugar, whey, fat-soluble extract of sea buckthorn (*Hippophae rhamnoides* L.) or rosehip (*Rosa canina* L.) or mountain ash (*Sorbus aucuparia*) fruits and water, kneading, fermentation at a temperature of 25...27 °C for 90...180 min, division, shaping, fermentation for 40...60 min, at a temperature of 38...40 °C, baking, whey and fat-soluble extract are taken in quantities of 5...30% and 0.5...2.5% by weight of the flour, the fat-soluble extract being obtained by mixing the respective powder with a granularity of 10...70 μm, with sunflower oil, in the respective ratio 1:(12...20), ultrasonic extraction at the frequency 35 kHz, temperature 20...45°C, for 0.5...1.5 hours and vacuum filtration.

Class no.

3. Agriculture and Food Industry

MD.15.**Title**

The Process for the Formation of a Regular Microrelief on The Surface of the Gearwheel Teeth

Authors

Sergiu Mazuru, Laurențiu Slătineanu,
Ion Stîngaci, Pavel Cosovschi, Andrei Platon

Institution

Technical University of Moldova

Patent no.

MD 374 Z 2011.12.31

**Description
EN**

The invention relates to the mechanical engineering technology, in particular to the machining of surfaces of gearwheel teeth of different metals and alloys operating in the lubricating medium.

The process for the formation of a regular microrelief on the surface of the gearwheel teeth consists in that the tool in the form of a profiled on the edge disk with the radius R is communicated a motion that simulates the real operating conditions by movements coordinated about the mobile $X1Y1Z1$ and fixed XYZ coordinate systems. The tool is also communicated a linear motion along the gearwheel tooth, at an angle of $\delta \geq 0$ about the plane formed by the axes $X1$ and $Y1$.

The gearwheel is communicated a rotary motion and ultrasonic vibrations modeled by the amplitude. The tool periodically comes in contact with the gearwheel, carrying out deformations on the surface of the teeth and forming a regular microrelief in the form of a grating of grooves with the necessary parameters along and by the depth of the tooth.

The result of the invention consists in increasing the quality of the surface of the gearwheel teeth and providing the lubrication of the meshing zones with insufficient lubrication.

Class no.

6. Mechanical Engineering - Metallurgy

MD.16.**Title**

The Mold For Metal Powders

Authors

Sergiu Mazuru, Andrei Platon, Alexandru Mazuru

Institution

Technical University of Moldova

Patent no.

MD 676 Z 2014.04.30

**Description
EN**

The invention relates to mechanical engineering technology, namely to molds for producing parts from metal powders. The mold for metal powders comprises a clamping sleeve (3), in which are located a matrix (2) and upper (4) and lower (5) forming elements, made helical with internal

protrusions in the lower part, which in assembly form a cylindrical surface, and placed with the possibility of mutual movement by a curved trajectory along the axis of molding. The mold further comprises a rod (7) and a punch (6), which together with the forming elements (4, 5) form the molding cavity.

The powder form for metal powders works as follows. The mold 2, together with the forming elements 4 and 5, is placed in the bushing 3, by tightening, then from the bottom of the mold 2 is transmitted advance to the core 7, after which the space created by the upper and lower forming elements 5 and the core 7 is filled with the required amount of metal powders 1. After filling, the forming elements 4 are moved relative to the forming elements 5 by $\frac{2}{3}$ of the height of the metal powder 1, then the punch 6 and the forming elements 4 and 5 are communicates a pressing force. After the required pressure level has been reached, and the forming elements 4 and 5, under the action of pressure, have moved with the execution of the rotational movement around their axis until they have aligned, the bushing 3 is removed, after which the phase is executed, extraction of the pressed part.

Class no.

6. Mechanical Engineering - Metallurgy

MD.17.**Title**

Large-Sized Nanocrystalline Ultrathin β -Ga₂O₃ Membranes Fabricated by Surface Charge Lithography.

Authors

Vladimir Ciobanu, Irina Jin, Tudor Braniste and Ion Tiginyanu.

Institution

Technical University of Moldova / National Center for Materials Study and Testing

Patent no.

-

**Description
EN**

Large-sized 2D semiconductor materials have gained significant attention for their fascinating properties in various applications. In this work, we demonstrate the fabrication of nanoperforated ultrathin β -Ga₂O₃ membranes of a nanoscale thickness. The technological route includes the fabrication of GaN membranes using the Surface Charge Lithography (SCL) approach and subsequent thermal treatment in air at 900 °C in order to obtain β -Ga₂O₃ membranes. The as-grown GaN membranes were discovered to be completely transformed into β -Ga₂O₃, with the morphology evolving from a smooth topography to a

nanoperforated surface consisting of nanograin structures. At intermediate temperatures, the formation of α and γ phases of Ga_2O_3 were disclosed by TEM analysis. The oxidation mechanism of the membrane was investigated under different annealing conditions followed by XPS, AFM, Raman and TEM analyses.

Thus, the combination of the SCL and thermal treatment under ambient conditions presents a cost-efficient approach for obtaining large-sized ultrathin membranes of $\beta\text{-Ga}_2\text{O}_3$ – a promising material for nano-electronics and photonics.

The authors acknowledge the support from the Ministry of Education and Research of the Republic of Moldova under the Grant #20.80009.50007.20 and to the European Union's Horizon2020 research and innovation programme under grant #810652 (NanoMedTwin project).

MD.18.**Title**

Process for wide bandgap semiconductor nanowires obtaining on narrow bandgap semiconductor substrate

Authors

Elena Monaico, Eduard Monaico, Veaceslav Ursaki, Ion Tiginyanu

Institution

Technical University of Moldova, National Center for Materials Study and Testing

Patent no.

Patent application No. a 2021 0054 from 06.08.2021

**Description
EN**

Herein, we propose the manufacture of wide bandgap (E_g) semiconductor nanowires (e.g. from Ga_2O_3 with $E_g = 4.9$ eV, or In_2O_3 with $E_g \sim 3$ eV) on narrow bandgap semiconductor support with good thermal conductivity (λ) (e.g. GaAs with $E_g = 1.44$ eV and $\lambda = 52$ W / m·K or InP with $E_g = 1.34$ and $\lambda = 68$ W / m·K), and the diameter of the nanowires varies in the range from 50 nm to 500 nm. The advantages of the proposed process over other already existing processes consists in the possibility of forming wide bandgap semiconductor nanowire networks on narrow bandgap semiconductor support with good thermal conductivity through simple, accessible and cost-effective technologies. In the first step, the GaAs or InP semiconductor nanowires are obtained on the surface of bulk semiconductor substrate via electrochemical etching of bulk substrates. Subsequent treatment of GaAs nanowires at 900 °C for 60 minutes in a low oxygen content atmosphere (3%) leads to the transformation of GaAs (InP) nanowires into Ga_2O_3 (In_2O_3) nanowires, accordingly to the EDX and XRD

analysis. The technological parameters of thermal treatment are optimized in such a way that bulk semiconductor substrate is not oxidized.

This work received partial funding from the PostDoc Grant #21.00208.5007.15/PD and state program Grant #20.80009.5007.20.

Class no. **14**

MD.19.

Title

Process for independent pore networks obtaining in semiconductor wafers

Authors

Eduard Monaico, Veaceslav Ursaki, Ion Tiginyanu

Institution

Technical University of Moldova, National Center for Materials Study and Testing

Patent no.

Patent application No. a 2022 0001 from 24.01.2022

Description EN

The invention relates to the technology for the production of nanostructured materials, in particular to processes for obtaining of semiconductor nanostructures by electrochemical etching, which can be used in microfluidics and micro-electro-mechanical systems (MEMS).

The method, according to the invention, consists in anodization of the surface of a semiconductor wafer covered with a mask, with dimensions larger than $20 \times 20 \mu\text{m}^2$ and contains holes smaller than $2 \mu\text{m}$.

As a result of the anodization, two pore networks were produced, as illustrated in Figure (right side): (i) a network of primary pores, which propagate under the mask in a direction parallel to the surface of the sample and perpendicular to the edge of the mask; (ii) a network of secondary pores, which initially propagate in the hole of the mask in radial directions and subsequently change their direction of propagation in the direction of the primary pores. Thus, two networks of pores are produced located in the same region of the semiconductor wafer, which are independent of each other, the entrance to the primary pores being located in the region of the semiconductor wafer near the edge of the mask, as illustrated in Figure (left side), and the entrance to the secondary pores is in the hole projected in the mask.

The advantages of the proposed process over other existing processes are the possibility of obtaining several independent pore networks in the same region of the semiconductor wafer, using accessible equipment and cost-

effective technologies.

This work received partial funding from the PostDoc Grant #21.00208.5007.15/PD and state program Grant #20.80009.5007.20.

Class no.

14

MD.20.

Title

Composition for the Production of Biscuits with High Biological Value

Authors

Boestean Olga, Netreba Natalia, Macari Artur

Institution

Technical University of Moldova

Patent no.

No. MD 1597

**Description
EN**

The invention relates to the food industry, in particular to a composition for the production of biscuits with high biological value. The composition, according to the invention, comprises, in parts by weight: wheat flour 1.0-2.5, fruit seed or fruit seed kernel flour 0.05- 0.6, butter or margarine 0.5-0.7, sugar 0.3- 0.9, chicken eggs 0.2-0.7 and baking soda 0.005-0.012. The result is the use of grape seed flour and / or flour from apricot kernels, obtained by preventive drying of seeds / kernels using a method combined with the use of pulsed microwave currents, grinding them with partial replacement of wheat flour, to obtain a functional preventive product. The advantage of using fruit pit seeds or pits is that they are often considered waste in fruit processing plants. Thus, the losses of enterprises can be reduced due to their subsequent use in the production of confectionery.

Class no.

3

MD.21.

Title

Design - Conceptdrone

Authors

Dmitrii Ciobanu, Mihail Stamati

Institution

Technical University of Moldova

Patent no.

-

**Description
EN**

The concept is based on the creation of a drone concept, which, in addition to its primary functions of flying, has the possibility of being transformed into a wheeled device, to be used in some hard-to-reach places on earth, thus raising its functionality.

MD.22.	
Title	Design-Concept Aquatic Platform For Cycling
Authors	Goriță Sandu, Podborschi Valeriu
Institution	Technical University of Moldova
	Patent application
Description	Aquatic platform, on which the bicycle is fixed, intended for moving on water. By rotating the bicycle pedals, the rear wheel, which attaches to the rollers, drives the transmission to the propellers located in the water at the bottom of the platform.
EN	Aplication: It can be used in water recreation places.
Class	14. Other (industrial design)
MD.23.	
Title	Design-concept Disassembly Packaging For Wine Bottles
Authors	Motologa Diana, Podborschi Valeriu
Institution	Technical University of Moldova
Patent no.	Patent application
	Two packaging options for one or two bottles of wine, intended for the protocol departments of wine companies to promote their brands and image.
Description	The packaging is made of wood (3-4mm plywood), by laser cutting. The assembly of the package is without glue or screws. The rigidity of the packaging structure is obtained by using a textile tape, which also has the function of a handle.
EN	Application: Wineries, shops, advertising organizations, etc.
Class no.	14
MD.24.	
Title	Design-Concept Multifunctional furniture for office spaces
Authors	Maria Tiseeva, Valeriu Podborschi
Institution	Technical University of Moldova
Patent no.	-
Description	Work table for design offices with the possibility of changing the height, angle of inclination and organization of the functional surface, easily assembled-disassembled, made of wood (plywood) with metal construction elements (optional).
EN	
Class no.	14

MD.25.	
Title	Design-Concept Packaging for Wine bottles
Authors	Mircea Zubcu
Institution	Technical University of Moldova
Patent no.	-
Description EN	Gift box, made of plywood, intended for storing and transporting wine products packaged in bottles. When the box is opened, the bottle is lifted slightly upwards and vice versa, under the weight of the bottle the box closes.
Class no.	14
<hr/>	
MD.26.	
Title	Process for Producing Yoghurt with high Biological Value
Authors	POPESCU Liliana, MD; GHENDOV-MOȘANU Aliona, MD; STURZA Rodica, MD; PATRAȘ Antoanela, RO; LUNG Ildiko, RO; OPRIȘ Ocsana-Ileana, RO; SORAN Maria-Loredana, RO.
Institution	Technical University of Moldova
Patent no.	Patent application No. MD 1497(13)Y / 28.02.2021
Description EN	The invention relates to the dairy industry, in particular to a process for producing yoghurt with high biological value. The process, according to the invention, comprises milk normalization, pasteurization, cooling, leavening with starter cultures for yoghurt, fermentation, introduction of a water-alcohol extract of berries, mixing, packaging, cooling and maturation of yoghurt. At the same time, a water-alcohol extract of berries is introduced, obtained by mixing berry powder with water-alcohol solution and microwave extraction followed by filtration and concentration, and as berries are used chokeberry or sea-buckthorn or dog rose, or hawthorn fruits.
Class no.	3. Agriculture and Food Industry
<hr/>	
MD.27.	
Title	Process for obtaining functional bread with the addition of flaxseed flour
Authors	COVALIOV Eugenia, POPOVICI Violina, CAPCANARI Tatiana, SIMINIUC Rodica, GROSU Carolina
Institution	Technical University of Moldova
Patent no.	Patent no. 1555, 2020.08.11
Description	The invention relates to the bakery industry and can be used

EN in the production of functional bakery products, in particular bread with an increased intake of dietary fibers with the addition of flaxseed flour.

The problem solved by the proposed invention is to improve the sensory characteristics, the nutritional and biological values by increasing the intake of phenolic compounds and essential amino acids and by reducing the glycemic index due to the substitution of carbohydrates from wheat flour with defatted flaxseed flour.

The invention solves the problem by proposing a process for obtaining functional bread with increased nutritional value having the following ratio of components: wheat flour 73.5 ...87%, defatted flaxseed flour with a fat content of max. 5% 5.8...19.3, sugar 5.0, salt 1.3 and yeast 0.9.

The result of the invention consists in obtaining a novel product of bread with improved nutritional and functional properties intended for both consumption mass, as well as dietary, functional, therapeutic and prophylactic nutrition for adults and children.

Class no. 3. Agriculture and Food Industry

MD.28.

Title **Process for obtaining functional sauce**

Authors POPOVICI Violina, GHENDOV-MOȘANU Aliona, PATRAȘ Antoanela, DESEATNICOVA Olga, STURZA Rodica

Institution **Technical University of Moldova**

Patent no. Decision no. 10012, 2022.03.10

Description The invention relates to the food industry, namely to vegetable oil and fat industry, in particular to a process for obtaining functional sauce. The process according to the invention includes mixing the lipophilic extract of sea buckthorn or hawthorn, or rosehip fruit, sunflower oil, milk powder, acetic acid, baking soda, egg powder, sugar, salt, mustard powder, corn starch, citric acid and tap water, heating the mixture to a temperature of 95.0 ...98.0°C, homogenizing for 12...15 min, cooling to a temperature of 20...25 ° C and packing.

EN

Class no. 3. Agriculture and Food Industry

MD.29.

Title	TUMnanoSAT flight model nanosatellite
Authors	Viorel BOSTAN, Ion BOSTAN, Valentin ILCO, Vladimir MELNIC, Alexei MARTINIUC, Vlad VARZARU, Nicolae SECRIERU
Institution	Technical University of Moldova / Space Technologies Center
Patent no.	Project Nr. 20.80009.5007.09 "Development and launch of the series of nanosatellites with research missions on the International Space Station, monitoring, postoperating and promoting space technologies"
Description EN	<p>The TUMnanoSAT nanosatellite was developed and manufactured by the Space Technology Center of the Technical University of Moldova, being selected in the 4th round of the KiboCube program promoted by UNOOSA and JAXA. This nanosatellite has a list of technology missions in order to verify the functionality of future satellite modules and subsystems.</p> <p>Also, there is one research mission - to study the functionality and reliability of nanosensors in space radiation conditions.</p> <p>TUMnanoSAT is ready for launch and inserted into the JSSOD launch deployer from JAXA. TUMnanoSAT will be delivered to International Space Station (ISS) with SpaceX CRS-25, which is a Resupply Service mission to the ISS planned to be launched in June 2022 with Cargo Dragon.</p>
Class	14. Other - Space Technologies ; 10. Information Technology and Communication

MD.30.

Title	TUMnanoSAT's satellite modules for research of the nanosensors properties in space radiation conditions
Authors	Viorel BOSTAN, Valentin ILCO, Alexei MARTINIUC, Vlad VARZARU, Valeriu VERJBIȚCHI, Nicolae MAGARIU, Oleg LUPAN
Institution	Technical University of Moldova / Space Technologies Center
Patent no.	Project Nr. 20.80009.5007.09 "Development and launch of the series of nanosatellites with research missions on the International Space Station, monitoring, postoperating and promoting space technologies"
Description EN	The Nanosensors have become an area of great interest due to their advanced properties. In order to research the

performance of nanosensors in space radiation conditions, satellite modules have been developed for the TUMnanoSAT nanosatellite. The TUMnanoSAT nanosatellite was developed and manufactured by the Space Technology Center of the Technical University of Moldova. A series of modules for testing nanosensors behavior in space conditions was developed by the TUM's nanomaterials research center in the fields of material science and nanotechnologies in cooperation with Space Technologies Center. These results of space testing will be useful focused on the development of new nanomaterials and nano-devices for various applications, including electronics, photonics, bio-medicine, radiation detection. The modules will allow the collection of experimental data from the orbit in spatial conditions, for further processing that will favor the improvement of the properties of nanosensors based on zinc oxide.

Class no. 14. Other – Nanosensors / Space Technologies

MD.31.
Title
THE MANUFACTURE OF BAKERY PRODUCTS FROM TRITICALE FLOUR
Authors

Turculeț Nadejda; Ghendov- Moșanu Aliona; Sturza Rodica; Veverița Efimia; Buiucă Petr; Lupașcu Galina; Rotari SilviGore Andrei; Leatamborg Svetlana

Institution

Technical University of Moldova

Patent no.

MD 1512/30.11.2021

**Description
EN**

The process includes the preparation of dough from triticale flour, compressed yeast, salt, sugar, whey, fat-soluble extract of sea buckthorn (*Hippophae rhamnoides* L.) or rosehip (*Rosa canina* L.) or mountain ash (*Sorbus aucuparia*) fruits and water, kneading, fermentation at a temperature of 25...27 °C for 90...180 min, division, shaping, fermentation for 40...60 min, at a temperature of 38...40 °C, baking, whey and fat-soluble extract are taken in quantities of 5...30% and 0.5...2.5% by weight of the flour, the fat-soluble extract being obtained by mixing the respective powder with a granularity of 10...70 μm, with sunflower oil, in the respective ratio 1: (12-20), ultrasonic extraction at the frequency 35 kHz, temperature 20...45°C, for 0.5...1.5 hours and vacuum filtration.

Class no.

3

Moldova State University

MD.32.**Title****CRYSTALLINE p-GaN LAYERS GROWN ON SILICON WITH ZnO INTERMEDIATE FILMS****Authors**

Simion RAEVSCHI, Leonid GORCEAC, Vasile BOTNARIUC

Institution**Moldova State University****Patent no.**

Patent granted by decision 9852/2021.08. 06

**Description
EN**

Process for growing p-GaN layers, which includes deposition on a substrate heterogeneous of ZnO nucleation film from a solution of zinc acetate dihydrate in ethanol with heat treatment subsequently at a temperature of 500°C for 2 hours. The subsequent deposition of a film of ZnO from a solution of zinc nitrate hexahydrate and KOH in water by boiling for 3 hours and heat treatment at a temperature of 500°C for 2 hours with subsequent introduction of the structure obtained in a GaN layer growth reactor by the HVPE method, in which, first, a layer of GaN at a temperature of 500°C for 15 min., and then the actual layer is deposited by GaN at a temperature of 800°C-1050°C for 25 min.

Class no.

2

MD.33.**Title****METHOD AND SETUP TO INCREASE POWER DENSITY THRESHOLD FOR CCD CAMERA****Authors**

Arcadi CHIRITA

Institution**Moldova State University****Patent no.**

MD 4771 / 2021.10.31

**Description
EN**

The image recording of photosensitive objects, such as biological objects, whose biological and chemical activity can change under light illumination, can be obtained at power densities from the object less than the minimum power density that can be registered by CCD camera used. The object under study is illuminated by coherent laser radiation. If the light signal from the object is less than the threshold sensitivity of the digital camera, then the digital camera matrix (only matrix, but not the object) is illuminated by an additional laser beam from the same laser source. The image is formed by two interfering laser beams. The image of the object is recorded as a set of dark and light

interference fringes with light fringe intensity bigger than the minimum sensitivity of the digital camera. The rasterized images, at power densities from the object practically nine times less than the power density threshold for the digital camera used, were recorded.

*ANCD research grant number # 20.80009.5007.12

Class no. 5

MD.34.
Title

METHODOLOGY DETERMINING THE MULTICRITERIA INDEX FOR ASSESSING THE EFFICIENCY OF PUBLIC PROCUREMENT IN THE REPUBLIC OF MOLDOVA IN CONDITIONS OF ECONOMIC SUSTAINABILITY

Authors

Andrei MULIC, Victoria GANEA

Institution

Moldova State University

Patent no.

MD 7090 / 01.12.2021

**Description
EN**

Development of a new methodology for determining the Multicriteria Index to assess the efficiency of public procurement in the Republic of Moldova in conditions of economic sustainability.

Class no. 2

MD.35.
Title

NEW INHIBITOR OF PROLIFERATION OF HUMAN RHABDOMYOSARCOMA RD CELLS

Authors

Aurelian GULEA, Vasiliu GRAUR, Irina USATAIA, Olga GARBUZ, Victor ȚAPCOV

Institution

Moldova State University

Patent no.

MD 4764 / 2021.08.31

**Description
EN**

The invention relates to chemistry and medicine, namely to a biologically active coordination compound that can find application in medicine for the prophylaxis and treatment of rhabdomyosarcomas.

Class no. 4. Medicine - Health Care – Cosmetics.

MD.36.
Title

NEW SYNTHETIC INHIBITORS OF SUPEROXIDE ANION RADICALS

Authors

Aurelian GULEA, Valentin GUDUMAC, Dorin ISTRATI, Irina USATAIA, Vasiliu GRAUR, Victor ȚAPCOV, Inna ȘVEȚ, Valeriana PANTEA, Lilia ANDRONACHE

Institution **Moldova State University**
Description MD 4749 / 2021.10.31; MD 4698 / 2021.02.28
EN

The invention relates to the biologically active coordination compounds of the class of isothiosemicarbazidates. The described compounds inhibit superoxide anion radicals. These agents exceed 515-112 times the analogous characteristics of quercetin that is used in medical practice, and 8-1.8 times analogous characteristics of prototype. The discovered properties of these substances are of interest for medical practice for enhancement of the arsenal of superoxide anion radical inhibitors.

4. Medicine - Health Care – Cosmetics.

MD.37.

Title

TABLE OF DISTANCES BETWEEN MENTAL AND BEHAVIORAL DISORDERS IN EPILEPSY

Authors

Gheorghe CĂPĂȚĂNĂ, Alexandru POPOV, Mariana BUTNARU

Institution

Moldova State University

Patent no.

O Nr. 6807 / 01.02.2021

Assessing the distances between mental and behavioral disorders in epilepsy (MBDE) using metric spaces developed for this purpose (for the first time).

The objectives of the Innovation are:

- Better understanding of MBDE mechanisms and remissions obtained;
- Development of intelligent support systems for MBDE;

Description

- Training and development of specialists in medicine and informatics.

EN

- Starting 3 doctoral programs.

The users of the innovation can be:

- Community mental health centers;
- Psychiatric hospitals;
- Psychiatrists;
- Family doctors;
- Scientific researchers;
- Students.

Class no.

10

MD.38.**Title****METHOD FOR PRODUCING ANTIBACTERIAL POLYMERIC MATERIAL****Authors**

Stefan ROBU, Paul GHIUCA, Lorena INACU, Viorel PRISACARI, Veronica SAVA, Petru SPATARU, Pavel TIULEANU

Institution

Moldova State University

Patent no.

Patent granted by decision 9981 / 2022.01.19

**Description
EN**

This paper describes a process for obtaining a polymeric material with antibacterial properties by direct interaction of chlorhexidine solutions with block-polymers styrene-butadiene grafted with 3% maleic anhydride, in a quantitative ratio of copolymer and chlorohexidine of 1: (0.3-0.6). As a result, an antibacterial polymeric material was synthesized with 4-5 times lower cost than those described in the literature. This was possible due to the reduction of the synthesis time of the final product. It has been shown that the antibacterial polymeric material possesses antibacterial activity close to the activity of chlorohexidine and has an action time 2-3 times longer than that of chlorohexidine. The bactericidal activity time reaches up to 3 days. Individual films can be obtained from the synthesized polymeric material that can be administered on the tissues of the human or animal body. The obtained polymeric material has high adhesion to metal or wood substrates, is film-forming and can be widely used for depositing starters on objects used in the health care system (hospitals, medical centers, leisure centers etc.).

4. Medicine - Health Care – Cosmetics.

MD.39.**Title****PHOTOSENSITIVE ORGANIC POLYMER MATERIAL****Authors**

Ion LUNGU, Stefan ROBU, Tamara POTLOG, Pavel TIULEANU, Petru BULMAGA

Institution

Moldova State University

Patent no.

a 2021 0068 / 2021.10.06

**Description
EN**

The invention relates to the elaboration of new photosensitive organic polymer material that will be used in photovoltaics for the elaboration of photovoltaic cells, as well as for the elaboration of electrophotographic information carriers. The essence of this work consists in the synthesis of a photosensitive organic polymer material consisting from copolymers of N-vinylcarbazole:1-octene

INTERNATIONAL EXHIBITS

and acryloyl chloride (N-VC: OC-1: Cl-AC) in that additionally are grafted zinc phthalocyanine (ZnPc) by Friedel-Craftz reaction with a content of 5-15 mol%. This new photosensitive material is easily soluble in organic solvents and has a good yield of 70 -72%. The thin films of this photosensitive organic polymeric material possess photosensitivity in the $\lambda = 300\text{-}800\text{ nm}$ visible and near infrared spectral region. A comparative investigation of the FTIR spectra of the N-VC: OC-1: Cl-AC (1) copolymer (Fig.1.) and of the polymer of the analog grafted with 10 mol% of PcZn (2) shows the disappearance of the absorption band $\nu = 680\text{ cm}^{-1}$ characteristic of the C-Cl bond from Cl-AC, as well as the increase of the intensity of the band $\nu = 1590 - 1610\text{ cm}^{-1}$ characteristic for the aromatic nuclei present in the copolymer (1) as well as in zinc phthalocyanine. From the FTIR spectrum of the analog polymer (2) it is observed the appearance of the wide band situated at $\nu = 3200 - 3400\text{ cm}^{-1}$ characteristic for the secondary and tertiary amine groups.

The absorption spectra of 0.5% PcZn grafted to N-VC:OC-1:Cl-AC copolymer (2) and 0.02% ZnPc grafted to N-VC:OC-1:Cl-AC copolymer (3) solutions are shown in Fig. 2. The UV-Vis spectrum of the copolymer grafted with PcZn revealed a wide band at $\lambda = 600 - 700\text{ nm}$, which increases in intensity at higher concentrations of PcZn. The UV-Vis absorbance spectra of grafting zinc phthalocyanine to copolymers N-VC:OC-1:Cl-AC is a confirmation that they have photosensitivity in this region.

In order to extend the spectral region of the photosensitive organic polymer material, the copolymers of N-vinylcarbazole: 1-octene and acryloyl chloride (N-VC: OC-1: Cl-AC) were grafted with zinc phthalocyanine by Friedel-Craftz reaction. As a result, a higher yield than 70% was obtained. The thin films of this photosensitive organic polymeric material have photosensitivity in the near visible and near infrared region.

MD.40.
Title
**PROCESS FOR OBTAINING FUNCTIONALIZED
CHITOSAN WITH DIHYDROXYFUMARIC ACID
RESIDUES**
Authors

Maria GONTA, Iacob GUTU, Mihail CEACIRU

Institution	Moldova State University
Patent no.	a 2021 0048 / 2021.07.16
Description EN	<p>The invention relates to the synthesis of a copolymer obtained after functionalization of chitosan (Cht) with carboxylic acid (dihydroxyfumaric acid), which has obtained from tartaric acid (a by-product of the wine industry). A new process for the functionalization of Cht with dihydroxyfumaric acid residues (Cht-DFH₂Na) has proposed. This includes: N-acylation of Cht with diacetyl tartaric anhydride and the formation of chitosan with diacetyltartaric acid residues (Cht-ADAT); alkaline hydrolysis of Cht-ADAT has performed and functionalized the chitosan with residues of tartaric acid (Cht-AT) obtained; oxidation of the composite Cht-AT with the Fenton reagent for obtaining the copolymer Cht-DFH₂Na. The synthesized product possesses antioxidant properties and can be successfully used to inhibit the oxidation of various organic substrates. The chitosan compound functionalized with natural antioxidant (dihydroxyfumaric acid) has reducing properties and can be used successfully to inhibit the oxidation of various organic substrates in the cosmetic, food, pharmaceutical and biomedical technology and in the inhibition of the formation of carcinogens, N - nitrosamines, as a result of in vivo nitrosation of medicinal substances with nitrites ions.</p>
Class no.	4. Medicine - Health Care – Cosmetics.

MD.41.

Title	GENETIC ALGORITHM FOR SOLVING THE NON-LINEAR TRANSPORTATION PROBLEM ON NETWORK WITH ONE SOURCE AND ONE DESTINATION
Authors	Tatiana PAȘA, Valeriu UNGUREANU
Institution	Moldova State University
Patent no.	MD 7066/2021.09.28
Description EN	<p>The genetic algorithm allows to solve non-linear large scale transportation problem on network with one source and one destination with concave cost functions. The proposed genetic algorithm significantly reduces the time to obtain the solution and problem can be solved in a reasonable time. It allows the exit from blockages in local solutions so that after a few iterations a chromosome with better characteristics is</p>

detected which is associated with a solution for which the transport cost is lower. The algorithm is implemented in the Mathematica System.

Class no. 10. Information Technology and Communication.

MD.42.

Title

METHOD FOR COLLECTING SOLID PARTICLES OF AIR POLLUTANTS

Authors

Arcadi CHIRITA, Veaceslav SPRINCEAN, Adrian PALADI, Vasili ANDRUH, Marianna SAVVA, Tatiana BULIMAGA, Marian JALENCU, Florentin PALADI

Institution

Moldova State University

Research project # 20.80009.7007.05

Patent no.

Advanced physical technologies with the UVS application in monitoring and modelling of environmental factors

Description EN

Invention relates to the identification of factors that pollute the atmosphere, in particular to the collection of solid particles and liquid droplets suspended in the atmosphere, and is used to monitor the environmental factors, being also attached to D800 X-8 drone platform*. Schematic representation of the airborne pollutants collection device depicts a silicon monocrystalline wafer 20x20 mm in size (1), which is installed in a dielectric frame (2). A tungsten filament (4), 30 μm in diameter, is mounted on dielectric holders (3) at 10 mm from the surface of the silicon wafer (1). When the high voltage source (5) is turned on, a positive potential of +5 kV is applied to the tungsten filament (4). The "0" electrode of the high voltage source (5) is connected to the reverse side of the silicon wafer (1). Solid particles in the air are positively charged and, under the action of an electrostatic field between the tungsten filament (4) and the silicon wafer (1), are collected on the surface of the silicon monocrystalline wafer (1). Solid particles and liquid droplets collected in such a way on the surface of the silicon monocrystalline wafer (1) can be examined straightforward by means of optical microscopy, atomic force microscopy (AFM) as shown in the figure below, as well as energy dispersive X-ray spectroscopy surveys (EDAX).

*ANCD research grant number 20.80009.7007.05.

Class no.

Environment - Pollution Control.

MD.43.**Title****INTEGRATED STUDY ON GOVERNANCE AND HUMAN RIGHTS IN THE REPUBLIC OF MOLDOVA****Authors**Rodica CIOBANU, Iordanca-Rodica IORDANOV,
Veronica MOCANU, Mariana ROSCA**Institution****Moldova State University
20.80009.1606.15****Patent no.***Modernization of the governance mechanisms focused on the protection of human rights*

The research carried out within phase two of the project illustrates the application and testing of the research methodology designed to identify the possibility of modernising governance mechanisms centred on the protection of human rights. The methodology applied helped to articulate an integral vision of the current real challenges, trends, action steps, as well as to identify drivers and benchmarks for the modernisation of the governance, including the primacy of human rights protection in the Republic of Moldova.

**Description
EN**

The research aimed to identify and propose key policy measures for reform through a comparative and integrated analysis. Thanks to the applied methodology, it was possible to identify the areas of convergence and of divergence between citizens and authorities, which converge not only the understanding of the substance of governance carried out through the principles of good governance, but also the involvement and the degree of rights' protection by the authorities. Thus, the research carried out provides a better understanding of the actions and areas for the social benefit. The results obtained were further validated through public debates held on sectoral issues with the involvement of professionals (representatives of the prosecutor's office, the judiciary, the Ministry of Internal Affairs) and academics in order to conceive and articulate a clear vision of how to modernise the governance in the Republic of Moldova.

Class no.12, Safety, protection and rescue of people.
14. Other.

MD.44.**Title****THE CURRENT MULTIDIMENSIONAL CONTEXT OF GOVERNANCE AND HUMAN RIGHTS IN MOLDOVA****Authors**

Rodica CIOBANU (coord.), Ion GUCEAC, Elena ARAMĂ, Andrei NEGRU, Iordanca-Rodica IORDANOV, Veronica MOCANU, Natalia CRECIUN, Oleg PANTEA, Svetlana SLUSARENCO

Institution

Moldova State University
20.80009.1606.15

Patent no.

Modernization of the governance mechanisms focused on the protection of human rights

**Description
EN**

The research highlights a subject that has been debated for many decades and apparently solved in all its theoretical and practical aspects, but nowadays, in the new reality of our human society, which is affected by various crises, including the pandemic and the war in Ukraine, has become a complex issue. In the Republic of Moldova, the problem of good and effective governance based on the protection of human rights has emerged as a result of the continuous crises (governmental, political, economic, health) that the country has experienced since the declaration of the independence until today. In this context, the research formulates possible solutions for overcoming and establishing democracy, good governance and strengthening the rule of law.

The research includes a comprehensive approach that reflects the interdependencies between the institutional and human dimensions, between the civil, cultural, economic, political and social dimensions, between what is and what should be.

The quality of governance is measured and analysed in terms of the degree of well-being and satisfaction of citizens, living conditions, degree of economic development, stability, existence and effectiveness of instruments and mechanisms for ensuring and respecting human rights.

Focusing on the identification of inseparable and interlinked dimensions to determine the fundamental benchmarks for good governance and democratisation, key assessment tools and means to create social and state stability are outlined.

Class no.

12. Safety, protection and rescue of people.

MD.45.

Title

INTERDISCIPLINARY METHODOLOGY IN THE PARADIGMATIC RECONSTRUCTION OF LAW

Authors

Rodica CIOBANU

Institution

Moldova State University
20.80009.1606.15

Patent no.

*Modernization of governance mechanisms focused on the protection of human rights***Description**
EN

The novelty and scientific originality of the results lie in the comprehensive study on the paradigmatic reconstruction of law by conceptualizing the research framework of the general theory of law, to strengthen its methodological dimension, by adopting an interdisciplinary approach that may overcome the crisis of legal science and lead to a continuous development under current conditions. The originality of the research consists in development of a new framework for the study of the theory of law, linked to the major trends of postmodern science - the multi-, inter- and transdisciplinary paradigmatic framework.

The main scientific results that help to solve the scientific problem consist in substantiating the reconceptualization of the scientific paradigm of law by applying the interdisciplinary methodology on convergence between legal theory and practice, which contributed to frame the complex character of the *person-state-law* axis, determining the reconfiguration dimensions and principles of the relations between epistemic and pragmatic framework, in order to identify effective law solutions and overcoming the legal science' crisis by strengthening the methodological dimension (general, fundamental and applicative) of the general theory of law.

The theoretical significance of the research consists in shaping the interdisciplinary paradigm based on the priority dimensions of law and current methodological principles, indicating the platform of rapprochement between legal theory and practice, as well as determining ways and means to overcome the crisis of legal science, as a primary step in overcoming the law crisis, by modeling and strengthening the interdisciplinary methodological foundations of the general theory of law.

The applicative value of the research is framed by two dimensions: one aims at creating a solid methodological support for the legal scientific research and an interdisciplinary platform for dialogue; another one focuses on updating the active role of human being in the current formula of the rule of law and legal science.

MD.46.

Title	HISTORY OF HIGHER EDUCATION IN MOLDOVAN SSR
Authors	Liliana ROTARU, Ion Valer XENOFONTOV
Institution	Moldova State University # 20.80009.1606.11
Patent no.	<i>University academic heritage from the Moldovan SSR: investigation and capitalization of good practices</i> The research carried out within the project aims to capitalize on the traditions, good practices and academic heritage of the higher education institutions that were created and operated in the Moldovan SSR. To this end, the first volume of unpublished archival documents was published with an introductory analytical study (<i>Crearea și consolidarea sistemului de învățământ superior în RSSM. Studiu, documente și materiale</i> [editor Liliana Rotaru], vol. I, Chisinau: Lexon-Prim, 2021. ISBN 978-9975-3502-6-6) and a bibliography on the subject, which includes topic publications, identified in libraries and databases in the Republic of Moldova (Istoria învățământului superior din RSS Moldovenească. Bibliografie/Bibliografie: Lidia Zasavițchi, Janna Nikolaeva; coordonator Liliana Rotaru. Chișinău: Lexon-Prim, 2022. ISBN 978-9975-163-06-4.). These volumes, as well as other publications, aim to create the theoretical-scientific and informational support for the elaboration/improvement of the national policies in the field of education and science in the Republic of Moldova.
Description EN	
Class no.	14. Other.

MD.47.

Title	USE OF NEO4J ALGORITHMS IN BIOLOGICAL DATA PROCESSING
Authors	Ion GANEA, Ana BÂRSAN
Institution	Moldova State University
Patent no.	<i>"Models, techniques and products intelligent data analysis program in plant genetics"</i>
Description EN	The Pearson Similarity algorithm from the Neo4j GDS library was used to determine the efficiency of bio-stimulators, which represents the ratio between the

covariance of the strings of the control samples and the samples on which the bio-stimulators were applied and the product of their standard deviations. The Pearson similarity algorithm calculates the protein content for all groups and is used to evaluate the similarity between the data obtained on the control group and those treated with P1R and P2B bio-stimulators. The resulting values vary between -1 (perfectly different) and 1 (perfectly similar).

The instruction verifies the similarity between the control group and the groups for which those compounds were applied. The *Pearson Similarity* algorithm calculates the protein content for all groups.

To this end, the *vectorType*: "maps" property is set as an additional parameter, and the *gds.alpha.similarity.asVector* function is used to construct a *map* type vector containing each group and the corresponding amount of protein.

In both cases, it was found that there was no similarity between the control group and the groups receiving bio-stimulators. The effect of applying bio-stimulators is significant.

Class no. 10. Information Technology and Communication.

MD.48.

Title

DROUGHT-RESISTANT NATIVE MEDICINAL PLANT VARIETY AND DEGRADED SOILS WITH A HIGH VALUE POTENTIAL IN COSMETOLOGY, NUTRITION AND PHARMACEUTICALS

Authors

Victor MELNIC, Elena PELEAH

Institution

MOLDOVA STATE UNIVERSITY

Patent no.

Patent application 2021 0008 / 2021.02. 26

**Description
EN**

Golden variety 21 (Imortela) perennial plant. It can be used in the cosmetology industry (queen of cosmetology), food (spice), pharmaceuticals, perfumery, balneotherapy. Variety resistant to increased drought and frost. Resistant to diseases and pests. High content of active ingredients and essential oil. It is not pretentious to the soil and can be grown on heavily sunny soils, rocky terraces, sandy-loamy. It is a variety that can prevent soil erosion and capitalization of lands with high, degraded slopes not used in the circuit.

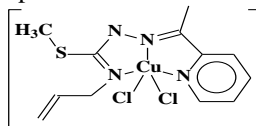
Class no.

3

"N.Testemiteanu"
State Medical and Pharmaceutical University

MD.49.	
Title	POLYMERIC MATERIALS WITH ANTIBACTERIAL PROPERTIES
Authors	Prisacari Viorel, Robu Ștefan, Sava Veronica, Rusnac Roman
Institution	Nicolae Testemitanu State University of Medicine and Pharmacy of the Republic of Moldova
Patent no.	Patent application nr. a 2020 0079 /2020.10.28
Description EN	<p>The invention relates to novel antibacterial preparations: polymeric materials with antibacterial properties based on chitosan, for use in the treatment of septic infections, including with multidrug-resistant causative agents. The essence of the invention consists in proposing two polymeric materials with pronounced antibacterial properties consisting of chitosan grafted with preparations based on isofural or furacillin, with a content of 10 to 30%.The technical result of the invention consists in the fact that the elaborated polymeric materials possess a pronounced bactericidal action at the level of isofural and furacillin preparations, but with prolonged activity, as well as 2-3 times better solubility in water, alcohol and organic solvents.</p> <p>Fields of application: medicine, pharmaceuticals.</p>
Class no.	4. <u>Medicine - Health Care – Cosmetics</u>
MD.50.	
Title	Dichloro{methyl-N-(prop-2-en-1-yl)-2-[1-(pyridin-2-yl)ethylidene] hydrazinecarbimidothioate-N,N,N}copper compound, inhibiting the proliferation of human rhabdomyosarcoma cells
Authors	GULEA Aurelian, GRAUR Vasilii, ȚAPCOV Victor, GARBUZ Olga, ANDRONACHE Lilia, CEBAN Emil, GUDUMAC Valentin.
Institution	Nicolae Testemitanu State University of Medicine and Pharmacy of the Republic of Moldova; State University of Moldova
Patent no.	MD No.4778 12/2021
Description EN	<p>The invention relates to chemistry and medicine, namely to a biologically active coordination compound from the class of transition metal S-alkylisothiosemicarbazones, and can</p>

find application in medicine in the treatment and prevention of human rhabdomyosarcoma (RD). According to the invention, the dichloro{methyl-N-(prop-2-en-1-yl)-2-[1-(pyridin-2-yl)ethylidene]hydrazinecarbamidothioate-N,N,N}copper compound with the formula:



inhibiting the proliferation of human RD cells was proposed. The result of the invention consists in the synthesis of the new copper coordination compound, inhibiting the proliferation of human RD cells 8.8 times more effective than the prototype, and 7.3 times more actively than the structural analogue.

Class no. Invention Classification (No 4)

MD.51.

Title

Anti-glaucoma shunt with valve

Authors

Bendelic Eugeniu, Alsaliem Sulaiman

Institution

Nicolae Testemitanu State University of Medicine and Pharmacy of the Republic of Moldova

Patent no.

Patent nr. MD 1493/ 2021

The invention relates to medicine, namely in ophthalmic microsurgery, being used in order to improve the surgical treatment of glaucoma patients by installing a controllable ophthalmomonotonia.

The problem solved by the present invention is to develop a device for normalizing intraocular pressure depending on its oscillations.

Description

EN

The advantages of the claimed device consist in the presence of the valve which, depending on the values of the intraocular pressure, will open and will allow the evacuation of the excess aqueous humor with the normalization of the intraocular pressure.

The design of the presented shunt (Fig. 1 and 2) allows the antiglaucoma intervention to be performed with minimal damage to the eye tissues.

The device meets the requirements and health standards, being made of polymethylmethacrylate (PMMA) and medical silicone, materials biocompatible with eye tissues.

Fields of application: medicine, ophthalmic microsurgery.

Class no.

4

MD.52.

Title **METHOD OF ISOLATION OF CELL CULTURES**
Authors **Jian Mariana, Nacu Viorel, Cobzac Vitalie, Braniște Tudor**
Institution **Nicolae Testemitanu State University of Medicine and Pharmacy of the Republic of Moldova**
Patent no. **MD 1584, 2021.12.31**

**Description
EN**

The invention relates to regenerative medicine and tissue engineering and can be used for isolating cell cultures intended for transplantation or testing of various compounds or substances *in vitro*. Summary of the invention consists in that the explant is placed in a cell culture vessel, into which a cell culture medium is poured, so that the explant is suspended in an environment that is incubated at 37°C, 5% CO₂ and in a humid environment for 3...4 days, after which the cell culture medium is changed and a small volume of medium is poured so that the explant is attached to the surface of the culture medium and incubated under the same conditions. The culture medium is changed every 24...48 hours, then after the appearance of cell colonies around the explant, it is placed in another part of the culture vessel with the addition of the culture medium in volume to maintain the explant on the surface of the culture medium. The number of changes in explant sites depends on the size of the cell culture vessel, and the isolation of cells is carried out until, for more than 7 days, the transition of cells from the explant to the surface of the medium with the formation of cell colonies occurs.

Class no.

4

MD.53.

Title **Method for assessing the influence of biologically active substances on hydrogen sulphide production capacity by a biological tissue.**
Authors **PANTEA Valeriana, ANDRONACHE Lilia, SARDARI Veronica, FULGA Ala, ȘVEȚ Inna, GAMANIUC Marina, GHINDA Sergiu, POPA Veaceslav.**
Institution **Nicolae Testemitanu State University of Medicine and Pharmacy of the Republic of Moldova**
Patent no. **MD No.1581 12/2021**
Description The invention relates to medicine and biochemistry and can

EN be used for selecting biologically active compounds affecting the production of endogenous hydrogen sulfide (H₂S), assessment of the activity of new agents in the prevention of complications of cardiovascular and neurodegenerative diseases, diabetes mellitus and other diseases.

The essence of invention consists in that the tested substances are mixed with phosphate buffer solution, which are incubated at 37°C, then a mixture, containing phosphate buffer solution, L-cysteine and pyridoxal-5'-phosphate is added. The samples are closed with a cover, containing on the inside a layer of agarose gel, containing sodium and potassium tartrate and copper (II) hydroxide. The samples are incubated at 37°C for 2 hours, after which the cover with the agarose gel is introduced into a plate reader and the absorbance is measured at 320 nm, then is calculated the hydrogen sulfide production capacity under the influence of the tested substances according to the formula: $CP (\%) = 100 - [1 - (Apr - Ab) / (Ak - Ab)] * 100$, where: CP (%) - hydrogen sulfide production capacity; Apr - absorption of the test sample; Ak - absorption of the control sample; Ab - absorption of the blank sample; in the event if the hydrogen sulfide production capacity exceeds 100%, the test substance activates the hydrogen sulfide production capacity, and if it is less than 100%, the test substance inhibits the hydrogen sulfide production capacity.

Class no.

4

MD.54.**Title**

Device for maintaining containers in the process of bubbling solutions for curative use

Authors

Bodrug Nicolae, Luca Ecaterina, Botezatu Adriana, Lungu Nicolae, Ursu Cătălina, Antonova Natalia, Tofan Elena

Institution

Nicolae Testemitanu State University of Medicine and Pharmacy of the Republic of Moldova

Patent no.

MD 1575/(BOPI 11/2021)

**Description
EN**

The invention relates to medical equipment and can be used for placing and fixing containers when bubbling solutions, namely for oxygenation or ozonation of solutions for curative use. Summary of the invention consists in that the device comprises a base (1) in the form of a plate with a size

of 125x200x10 mm, on which are rigidly fixed in a vertical position two parallel rods (2, 3), of a length of 600 mm and a diameter of 10 mm, the free ends of which are fixed to each other with the help of a horizontal bar (4) and screws (5). Each rod is equipped with a bushing (6, 7) with the possibility of sliding along the rods (2, 3), at the same time both bushings (6, 7) are rigidly fixed in a block with the help of a horizontal bar (8), at one end of which is fixed a handle (9) by means of screws (10), and at the opposite end is fixed a blocking mechanism (11) of the specified block. The blocking mechanism consists of a curved plate (12) and fixed on an axle (13), with the possibility of its movement at an angle of 90°. One end of the curved plate (12) is fixed in the handle (14), and the opposite end is made sharp (15), at an angle of 90° with respect to the longitudinal axis of the curved plate (12). On the front surface of the block are fixed in a vertical position two branch pipes (16) with the help of a rectangular plate (17) and screws (18). The lower ends of the branch pipes (16) are connected to two needles (19), one of which has a length of 10...15 cm, and the other 5...6 cm, the opposite ends of the branch pipes (16) communicate with silicone tubes.

Class no.

4

MD.55.**Title**

Method for complex treatment of SARS-CoV-2 virus infection

Authors

Luca Ecaterina, Țurcanu Gheorghe, Ursu Cătălina, Antoci Elmira, Calancea Valentin, Zlatovcena Alla, Gușan Ion, Bodrug Nicolae

Institution

Nicolae Testemitanu State University of Medicine and Pharmacy of the Republic of Moldova

Patent no.

MD 1561/2021

**Description
EN**

The invention relates to medicine, the specialty of pneumology and can be used for the treatment of SARS-CoV2 infection. At the current stage, SARS-CoV2 infection is aggravated by the presence of comorbidities, which significantly complicates the evolution of the disease and reduces the effectiveness of the therapeutic procedure. Therefore, it is necessary the intervention in the therapeutic scheme in order to correct the therapeutic management of patients with SARS-CoV2 infection by

combining ozone therapy with the regular treatment by different **ways**: ozonated physiological solutions, rectal insufflations and nasal insufflations, according to the individualized therapeutic protocol.

The ethiopathogenetic **effects** expected from the complex therapy are anti-inflammatory antipathogenic (antiviral, antibacterial), immunomodulator, metabolic correction with activation of oxygen-dependent processes, detoxification, optimization of the blood rheology. **Socio-economical relevance**: Inclusion in the patient's treatment scheme the ozone therapy allows faster and more stable reduction of clinical manifestations: fatigue, asthenic syndrome, dyspnea, reflected by objective examination data, improved oxygen saturation values, stabilized heart rate and arterial blood pressure.

Domains of application: Internal Medicine, Pneumology.

Class no.

4

MD.56.

Title

Device for excision of soft tissues in pericoronaritis

Authors

Motelica Gabriela, Chele Nicolae, Rusu Andrei

Institution

Nicolae Testemitanu State University of Medicine and Pharmacy of the Republic of Moldova

Patent no.

MD 1539/2021

Description

EN

The essence of the invention lies in the fact that the device for excision of soft tissues in pericoronaritis, which includes two jointed branches hinged together, which are held in the open position with the help of an S-shaped keeper, on the working parts of which removable nozzles are fixed, one of which is executed in the form of a supporting element, and the other At the same time, the support element is executed as a rectangular plate with rounded corners with a width of 7 mm, and the cutting element with a width of 6 mm and a height of 1,5 mm is executed in a shape congruent with the support element and has the edges with a cutting edge bent and oriented to the support element, millimeter gradations are executed on the cutting element, and millimeter gradations.

Class no.

4

MD.57.**Title****DEVICE FOR DECELULARIZATION OF BIOLOGICAL TISSUES****Authors****Macagonova Olga, Cociug Adrian, Nacu Viorel Nicolae Testemitanu State University of Medicine and****Institution****Pharmacy of the Republic of Moldova,**
Laboratory of tissue engineering and cellular cultures**Patent no.****MD 1567 (BOPI nr. 10/2021)****Description
EN**

The invention relates to medicine and can be used in regenerative medicine, the field of tissue engineering, namely as a device for the diffusion of solutions through the biological membrane under negative pressure. The problem solved by the invention is the creation of a new device that allows us to create the negative pressure in the vessel where decellularizing solution leaks and to reduce the diffusion time of the solutions through the biological membrane from 24 hours to 30 minutes. The device for the diffusion of solutions through the biological membrane under pressure in the decellularization process, consists of two cylindrical vessels, graduated made of plastic mass, which open towards the pump, which allows the formation of a vacuum in the lower vessel.

Fields of application: regenerative medicine and tissue engineering

Class no.

4

MD.58.**Title****Device and method of tracheostomy in children****Authors**

Țîbîrnă Gheorghe, Gudumac Eva, Railean Silvia, Bernic Jana, Țîbîrnă Andrei, Lisița Natalia, Tofan Eugenia, Danilov Lucian, Ababii Polina, Spinei Aurelia, Porosencov Egor, Mănăscurtă Ghenadie, Ursu Dănis, Poștaru Cristina

Institution*Nicolae Testemitanu State University of Medicine and Pharmacy of the Republic of Moldova***Patent no.**

MD 1559, BOPI nr. 8/ 2021

**Description
EN**

The invention relates to medicine, in particular to medical equipment for use in maxillofacial surgery and for performing tracheostomy in children.

Tracheostomy is the emergency surgical treatment of acute ventilatory dysfunction (by obstruction of the upper respiratory tract) or is performed with well-defined

indications in a number of conditions, which require the restoration of adequate ventilation.

The problem solved by the invention consists in the elaboration of a device and a method for performing tracheostomy in children, which would eliminate the disadvantages of the device and the known method, with the prophylaxis of intraoperative or postoperative complications, such as hemorrhages or inflammatory processes that can lead to scarring and scar stenosis.

Class no.

4

MD.59.

Title

Method for treating chronic sclerosing abacterial prostatitis complicated by infravesical obstruction

Authors

Ghicavii Vitalii, Colța Artur

Institution

Nicolae Testemitanu State University of Medicine and Pharmacy of the Republic of Moldova,

Patent no.

MD 1527 /2021

**Description
EN**

The invention relates to medicine, in particular to urology, and can be used for treating chronic sclerosing abacterial prostatitis complicated by infravesical obstruction. Summary of the invention consists in that it is preoperatively performed the transrectal ultrasound examination of the prostate with the determination of the prostate volume and its ecostructure, then the patient is placed on the operating table in the lithotomy position, is performed the spinal anesthesia, afterwards using a thulium YAG laser with continuous wave, of a length of 2,0 microns, is dissected the sclerotic tissue of the prostate up to its capsule, from the neck of urinary bladder up to the seminal colliculus, to the right and left of the middle lobe, the incisions are made in the projection of 5 and 6 or 7 and 12 o'clock of the conventional dial, is performed the enucleation of the middle lobe, then in turn are enucleated the lateral lobes or is enucleated the middle lobe together with one of the lateral lobes, depending on the spread of the process, at the same time it is performed the hemostasis, then in the cavity of the urinary bladder is performed the disintegration of sclerosing voluminous tissues, which are crushed with a morcelator and removed from the cavity of urinary bladder.

Class no.

4

MD.60.**Title****Importance of the forensic-chromatic tools (color palette and forensic-color ruler) in medico-legal practice****Authors**

Padure Andrei, Luchin Lilian, Mokaniuk Oleksandr

Institution***Nicolae Testemitanu* State University of Medicine and Pharmacy of the Republic of Moldova****Patent no.**

Series O no. 6543; 6544

**Description
EN**

During medico-legal examination becomes necessary to describe the color of different researched objects and reflect within an image their size and color. This purpose can be achieved by using a standard color palette and photographing using a forensic ruler placed next to the investigated object. In certain situations, the correct appreciation of color and its name becomes crucial for conclusions.

The color palette is a tool for colors identification and standardization of their names during examinations. It is made of thin plastic on white background (18x14cm) and has two functional surfaces. On the front is the color palette itself, and on the back - the color nomenclature. The palette contains 12 chromatic colors with two light and dark shades as follows: red, red-orange, orange, yellow-orange (gold), yellow, yellow-green, green, blue-green (turquoise), blue, blue-purple (indigo), purple (violet), red-purple. It also contains achromatic colors: black, white and gray with two light and dark shades. Each color is placed on a 1.3cm square and is coded according to color nomenclature. There are 67 squares with chromatic and achromatic colors. The nomenclature represents the name of colors and their shades reflected in the color palette and includes 67 names.

The complex ruler is made of thin plastic, consists of two branches joined at one end and is foldable. Each branch is 16x3.5 cm in size. The forensic ruler has white background surface with black inscriptions on one side, and black background with white inscriptions on another one and contains the necessary forensic elements. The color ruler consists of 3 rows of 12 chromatic and achromatic colors and their light and dark shades as in the color palette. Each color is placed on a 0.8cm square and is coded according to the color nomenclature in the color palette.

Class no.

4

MD.61.**Title**

INSTRUMENT SET to assess and raise awareness of the phenomenon of climate change and the process of adaptation

Authors

Croitoru Cătălina

Institution

Nicolae Testemitanu State University of Medicine and Pharmacy of the Republic of Moldova

Patent no.

-

**Description
EN**

As a result of the activity in the postdoctoral research project and in several projects initiated at the proposal of the Francophone University Agency (AUF), a set of tools has been developed that can be used both to assess and raise awareness of climate change, its consequences on human health and adaptation, and impact prevention measures.

The aspect included in this competition presents some of the objectives of the research project "Estimating the stressful impact of heat waves on the health of the population" (*N. Testemitanu* USMF Research Ethics Committee, No. 13 of 15.03.19).

Class no.

4

MD.62.**Title**

Cultivation process of raw material based on *Pichia pastoris* with the expression of growth hormone

Authors

Rusnac Liliana, Valica Vladimir, Cazacu Radu, Scutari Corina, Grigoriev Valeria, Boiciuc Chiril, Cazacu Vasile, Todiraş Mihai

Institution

Nicolae Testemitanu State University of Medicine and Pharmacy of the Republic of Moldova

Patent no.

-

**Description
EN**

Within the collaboration among *Nicolae Testemitanu* SUMPh, the pharmaceutical company Balkan Pharmaceuticals and ICGEB the technological transfer was carried out for scale-up from laboratory to pilot stage of working cell bank preparation and *Pichia pastoris* growth, with the purpose to manufacture the recombinant human growth hormone (rhGH). *Pichia pastoris* is a methylotrophic yeast. High growth rate on an inexpensive and almost protein-free medium, the secretory pathway that exhibits much of the structure and function of the mammalian secretory system as the capacity to fold, to glycosylate and

to secrete proteins makes this system suitable for biotechnological use. The GH1 altered recombinant human somatropin gene was directionally cloned into the *Pichia pastoris* culture genome by restriction near the AOX1 gene promoter as expression vector serving the pPIC9K plasmid. The GH1 gene was activated by the AOX1 gene promoter which may be induced by the presence of methanol in the culture medium. Subsequently, the "Prepro-alpha Factor Leader" sequence from *Saccharomyces cerevisiae* was added to the modified sequence so that the obtained somatropin could be secreted into the culture medium. Within the project "Cultivation process of raw material based on *Pichia pastoris* with the expression of growth hormone" the impact of the chosen technological processes on the obtained product was evaluated, Technological Protocols for short-term and long-term storage of *Pichia* strains, inoculation and growth (Erlenmeyer flask) of *P. pastoris* were developed. Standard Operating Procedures were elaborated for working cell bank preparation and in-vitro assay of hGH biological activity, for the subsequent manufacture of the rhGH biosimilar at the pharmaceutical company Balkan Pharmaceuticals SRL.

Class no.

3

MD.63.**Title**

„The assessment of health status and patients' life quality included in the Covid-19 Electronic Register"

Authors

Costru Tudor, Puia Raisa, Buta Galina, Cojocaru Stela, Groppa Stanislav, Ungureanu Alina, Gorobievski Svetlana

Institution

Nicolae Testemitanu State University of Medicine and Pharmacy of the Republic of Moldova (*Nicolae Testemitanu* SUMPh)

Patent no.

-

The registration of copyrights and related rights certificates is achieved through the project „The assessment of health status and patients' life quality included in the Covid-19 Electronic Register". The development of „The Electronic Register of patients with COVID-19 hospitalized in Public Medical Institutions of the Republic of Moldova" and „The assessment of health status and patients' life quality included in the Electronic Register of patients with COVID-19 hospitalized in PMI of Moldova" was carried out by the

**Description
EN**

project team from the *Nicolae Testemitanu* SUMPh. The Electronic Register allows the rapid processing and structuring of data of patients hospitalized with COVID-19 in accordance with the standardized requirements. It was developed within the project and it is applicable from February 2021.

The socio-economic and technical role of the project: These inventions serve as practical support in creating effective tools for assessing the impact of SARS CoV-2 infection on patients' health and life quality. Knowledge of the disease's peculiarities depending on the multitude of predisposing factors is essential for understanding the consequences of the disease, the therapeutic management, and for assessing the need and effectiveness of recovery measures, including their influence on health-related life quality. Analysing the structured data in the registry facilitates smart decisions based on credible evidences.

The fields of activity: clinical medicine, social medicine, public health and management.

Through the innovation and technology transfer project no. 22.80015.8007.258T, which runs from 03.01.2022 at the *Nicolae Testemitanu* SUMPh, the software „The Electronic Register of patients with COVID-19” will be implemented in 3 medical institutions.

Class no.

4

MD.64.

Title

Method for restoring bone defects of the jaws

Authors

ZUGRAV Vasile, MD; CHELE Nicolae, MD

Institution

NICOLAE TESTEMITANU State Medical and Pharmaceutical University, Republic of Moldova

Patent no.

Patent No. 1503; 2020.10.05

Description EN

The invention relates to medicine, especially to dentistry and can be used for restoring bone defects of the jaws, caused by pathological or physiological bone resorption. Summary of the invention consists in that it is preoperatively performed the computed tomography with the determination of the dimensions of the bone defect of the jaw, then from the patient 2-3 hours before the procedure is sampled 10 ml of venous blood, which is centrifuged for 8-12 min, at 3000-3500 rpm, to obtain a platelet-rich suspension, after which is

stretched a piece of absorbable surgical polyglactin or polyglycolic acid mesh, on which are applied hydroxyapatite crystals and is sprayed with the prepared suspension with the formation of a membrane-shaped complex, which is introduced into a press box for its dehydration (fig. 1). Then local anesthesia and an incision of the mucous membrane are performed, the tissues are detached with the formation of a mucoperiosteal flap, the granulation tissues and sharp edges of the bone are removed; a bone allograft is applied in the defect site as an augmenting material (fig. 2), over which is applied the prepared membrane (fig.3), which is adapted to the dimensions of the bone defect, and the free edge of the membrane is fixed with absorbable staples, avoiding free spaces in the area of the bone defect, after which the mucous membrane is sutured.

Class no. 4

The State Agrarian University of Moldova

MD.65.**Title****Procedure For Feeding Cows****Authors**

Krasociko P., Eremia N., Antonova Z., Antonova M.,
Krasociko I., Karpenea M., Podrez V., Krasociko P.,
Karpenea A., Modvala S., Roşca M.

Institution

The State Agrarian University of Moldova
Academy of Veterinary Medicine in Vitebsk

Patent no.**Patent application, nr. S 2021 0097****Description
EN**

The feeding process for young bovine animals includes feeding them at the basic ration and combined feed in which as a source of energy dry protected fats are used as a basis for waste from the production of rapeseed oil in the amount of 3% or 45 ... 72 g of mass of combined feed in the amount of 1.5 ... 2.4 kg / head / day, distribution 2 times a day (morning and evening, in equal amounts from the daily norm).

Class no.**3. Agriculture and Food Industry****MD.66.****Title****Method For Preventing Immunodeficiency Dyspepsia In Calves****Authors**

Krasociko P., Eremia N., Krasociko I., Kozel L., Vîsocina E., Neicovcena I.

Institution

The State Agrarian University of Moldova
Academy of Veterinary Medicine in Vitebsk

Patent no.**Patent, nr. 1530 Z 2021.12.31****Description
EN**

The method for preventing immunodeficiency dyspepsia in calves comprises feeding newborn calves with a mixture containing, per 1 L: skimmed milk powder - 100 g, apitherapeutic product - 1.0-2.0 g, water at a temperature of 38-40°C - the rest, in a dose of 1000.0 ml / head once a day, for 30 days, at the same time the apitherapeutic product contains, in a ratio of 3:1, powder of dead bees and a mixture of drone larvae homogenized with lactose and glucose.

The result of the invention consists in reducing the incidence of calves due to immunodeficiency dyspepsia.

Class no.

3

MD.67.

Title	Process for shaping the slender spindle crown of the apple tree
Authors	BALAN, Valerian., BALAN Petru., BÎLICI Inna
Institution	State Agrarian University of Moldova
Patent no.	1229 Z 2018.09.30
Description EN	The invention relates to fruit growing, namely to a process for shaping the slender spindle crown of the apple tree. The process, according to the invention, comprises arcuation of the highly developed trunk without branches with its fixation in horizontal position in spring in the first year after planting at the onset of the awakening of buds, selection of an extension shoot of the central axis with arched-cane pruning of vertical shoots when they reach a length of 20- 25 cm, fixation of the extension shoot in vertical position, in July.
Class no.	3. Agriculture and Food Industry

MD.68.

Title	Process for thinning apple tree flowers
Authors	BALAN, Valerian., VĂMĂȘESCU, Sergiu
Institution	State Agrarian University of Moldova
Patent no.	MD 1230 Z 2018.09.30
Description EN	The invention relates to fruit growing, namely to a process for thinning apple tree flowers. The process, according to the invention, comprises spraying the trees with a 0.5...0.6% aqueous urea solution, with a consumption of 1000 L/ha, in spring in the flowering phase, 75% of the flowers being opened before the first flower petal fall, at the temperature of 12...25°C and air humidity of 65-80%.
Class no.	3. Agriculture and Food Industry

MD.69.

Title	Process for rind cutting grafting of fruit trees
Authors	BALAN Valerian, MD; ȘARBAN Vasilie, MD; GUCI Ivan, MD
Institution	State Agrarian University of Moldova
Patent no.	MD 1398 Z, 2019.12.31
Description EN	The invention relates to agriculture, in particular to horticulture, namely to a process for rind cutting grafting of fruit trees. The process, according to the invention,

comprises stump cutting of the stock with the clean-up of the obtained section, in the rind is made at least one longitudinal incision of a length of 3-5 cm and is exfoliated the rind on one side of the incision, on the scion is made an oblique section of a length of 4-5 cm, the scion is shortened to 2-3 buds, then on one side of the edge of the scion section is removed a narrow strip of rind to the cambium, is scrapped the epidermis on the opposite side of the section, is introduced the scion under the exfoliated rind of the stock, is tied up, is stuck a blade between the tying and the stock and is coated with grafting wax, at the same time on one stock can be grafted 1- 3 scions. The result of the invention consists in obtaining a stable concretion of the scion with the stock and the rapid concretion of symbionts, which ensures good growth of the scion.

Class no.

3. Agriculture and Food Industry

MD.70.**Title****Blackberry ramification method****Authors**

Balan Valerian, Pompuș irina, Dodica Dumitru, Șarban Vasile, Guci Ivan

Institution**State Agrarian University of Moldova****Patent no.**

Nr. 1442 din 2020.07.31

**Description
EN**

The invention relates to the agriculture, in particular to fruit growing (pomology), namely to a blackberry pruning method. According to the invention, the method includes the pinching of 2-3 apical leaves on the annual stems without branches, which have reached the height of 1,5-1,7 m, at the same time the pinching is performed without traumatizing the stem apex and can be repeated, if necessary, at intervals of approximately 5-7 days. The technical result of the invention consists in creating optimal conditions for branch growing on the stems, the formation of cold-resistant fruiting branches, which ensure the production of large quantities of high quality fruits.

Class no.

3. Agriculture and Food Industry

MD.71.

Title	Raspberry pruning method in the first year after planting
Authors	Balan Valerian, Dodica Dumitru, Șarban Vasilie, Guci Ivan, Pompuș Irina
Institution	State Agrararian University of Moldova
Patent no.	Nr. 1443 din 2020.07.31
Description EN	<p>The invention relates to the agriculture, in particular, to fruit growing (pomology), and namely to a raspberry pruning method in the first year after planting. According to the invention, the method includes pruning the stem of the parent plant at the level of the roots, when the newly formed suckers reach the height of 10-15 cm.</p> <p>The technical result of the invention allows to increase the survival rate of raspberry plants and the formation of well-developed suckers, which ensure the next year's harvest.</p>
Class no.	3. Agriculture and Food Industry

MD.72.

Title	Process for cultivating blackberries
Authors	BALAN Valerian, MD; POMPUȘ Irina, MD; DODICA Dumitru, MD; ȘARBAN Vasilie, MD; GUCI Ivan, MD
Institution	State Agrararian University of Moldova
Patent no.	Nr. 1450 din 2019.12.18
Description EN	<p>The invention relates to agriculture, in particular to fruit growing, namely to a process for cultivating blackberries. The process, according to the invention, comprises tying fruit canes to a trellis in spring, after which a cord is tied to the trellis posts, parallel to the wire and fastened to it using fasteners. The blackberry offshoots and sprouts are directed between the wire and the cord. After harvesting, the branches that have borne fruits are cut off at the base and removed, and in late autumn, the cord fasteners are removed, the cord is untied from the posts and collected, and the newly formed fruit canes are allowed to freely fall to the ground.</p>
Class no.	3. Agriculture and Food Industry

MD.73.**Title**

Adjusting sustainable and ecological technologies of fruit production in quantitative and qualitative aspects depending on the integrity of the culture system and climate change

Authors

Balan Valerian, Peşteanu Ananie, Manziuc Valerii, Vămăşescu Sergiu, Bîlici Inna, Ivanov Igor, Balan Petru, Şarban Vasilie, Buză Corneliu, Talpalaru Dumitru, Dodica Dumitru

Institution

State Agrarian University of Moldova

Patent no.

MD Proiect nr.20.80009.5107.04

Climate change is one of the major challenges of our century and the effects of climate change on the anthropic ecosystems represent an alarming concern. Based on these assumptions, the present research project aims to evaluate the agro-biological potential of some varieties of **apricot, plum, sweet cherry, apple, walnut, raspberry and blackberry** in the context of the current climate changes in order to establish a range of cultural assortments and cultivation technologies that will allow achieving sustainable and competitive ecosystems.

**Description
EN**

The research objectives are focused on the growth and improvement of the research-development activity by accumulating fundamental knowledge, on developing solutions for sustainable ecosystems by choosing the most adapted apricot, plum, sweet cherry, apple, walnut, raspberry and blackberry varieties for each studied area and on adjusting appropriate cultivation technologies.

The solutions to the research problems addressed in the project will contribute to the modelling of the plantation structure, the programming of higher yields appropriate to the production conditions, the development of operating techniques during the harvesting and post-harvesting period of fruits, as well as ensuring sustainable agriculture, food security and food safety.

The team will coordinate its activities with **APEF „Moldova fruct”, UAPCN „Asociația Nucicultorilor din Moldova”, Public Institution „Laboratorul central fitosanitar”**, will have a close collaboration with the associations of agricultural producers in order to avoid duplication of efforts and to achieve a positive synergy in pursuit of common goals. ***Within the project 18,817.05.29A 7 patents were elaborated: MD 1189, 1190, 1229, 1230, 1442, 1443, 1450***

Class no.

3. Agriculture and Food Industry

“Ion Creangă” State Pedagogical University of Chisinau**MD.74.****Title**

„e-Medical English - interactive digital software for the computer-assisted study of English medical terminology, Volume 1.

Authors

V.Cazac, L. Armașu-Canțir, G.Grădinari, N.Balmuș

Institution

“Ion Creangă” State Pedagogical University of Chisinau

Patent no.

O Nr 7119, from 05.01.2022 (Certificate of Copyright and Related Rights, AGEPI Moldova),

**Description
EN**

”e-Medical English - interactive digital software for the computer-assisted study of English medical terminology is a software (interactive digital course book), carried out via Delphi 10.1 FMX (Cross-Platform App Development Software). The volume 1 contains 10 content units based on short videos that are accessed directly from the pages of the manual. Interactive learning / assessment activities are carried out through various tests: true / false, choose the correct options, odd one out, labeled texts and images, gap filling, etc. The originality under which the copyright and related copyrights of the e-Medical English software have been registered lies in the flexible way in which the digital resources are created, edited and included within the manual pages. Currently e-Medical English volume I comprises 10 videos (online/offline/QR code access and annotated audio descriptions) , including tests such as: multiple choice -10; selection/identification -12, reordering/rearrangement -9; revision -8, replacement/correction -12. "E-Medical English" is available in 2 versions, both for teachers and for students. The teacher version allows the user to create and include various resources and digital activities for learning, self-assessment and class assessment. The student version allows the user to explore the information included in the textbook and interactively complete learning and assessment tasks available and permitted by the teacher.

Class no.

10

MD.75.**Title**

Virtual Wave Optics Laboratory (LabVirt 1.00)

Authors

N.Balmuş, I.Andronic, T.Chiriac

Institution**“Ion Creangă” State Pedagogical University of Chisinau****Patent no.**

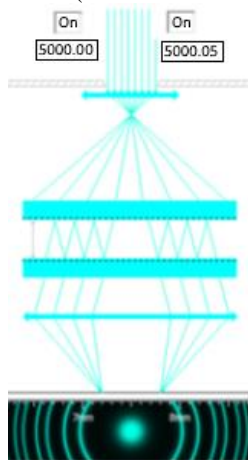
Series O Nr.6788, from 14.01.2021 (Certificate of Copyright and Related Rights, AGEPI Moldova),

LabVirt 1.00 is a set of educational software carried out via Delphi 10.1 FMX (Cross-Platform App Development Software) with the help of which users perform experiments and virtual labojratory works of wave optics. Version 1.00 includes experiments and virtual laboratory work to study the emission and absorption spectra, interference (Young's double slit, Fresnel's double prism and mirror, Lloyd's mirror, Newton rings) diffraction (Fresnel and Fraunhofer), diffraction grating, interferometers (Michelson, Fabry-Perot and Jamin).

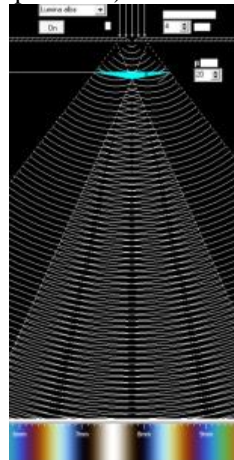
Copyright and related rights have been registered based on the originality of the algorithms for simulating the interference and diffraction phenomena. The originality of virtual laboratory work is based on algorithms that generate realistic experimental data, affected by errors modeled on the basis of the normal Gauss distribution.

Description

The laboratory's works contain options for knowledge assessment (randomized tests and problems).

EN

Fabry-Perot Interferometer



Fresnel interference.

Academy of Economic Studies of Moldova

MD.76.**Title**

**IMPROVING THE PERFORMANCE OF
AGRICULTURAL HOLDING COMPANIES IN THE
NATIONAL ACCOUNTS SYSTEM. RAP MODEL**

Authors

**Victor Romeo IONESCU, Monica Laura ZLATI,
Valentin Marian ANTOHI, Silviu STANCIU,
Svetlana MIHAILA, Galina BĂDICU**

Institution

**Academia de Studii Economice a Moldovei,
Universitatea „DUNĂREA de JOS” din Galați**

Patent no.

**Certificate SAIP AGEPI MD seria OȘ 7106 din
10.12.2021**

**Description
EN**

The performance farming is a new bet for the EU in the context of the present's major climate and economic challenges. This paper aims at defining a model of agricultural competitiveness for the EU and its application for the evaluation of regional agricultural performance, in relation to the global competitiveness index, using the theory of catastrophes.

The objectives of the analysis are: to evaluate the current growth theories in agriculture, to conceptualize a new model of agricultural performance improvement (RAP), to test the model and to obtain the relevant working tools after its application. The used methods are: the study of the general models of growth in agriculture; the dynamic analysis of the Eurostat data on agricultural performance and Member States' data published in the National Accounts System; the conceptualization of the RAP (Regional Agricultural Performance) growth model; the statistical testing of the model, its connectivity with global competitiveness indexes and climate change; the hypotheses' building in order to eliminate the climate transformations influences according to the catastrophe theorem's results; and providing a viable and sustainable tool for the national strategy for agriculture's forecasting changes to the Member States.

The novelty element brought by the present proposed model is that of quantification in a broader and special way of the impact of environmental changes on the performing agricultural output in terms of National Accounting System.

MD.77.**Title****BIVARIATIONAL SENSITIVITY ANALYSIS OF DETERMINANTS IN INCREASING THE QUALITY OF INTEGRATED REPORTING****Authors**

Veronica GROSU, Svetlana MIHAILA, Marius – Sorin CIUBOTARIU, Elena HLACIUC, Marian SOCOLIUC, Cristina - Gabriela COSMULESE, Mihaela TULVINSCHI, Anamaria-Geanina MACOVEI

Institution

Academia de Studii Economice a Moldovei, Universitatea “STEFAN CEL MARE”, Suceava

Patent no.

Certificate SAIP AGEPI MD seria OȘ 7108 din 16.12.2021

**Description
EN**

The importance of the IR issue lies in the fact that today most companies have become increasingly interested and focused on integrating financial information into the sustainable context of their economic development, which results in increasing the transparency, integrity and accuracy of their financial results using a single reporting tool. This tool identified in this research paper based on the suggested model will increase its sustainable use, providing its users with a new form of integrated thinking and a new means of communication with the external environment, making a stronger connection between the internal functions of the company and the demands of stakeholders.

Last but not least, IR based on GRI Standards and European directives that are quite new, while the number of those business entities that report on the basis of GRI Standards is in some way limited.

Consequently, our study proposes a viable model for assessing the quality of RIS, capable of ensuring the best integration, analysis and identification of these correlations between the three areas of sustainable development (i.e. economic and financial, environmental and social).

Institute of Chemistry, Republic of Moldova

MD.78.

Title **Composition with antioxidant properties for crop plants**
Authors Bulhac Ion, Ștefiriță Anastasia, Brînză Lilia, Zubareva Vera
 Institute of Chemistry, Chisinau, Republic of Moldova
Institution Institute of Genetics, Physiology and Plant Protection,
 Chisinau, Republic of Moldova
Patent no. Patent application a 2021 0024, 2021.04.27

The invention relates to novel chemical compositions with properties of biologically active substances, which can be used in agriculture to reduce the negative impact of reactive oxygen species on maize and soybean plants and to reduce the oxidative destruction of cellular components.

A new complex composition, conventionally called Tiogalmet, is proposed, which contains thiourea and galmet - a preparation consisting of a mixture of gallates of potassium, ammonium, magnesium, and potassium molybdate and ammonium paramolybdate.

Description EN

The technical result of the invention consists in increasing the antioxidant properties of maize and soybean plants in optimal humidity conditions by about 27.00 and 17.00% respectively compared to the control and by 42.85 and 18.89% - in conditions of insufficiency of moisture. The technical result is ensured by decreasing the content of malonic di-aldehyde - the final product of peroxide oxidation of lipids by reactive oxygen species, and by intensifying the activity of enzymes of antioxidant protection systems.

The advantages of the invention consist in the greater effect on the degree of increase of the antioxidant properties of the plants compared to the closest technical solution: by 17, 0 - 7,0% respectively for corn and soybean in optimal conditions and by 20,5 and 6,0 % in moderate drought conditions.

MD.79.

Title **Inhibitor of steel corrosion in water**
Authors LOZAN Vasile, PARȘUTIN Vladimir, COVALI Alexandr,
 JOVMIR Tudor
 Institute of Chemistry of Republic Moldova;
Institution Institute of Applied Physics of Republic Moldova

Patent	MD1615 Y (2022.04.30) The invention relates to the field of metal protection against corrosion in water and can be used for inhibition of corrosion in closed steel pipeline thermal systems. It has been proposed a combination of organic dicarboxylic acids, namely adipic and alpha-ketoglutaric acids, as inhibitor of steel corrosion, effective concentrations being 0.025-0.75 g/L and 0.05-0.75 g/L respectively.
Description EN	Due to unexpected synergetic effect of acids action, the corrosion lost is reduced up to 40 times, compared with corrosion in absence of named inhibitors.

MD.80.	
Title	Cadmium(II) one-dimensional coordination polymer based on 1,2-bis (pyridin-4-ylmethylene)hydrazine and 2-aminobenzoic acid ligands, which shows a photoluminescent activity and an ability to solvent exchange.
Authors	Lozovan Vasile; Fonari Marina; Kravtov Victor; Siminel Nikita; Coropceanu Eduard; Kulikova Olga; Costriucova Natalia.
Institution	Institute of Chemistry, MD; Institute of Applied Physics, MD; Tiraspol State University, MD.
Patent	Nr. 4776 B1 The essence of the invention consists in obtaining of Cd(II) one-dimensional coordination polymer [Cd(2-aba)₂(4-bphz)]_n·0,75n(dmfmf) based on the bridging azine 1,2-bis(pyridin-4-ylmethylene)hydrazine (4-bphz) and terminal 2-aminobenzoate (2-aba) ligands, that shows a photoluminescent sensitivity in the process of exchanging or removing solvent molecules (dimethylformamide) from the crystal cavities . The polymeric structure is preserved in the process of exchanging or evacuation of the solvent molecules. This compound exhibits selective photoluminescent activity when exchanging or removing guest molecules from the crystal structure accompanying by changes in the emission intensity or by displacement of the emission bands. The compound shows photoluminescence sensitivity for ethanol guest molecules, indicated by significantly higher emission intensity compared to other guest species, and may serve for possible application as a sensor for detecting of ethanol molecules.
Description EN	

MD.81.	
Title	Process for treating common winter wheat grains
Authors	Lupascu G., Macaev F., Gavzer S., Cristea N., Lupascu L., Stangaci E., Pogrebnoi Vs., Pogrebnoi S.
Institution	Institute of Chemistry, Republic of Moldova; Institute of Genetics, Physiology and Plant Protection;
Patent	MD 1604
Description EN	<p>The problem solved by the invention is the extension of the range of processes for the treatment of common winter wheat grains with compounds of class 1,2,4-triazoles to increase the resistance of wheat plants to the <i>Fusarium oxysporum</i> action.</p>
	<p>The technical result of the invention is that the treatment of common winter wheat grains of the lines Moldova x Moldova 3 (LM / M3) and Select x BT43 / 42 x Select (L SBS), in the presence of the fungus <i>F. oxysporum</i>, with the compound (z) -1- (2,4-dichlorophenyl) -5-methyl-2- (1h-1,2,4-triazol-1-yl) hex-1-en-3-one in concentrations of 0.005 and 0.01% for 3 hours contributes to the increase of dry mass per plant by 9.99... 30.47% compared to the closest prior art, which denotes that the compound contributes to the increase of the wheat resistance to this pathogen and presents an opportunity to use it in the measures of common winter wheat protection from one of the causative agents of root rot.</p>
MD.82.	
Title	Methyl ester of (16R)-spiro[pyrrolidin-2', 16-ent-17-norkauran]-19-oic acid with selective cytotoxic activity
Authors	Kulcički Veaceslav, Gîrbu Vladilena, Pruteanu Elena, Renaud Philippe, Daelemans Dirk, Ungur Nicon
Institution	Institute of Chemistry of Moldova
Patent no.	Katholieke Universiteit Leuven
	MD4792 (B1)
Description EN	<p>The invention relates to a natural compound derivative that has selective cytotoxic properties in relation to certain lines of human cancer cells and can be used as a chemotherapeutic agent for the treatment of oncologic diseases. In particular, an ent-kaurenoic acid derivative is described which contains a 2-spiropyrrolidine moiety and its cytotoxic activity. The parent tetracyclic diterpenoids are</p>

easily available from sunflower waste. The selective cytotoxic activity of the claimed compound is demonstrated on the inhibition of cells multiplication belonging to Hap-1 (chronic myeloid leukemia), NCI-H460 (lung carcinoma), DND-41 (acute lymphoblastic leukemia), HL-60 (acute myeloid leukemia), K-562 (chronic myeloid leukemia) and Z-138 (non-Hodgkin lymphoma) cancer cell lines.

MD.83.

Title	Tris(2,6-dimethyl pyridinecarboxylate-1kONO)-di-μ-(isothiocyanato-1,2kN)-(diisothiocyanato-2kN)barium(II)cobalt(II) with biostimulatory properties of the synthesis of bioactive principles on fungi
Authors	Bulhac Ion, Ureche Dumitru, Bourosh Pavlina, Cocu Maria, Ciloci Alexandra, Condruș Viorica, Dvornina Elena
Institution	Institute of Chemistry, Republic of Moldova; Institute of Applied Physics, Republic of Moldova; Institute of Microbiology and Biotechnology, Republic of Moldova.
Patent no.	Patent application No. A 2021 0059, 2021 09 09 The invention relates to coordination chemistry, in particular to the synthesis of a new Ba-Co heterodinuclear coordination compound with biostimulatory properties, that may be used in the development of biotechnologies, in order to increase the biosynthesis of enzymes and the productivity of microbial biomass.
Description EN	According to the invention, a novel coordination compound: tris(2,6-dimethyl pyridinecarboxylate-1kONO)-di-μ-(isothiocyanato-1,2kN)-(diisothiocyanato-2kN)barium(II)cobalt(II) is claimed. The compound possesses biostimulatory properties of the synthesis of bioactive principles on fungi. The complex increases by 35.6–51.0% the biosynthesis of exocellular amylases in the fungal strain <i>Aspergillus niger</i> CNMN FD 06 and by 33.6–37.6% the amount of mycelial biomass accumulated at <i>Lentinus edodes</i> (Berk) Sing CNMN FB 01, facilitating the reduction of the technological cycle by 24–48 hours.

MD.84.	
Title	BEE FEEDING PROCESS
Authors	Eremia N., Macaev F., Pogrebnoi S., Znogovan A., Neicovcena I., Coșeleva O., Sarî N., Eremia M. The State Agrarian University of Moldova;
Institution	Institute of Chemistry; Universitatea de Stat de Medicină și farmacie "N. Testimiteanu"
Patent no.	Decision to grant the patent, nr. 10005 from 2022.02.25
Description EN	Process for feeding bees, which includes feeding them in autumn with a mixture of 60% inverted maize syrup solution and 1.0-3.0 ml / L of 3% aqueous solution of rebaudiozide A, in an amount of 2, 0 L per bee family and spring with a mixture of 50% inverted maize syrup and 1.0-3.0 ml / L 3% aqueous solution of rebaudioside A, 1.0 L per family of bees, every 7-9 days, from April until the main harvest..
MD.85.	
Title	BEE FEEDING PROCESS
Authors	Eremia N., Macaev F., Pogrebnoi S., Znogovan A., Modvala S., Mardari T., Eremia I, Sarî A. The State Agrarian University of Moldova;
Institution	Institute of Chemistry; Universitatea de Stat de Medicină și farmacie "N. Testimiteanu"
Patent no.	MD1598 Y 2022.02.28
Description EN	Procedure for feeding bees, which includes feeding them in autumn with a mixture of 60% inverted maize syrup solution and 1.5-4.0 ml / L of 3% aqueous stevioside solution in an amount of 2, 0 L per bee family and spring with a mixture of 50% inverted maize syrup and 1.5-4.0 ml / L of a 3% aqueous solution of stevioside, 1.0 L in a bee family, every 7-9 days, from April until the main harvest.
MD.86.	
Title	BEE FEEDING PROCESS
Authors	Eremia N., Macaev F., Pogrebnoi S., Znogovan A., Neicovcena I., Coșeleva O., Sarî N., Eremia M., Jereghi V.
Institution	The State Agrarian University of Moldova; Institute of Chemistry; Universitatea de Stat de Medicină și farmacie "N.

Patent no.	Testimițeanu”
	Decision to grant the patent, nr. 9979 from 2022.01.19 Procedure for feeding bees, which includes feeding them in autumn with a mixture of 60% sugar syrup and 1.5-4.0 ml / L of 3% aqueous solution of stevioside, in an amount of 3.0 L per bee family and spring with a mixture of 50% sugar syrup and 1.5-4.0 ml / L of 3% aqueous solution of stevioside, in a quantity of 1.0 L of mixture per family of bees, every 7 days, from April until the main harvest.
Description	
EN	

MD.87.	
Title	BEE FEEDING PROCESS
Authors	Eremia N., Macaev F., Krasociro P., Pogrebnoi S., Znagovan A., Neicovcena I., Coșeleva O., Eremia I., Sarî N.
Institution	Institute of Chemistry; The State Agrarian University of Moldova; Universitatea de Stat de Medicină și farmacie ”N. Testimițeanu”
Patent no.	Decision to grant the patent, nr. 10006 from 2022.02.25 Process for feeding bees, which includes feeding them in spring with a mixture of 50% sugar syrup and 1.0-3.0 ml / L aqueous solution containing dehydroabietinic acid 4.91 g, KOH 1, 08 g and distilled water up to 200 ml, in the amount of 1.0 L of mixture in a family of bees, every 7 days, from April until the main harvest.
Description	
EN	

National Agency for Public Health, Republic of Moldova

MD.88.**Title**

Testing method of donors blood for viral hepatitis B markers

Authors

Spînu Constantin, Sajin Octavian, Cebotari Svetlana, Spînu Igor, Suveică Luminița, Ciobanu Igor, Donos Ala, Isac Maria

Institution

National Agency for Public Health

Patent no.

Patent MD 1166Z2018.02.28

**Description
EN**

The invention relates to medicine and can be used to prevent infection with viral hepatitis B virus as a result of blood transfusion from people with acute and chronic viral hepatitis B.

The disadvantages of the known method are that the application of the existing algorithm does not allow the detection of all cases of occult viral hepatitis B, as a result there is a danger of transmitting the hepatitis B virus through blood transmission. The problem solved by the proposed method is the maximum reduction of the risk to the exclusion of the possibility of transmission of nominated hepatitis by blood transfusion from donors with occult hepatitis B. The essence of the invention is that in the blood presence of HBsAg, anti-HBcor sum, anti-HBcor IgM and anti-HBs is successively determined, and for blood with anti-HBs titer > 100μ/ml, the hepatitis virus DNA test is additionally performed and if the test is positive, the presence of viral hepatitis B markers in the donors blood is determined. The result is a new testing algorithm of donated blood for viral hepatitis B markers, especially HBV DNA, which excludes the transfusion of blood products from people with a positive anti-HBs marker more than 100μ/ml with traces of viral hepatitis B virus DNA, characteristic of occult hepatitis B.

MD.89.**Title**

Digitalization of epidemiological surveillance of COVID-19infection

Authors

Spînu Constantin, Sajin Octavian, Dascalov Alexandru

Institution

National Agency for Public Health

Series Nr. 6908 from 17.11.2021

Description
EN

Given the global importance of the SARS-CoV-2 virus pandemic, the elaboration and development of a digital tool for informational epidemiological surveillance of this pandemic has become an imperative of the day. Thus, for the first time in the Republic of Moldova, the development of such a digitized system will allow the study of the dynamics of the epidemic process by COVID-19, determining risk factors with estimating the risk of infection depending on gender, age, living environment and geographical area - all based on current information and evidence. The development and implementation of the digitized system for epidemiological surveillance of SARS-CoV-2 virus infection will allow the evolution of COVID-19 morbidity in the Republic of Moldova. The obtained results will lead to the decrease of the socio-economic impact of COVID-19 and the up-to-date adjustment of the prophylaxis measures based on the obtained information by digitizing the surveillance process. Modeling the evolution of the COVID-19 pandemic in the Republic of Moldova with the development of mathematical methods based on digitized information to be made available to Government decision-makers.

MD.90.

Title

Determination method of viral hepatitis B markers in donors blood

Authors

Spînu Constantin, Spînu Igor, Cebotari Svetlana, Sajin Octavian, Isac Maria, Placintă Gheorghe, Ciobanu Igor, Cojuhari Lilia,

Institution

Patent MD 975Z 2016.07.31

National Agency for Public Health

Description
EN

The invention relates to medicine, in particular to the field of public health protection and can be used to prevent infection with viral hepatitis B virus in occult viral hepatitis B by blood transfusions. The disadvantages of this method are that the use of the existing algorithm does not allow the detection and exclusion of all cases of occult hepatitis, as a result there is a danger of transmission of viral hepatitis B virus through blood transfusions. According to literature data with impact factor in endemic countries at least 1% of people are with the absence of HBsAg and the presence of anti-HBcor sum, indifferent of the concentration of anti-HBs

may have occult viral hepatitis B and potentially are infectious. The problem solved by the invention is to increase the effectiveness of triage for donated blood in order to prevent the transmission of viral hepatitis B by blood transfusion from people with occult viral hepatitis B. The result is the creation of an original testing algorithm of donated blood for viral hepatitis B markers, which reduces the possibility of transmitting the nominated virus by blood transfusion, especially from people with occult hepatitis B or viral reactivating.

MD.91.**Title**

Method for identifying the anti-SARS-CoV-2 IgG marker in blood serum (Patent MD 1524Z 2021.12.31, Republic of Moldova)

Authors

Spînu Constantin, Cebotari Svetlana, Isac Maria, Sajin Octavian, Spînu Igor, Ceban Alexei, Donos Ala, Suveică Luminița, Miron Aliona

Institution

National Agency for Public Health

**Description
EN**

The laboratory diagnosis of COVID-19 infection can follow two paths: 1. Virus detection, detection of SARS-CoV-2 viral RNA by RT-PCR method. 2. Detection of specific IgM and IgG antibodies - which represent the body's immune response to SARS-CoV-2 virus in immunoassay analysis with significance: early infection (IgM+; IgG-) person in transit (IgM+; IgG+) and person in recovery (IgM-; IgG+). Interpretation of results involves the following: negative; equivocal result and positive result. The disadvantages of the method are that some blood samples (serum) collected from patients, including primary blood donors with a clinical diagnosis of COVID-19 infection demonstrate the presence of equivocal results. This situation makes it difficult to interpret the results. The problem solved by the invention is to develop an original method of blood samples testing in ELISA by excluding equivocal results following the processing of samples with a special substance (removal of non-specific inhibitors). So the proposed technology significantly change the effectiveness of the test, shown by increasing sensitivity and specificity. The result of the invention consists in the exclusion of equivocal results, which require repeated investigation of patients after an

interval of 2 weeks with additional costs: collection of samples, transportation, investigation, additional time for repeated investigation of the patient, etc.

MD.92.**Title**

Acute viral diarrhea in children

Authors

Donos Ala, Spînu Constantin, Stela Gheorghită, Tatiana Alsaliem,

Institution

National Agency for Public Health

Patent no.**Description
EN**

The study reflects a deep relevant material referring to a very current and global important issue - rotavirus infection in infants. A new nosology is promoted in the local medical space. The materials of the monograph have a major importance in clinical-paraclical diagnosis, treatment, management and correspond to the requirements of international and national guidelines, WHO and UNICEF policies. The final goal of the paper is to estimate for the first time the clinical-epidemiological impact of infant vaccination against rotavirus infection depending on the rotavirus genotypes identified in the Republic of Moldova. The materials included in the monograph will be implemented in medical practice through different categories of pediatricians, family doctors, resident doctors, which contribute to improving childrens health.

MD.93.**Title**

RHIZOPUS STOLONIFER FUNGI STRAIN FOR BIODEGRADATION OF COBALT AND NICKEL COMPOUNDS

Authors

COREȚCHI Liuba, PLAVAN Irina, BAHNAREL Ion

Institution

National Agency for Public Health

Patent no.

Nr. 4486

**Description
EN**

The invention relates to Biotechnology and Environmental protection. The novelty consists in developing a new biotechnological process to reduce the risk of environmental pollution, based on the use of non-pathogenic microorganisms. It is proposed fungi *Rhizopus stolonifer* 67 CNMN-FD-18, which possesses the biodegradation of toxic compounds of cobalt and nickel.

Applications: Environment – ecology, ecological management, environmental protection and monitoring.

MD.94.**Title****IMMUNE STATUS ASSESSMENT PROCESS****Authors**

COREȚCHI Liuba, GÎNCU Mariana, BAHNAREL Ion, ABABII Aurelia

Institution**National Agency for Public Health****Patent no.****2667 C2 MD A 61 B 5/145****Description
EN**

The invention relates to the field of medicine, in particular to processes for the evaluation of the immune status under the conditions of stressogenic factors, including increased ionizing radiation conditions. There is provided a process for the individual assessment of the immune status in patients exposed to stress factor associated with ionizing radiations, according to the correlation of sum of the populations of T-lymphocytes, including correlation of TCD4+ (T-helper lymphocytes) and TCD8+ (T-suppressor lymphocytes) populations to the TCD3+ (pan T-lymphocytes) x 100, investigated by using of immunofluorescent immunotherapy or the biphenotypic method. The technical result consist in increasing of individual assessment of immune status in patients exposed to radiostresogen factor with detection of the correlation between expression of tension index of immune response and manifestation of clinical pathologies. *Applications: Medicine*, individual assessment of immune status in patients exposed to ionizing radiations and another stress factors.

MD.95.**Title****QUESTIONNAIRE for studying the influence of radon x smoking interaction as a trigger factor of bronchopulmonary cancer in the conditions of the Republic of Moldova****Authors**

CoreȚchi Liuba, Overcenco Ala, Bilba Valeriu, Ababii Aurelia

Institution**National Agency for Public Health of the Ministry of Health of the Republic of Moldova****Patent no.**Serial **O** No. **7074** from **18.10.2021** issued by State Agency for Intellectual Property of the Republic of Moldova**Description
EN**

Bronchopulmonary cancer is currently the leading cause of cancer death worldwide. The effect of the interaction of

residential radon and smoking on the appearance of bronchopulmonary cancer is studied by case-control methods and sociological methods. A specific questionnaire was developed for the case-control study of patients with bronchopulmonary cancer in Romanian and Russian. It includes 15 questions (socio-demographic, type of housing, smoking, radon measurement, diagnosis).

Parts I and II of the questionnaire ("Socio-demographic data" and "Smoking") are to be completed by persons, involved in the survey within the Oncological Institute (experimental group) and by persons living in the same house with a person from the experimental group or neighboring, without oncological diseases (control group).

Part III of the questionnaire "Radon concentration in the interviewee's home" is to be completed by the collaborators of the Radiation Hygiene and Radiobiology Laboratory of National Agency for Public Health.

Part IV of the questionnaire "Diagnosis of the interviewee, pathologically confirmed" is to be completed by the physician-specialist of the Oncological Institute.

The questionnaire's data will be processed by statistical and analytical methods. Obtaining a reliable statistical results of the interaction of radon x smoking makes it possible to quantify and qualify the combination of these risk factors for bronchopulmonary cancer appearance in the country, which in turn will serve as a scientific basis for developing appropriate methods for reducing and preventing bronchopulmonary cancer by national public health authorities.

MD.96.

Title **Quantification of health risk associated with radon exposure.**

Authors **Ababii Aurelia**

Institution **National Agency for Public Health**

Description
EN

One of the important sources of exposure of the population to radiation is radon (^{222}Rn). Being a radioactive noble gas, produced in the natural decay series of uranium and thorium, it contributes about 70% to the exposure to natural radiation of the population and by 50% to the total exposure to ionizing radiation. Inhalation exposure to ^{222}Rn isotopes and their short-lived offspring is a major risk factor for the

incidence of bronchopulmonary cancer. Due to the storage capacity in the indoor air of homes, radon concentrations can increase to very high values. The research aims at using the modern methodology for quantifying the natural and technogenic radiostressogenic factor by radonometry, spectrometry, dosimetry, the health risk will be established, associated with the action of ionizing radiation, caused by radon. The aim of the research is to estimate the health risk associated with radon exposure and to develop measures to control the influence of radiostressogenic factor in the onset of oncological diseases, in the context of EURATOM / 59/2013. Based on the multiple quantification of radon concentrations in the main components of the environment and indoor air of the dwellings, the doses of population exposure to radon will be calculated. Geographical areas with an increased risk of radon exposure will be elucidated. National population radiation protection regulations will be updated. The synergism between radon concentration and smoking in the onset of bronchopulmonary cancer will be highlighted. Effective Strategies to Reduce the Negative Impact of Radon on Health will be developed. The obtained database will be useful in mapping radionuclides and oncological diseases on the territory of the Republic of Moldova, in order to develop decisions and measures aimed at preventing lung cancer and other cancers.

MD.97.**Title**

Health status of people in risk groups exposed to ionizing radiation

Authors

GINCU MARIANA, CORETCHI LIUBA

Institution

National Agency for Public Health

Aim of the project: To establish some particularities of the health of those exposed to harmful radiostressogenic factors and to elaborate the measures to diminish the risks.

*Objectives:***Description
EN**

1. Dynamic evaluation of the clinical features of pathologies of people exposed to ionizing radiation: participants in reducing the consequences of the Chernobyl nuclear accident (PRCCNA);
2. Estimation of the health status of the PRCCNA descendants of the first and second generation: clinical, cytogenetic and immunological aspects.

3. Elucidation of the cytogenetic mechanisms of the response to the action of ionizing radiation in the PRCCNA descendants.

4. Development of measures and recommendations to reduce the risk of exposure to ionizing radiation on health.

Achievements: The clinical investigations indicates that the PRCCNA patients compared with control group, were more susceptible to infections and non-infectious diseases, with the prevalence of large polymorphism of nervous, heart-vascular and gastric-intestinal system, which were accompanied by circulatory disorder of the vegetative nervous system. The immunological analysis reveals alterations in the immune system of the PRCCNA. Cytogenetic research of the lymphocyte cultures of peripheral blood of PRCCNA and their children revealed the deterioration of the hereditary system, being expressed through high level of genomic, chromosomal, and chromatid type aberration. Chromosomal type of aberrations dominated in the adults and chromatid type in the children. On the base of cytogenetic markers, it has been determined that the radiation affection of PRCCNA indicated by the official physical doses not always coincided with the data of the biological indicators.

Applications. The results are useful for assessing the influence of exposure to low doses of ionizing radiation on health.

Advantages. Complex study of the influence of ionizing radiation on human health.

**Institute of Mathematics and Computer Science,
Republic of Moldova**

MD.98.**Title**

Platform for Digitization of Romanian Historical Heritage Printed in the Cyrillic Script

Authors

Tudor Bumbu, Svetlana Cojocaru, Lyudmila Burtseva, Alexandru Colesnicov, Ludmila Malahov

Institution

Vladimir Andrunachievici Institute of Mathematics and Computer Science

**Description
EN**

This project aims at development a new Digitization Platform able to automate the digitization of Romanian old texts and heterogeneous documents (i.e. those which include, in addition to text, some elements of another nature: tables, formulas, musical notes, etc.) of 17-20 centuries printed in the Cyrillic script. The proposed Platform is a desktop and web application which integrates the entire digitization cycle: uploading of images and/or PDF files, image pre-processing, optical characters recognition, verification and editing (automatic or manual) of the recognized text, its transliteration, verification and editing (automatic or manual) of the transliterated text and its final saving. The Platform also contains methods for heterogeneous documents processing and is based on image preprocessing tools such as Scan Tailor, FineReader Image Preprocessing and OpenCV; optical character recognition tools (FineReader) trained on Cyrillic characters of the 17-20 centuries and word vocabularies of the same periods; Cyrillic to Latin transliteration software – AA Conv. The last one operates with documents printed in Romanian Cyrillic alphabet, Romanian transitional alphabets, and Soviet Cyrillic alphabet. The Platform offers a free online access to digitized cultural resources (both in original form and in one adapted to modern spelling and language style). Potential beneficiaries are researchers, students, and the whole society. Also, the Platform is destined to publishing houses, libraries, archives. This project is the key point in assuring that cultural heritage (represented mostly by numerous Romanian books printed in Cyrillic script) is brought closer to the nowadays readers. The Platform was developed within the project 20.80009.5007.22.

MD.99.**Title**

A system for generating content on the Moodle learning platform for adaptive assessment of students

Authors

Parahonco Alexandr, Mircea Petic

Institution

Vladimir Andrunachievici Institute of Mathematics and Computer Science

Within the research project 20.80009.5007.22 Intelligent information systems for solving ill-structured problems, processing knowledge and big data (<http://www.math.md/en/projects/20.80009.5007.22/>), a system for generating educational content was developed, including teaching materials and tasks for student assessment. Part two is computer adaptive testing by TestWid and TestWidTheory plugins for the Moodle educational platform. TestWid assesses the student's skills and decides which questions to provide, saving the student time and resources. The TestWidTheory plugin gives us a resource to introduce any teaching material to create references to the questions in the TestWid plugin. Together, they make the retake of the test more efficient because the system provides the list of references for each erroneous task and generates a new set of questions for the new test.

**Description
EN**

We aim to improve the process of student evaluation at the national level. Considering that the Moodle platform is free and flexible for change, we can introduce these technologies into any institution. A competency-based approach is our foundation. Application of adaptive tests will create the best conditions for the student/pupil both in testing and learning, because the accuracy of the test guarantees its correct evaluation. Comfort, in this case, contributes to the motivation and positive psychological state of the student. Currently, the importance of managing to ensure interoperability between the online environment and e-learning systems is essential. Essentially, to fill e-learning systems with content (text, images, video, audio) is a time-consuming task. Ensuring a mechanism for selecting and adapting content for e-learning platforms would make the work of the teacher significantly easier. Thus, the problem of automatically completing e-learning platforms with content in an automatic way would be

specific not only to pre-university education but also to university one. The task is not only to simply fetch information from the online environment, but also to consider how to adapt and assess the credibility of the content to be obtained.

The beneficiaries of the results are computer education and research to study the possibility of using adaptive assessment, quality management, and their implementation in the educational process of higher education institutions.

MD.100.**Title**

System for registration and triage of disaster casualties, using mobile devices

Authors

Constantin Gaidric, Svetlana Cojocar, Iulian Secieru, Olga Popcova, Elena Guțuleac, Mircea Petic, Ivan Budanaev, Olesia Caftanov, Tudor Bumbu

Institution

Vladimir Andrunachievici Institute of Mathematics and Computer Science

The developed system is aimed to support decision-makers (healthcare personnel and aides) in management of mass casualty situations in the collection points at disaster site.

It offers simple and user-friendly interface, allowing medical first aid personnel to:

- gather (including voice registration) and organize the primary medical data of casualties;
- perform triage based on vital signs and assign the triage priority for quick categorization of casualties (Red I, Red II, Yellow, Green);

**Description
EN**

- perform more accurate re-triage based on ultrasound features by implementing EFAST (Extended Focused Assessment using Sonography in Trauma) in case of availability of emergency ultrasound equipment – modern portable medical ultrasound scanners. It can be done for casualties with injuries of thorax and abdomen, and can be repeated during transportation;

- set priorities for evacuation of injured persons from the disaster site and routing them to the specialized medical centers (including transmission of the casualty related data).

The software is developed for mobile devices using Android Studio Arctic Fox v.2020.3.1, powered by the IntelliJ

Platform.

The proposed system can be used in disasters caused by terrorism as well as natural phenomena, particularly in countries with high seismic hazard.

Positive impacts:

- fast registration and triage priority assessment;
- accurate casualty triage re-assessment and more effective emergency therapy before further transportation, that will minimize over- and under-triage;
- coordinated evacuation of casualties will help in efficient distribution of the available resources.

The system was developed within the NATO Science for Peace and Security Programme, project G5700.

MD.101.	
Title	Augmented Reality tool for assisting elementary pupils in learning geometry
Authors	Caftanatov Olesea, Titchiev Inga, Iamandi Veronica, Talambuta Dan.
Institution	Vladimir Andrunachievici Institute of Mathematics and Computer Science
Description EN	<p>Rapid development of the technology has influenced its inevitable entrance in the learning processes. Among new approaches, augmented reality (AR) is a technology that is gaining momentum around the globe. The advantages of AR are visualization, information completeness, interactivity, being a perfect solution for assisting elementary pupils in grasping geometry knowledge, because it allows to develop their imaginative thinking and spatial imagination, moreover, maintain interest in the learning process. In Republic of Moldova the trend of implementing AR in educational field are very new, thus, through our project we intend to bring our contribution in implementing these new technologies in the teaching process. We develop an AR tool that enhance the learning effect by tracking 2D markers that trigger the visualization of the 3D geometry objects. Pupils can interact with designed markers to change the position, size and color of 3D objects. Moreover, by interacting with virtual tutor pupils can see the superimposed digital content that explains and demonstrate the basic theorems. The advantages of implementing augmented reality technologies</p>

consist in the fact that it does not require the use of specialized equipment, that is why it is possible to spread rapidly in our educational fields. It can be easily used today with all computers or mobile devices. Additionally, we designed a friendly interface that can be easily used even by 2-3th grade kids. The tools can be extendable to any age category even for students. The tools are created by using Unity platform with Vuforia database. More about workflow can be seen in graphical abstract below. The application was developed within the project 20.80009.5007.22.

Institute of Applied Physics, Republic of Moldova

MD.102.

Title	Method of recovery of protein concentrates enriched with beta-lactoglobulin from whey
Authors	BOLOGA Mircea, VRABIE Elvira, Sajin Tudor, PALADII Irina, POLICARPOV Albert, VRABIE Valeria, STEPURINA Tatiana, SPRINCEAN Catalina
Institution	Institute of Applied Physics
Patent no.	Patent application No. S 2021/0106
Description	The invention relates to the dairy industry, and in particular to a method for producing a protein-mineral concentrate (PMC) from whey enriched with beta- lactoglobulin (β -Lg). The method, according to variants of the invention, includes cooling the whey, separating it from casein powder, electroactivating the whey for 5...10 minutes at a temperature of 15-20°C in the cathode cell of an electrolyzer with a cationic ion-selective membrane, supplying a solution of calcium chloride to the anode cell, separating the foamy phase of whey from the liquid phase, collection of the protein-mineral concentrate, by centrifugation, from the foamy phase, after which the protein-mineral concentrate is dried at temperatures excluding thermal denaturation of proteins, and the deproteinized whey is sent for further processing to separate lactulose. In the first variant of the proposed method, whey electroactivation is carried out by cyclic power supply of the electrolyzer with a current with a cycle duration of 60 s and an interval between cycles of 10 s, while the protein-mineral concentrate is collected from the foamy phase at pH values of 8.00...11.00. In the second variant, whey electroactivation is carried out by continuous power supply of the electrolyzer with current, while the protein-mineral concentrate is collected from the foamy phase at pH values of 8.00...9.00.

MD.103.

Title	The process for obtaining the hybrid photocatalyst based on nanocrystalline TiO₂ and diatomite by electrolysis
Authors	DAȚKO Tatiana, ZELENȚOV Veaceslav, DVORNIKOV Dmitri, SAINSUS Iurii
Institution	Institute of Electronic Engineering and Nanotechnologies (IEN); Institute of Applied Physics

INTERNATIONAL EXHIBITS

Patent	<p>(IFA)</p> <p>Patent application No. s 2021 0046, 2021.05.31</p> <p>A method for producing a hybrid photocatalyst based on nanodimensional titanium dioxide and local diatomite (NTD). The method consists in processing the mixture of diatomite and titanium dioxide precursor in the cathode chamber of the two-chamber electrolyzer by passing an electric current with a density of 30-100 mA/cm² through an aqueous suspension of diatomite and titanium dioxide precursor. Method characterized in that heterogeneous hydrolysis of the precursor by electrolysis products is carried out directly in the presence of diatomite in a single step.</p>
Description EN	<p>The invention relates to the field of renewable alternative solar energy, to purification photocatalysis of water and air by organic and inorganic pollutants using a photocatalyst on nanodimensional titanium dioxide base grafted on the surface of a porous carrier - natural diatomaceous earth. It can also be used in devices that convert radiant energy, including solar energy, to produce hydrogen from water in electrochemical cells, or in the heterogeneous photocatalytic conversion of carbon dioxide to produce new compounds.</p>

MD.104.	<p>Process for corrosion protection of steel in water</p> <p>Authors PARSHUTIN Vladimir, COVALI Alexandr</p> <p>Institution Institute of Applied Physics of Republic of Moldova</p> <p>Patent Patent MD 1496</p> <p>The invention relates to the field of metal protection from corrosion in water and can be used to inhibit corrosion in closed steel pipeline systems.</p> <p>The process for corrosion protection of steel in water comprises the introduction into the corrosive medium of 0.5-1.5 g/L of potassium permanganate KMnO₄ and 10-30 ml/L of aqueous extract of amaranth <i>Amaranthus retroflexus</i> L., obtained by extraction of dry herb in water in a mass ratio of 4:10 at a temperature of 70-90 °C for 1-3 hours, with subsequent filtration.</p> <p>The technical result of the invention consists in increasing the corrosion resistance up to 35 times, using an effective, environmentally friendly and inexpensive inhibitor.</p>
Description EN	

MD.105.

Title **Process for corrosion protection of steel in water**
Authors PARSHUTIN Vladimir, COVALI Alexandr
Institution **Institute of Applied Physics of Republic of Moldova**
Patent Patent MD 1507

**Description
EN**

The invention relates to the field of metal protection from corrosion in water and can be used to inhibit corrosion in closed steel pipeline systems. The process for corrosion protection of steel in water comprises the introduction into the corrosive medium of 0.5-1.5 g/L of potassium permanganate KMnO_4 and 10-40 ml/L of aqueous extract of greater celandine *Chelidonium majus*, obtained by water extraction of dry leaves and stems in a mass ratio of 1:(20-30) at a temperature of 75-90 °C for 2-3 hours, with subsequent filtration.

The technical result of the invention consists in using an environmentally friendly, effective and inexpensive inhibitor, which provides an increase in corrosion resistance of up to 29.6, allows refusing burning of foliage, which does harm to the nature.

MD.106.

Title **Employing of hexaamminecobalt(III) trichloride bis(1,10-phenanthroline) with antibacterial properties against tumor growth in grapevine**
Authors BACA Svetlana, SULTANOVA Olga, DARII Mariana, BOUROSH Pavlina
Institution **Institute of Applied Physics and Practical Scientific Institute of Horticulture and Food Technology**
Patent no. MD 4725 C1

**Description
EN**

The invention relates to chemistry and biotechnology, namely to a coordination compound based on hexaammine cobalt(III) trichloride and 1,10-phenanthroline, $[\text{Co}(\text{NH}_3)_6]\text{Cl}_3 \cdot 2(\text{phen}) \cdot 3\text{H}_2\text{O}$, which can be used as an inhibitor of the development of bacterial cancer in plants. The compound hexaammine cobalt(III) trichloride bis(1,10-phenanthroline) trihydrate possesses pronounced properties as an inhibitor of cancer development in grapevines, a fact established by testing the inhibiting growth effect of *Rhizobium* (Agrobacterium) *vitis* bacteria. Applications: Chemistry, Agriculture; Horticulture

**Institute of Genetics, Physiology and Plant Protection,
Republic of Moldova**

MD.107.	
Title	“Ametist” rhizogenic interspecific genotype <i>V. vinifera</i> (2n=38) x <i>M.rotundifolia</i> (2n=40).
Authors	ALEXANDROV Eugeniu, BOTNARI Vasile, GAINA Boris
Institution	Institute of Genetics, Physiology and Plant Protection
Patent no.	No. 364 for 20221.06.30
Description EN	<p>Ametist - rhizogenic interspecific genotype (2n = 38), <i>Vitis vinifera</i> L. (2n = 38) x <i>Muscadinia rotundifolia</i> Michx. (2n = 40). Grape weight - 300-350 g. At full maturity the berries accumulate a sugar content in the must of 25-28%. Depending on the cultivation technology, the possible harvest is 10-14 t / ha. Resistant to phylloxera, drought, low temperatures in winter, to attack pathogens. It allows to obtain biologically derived products. Intended for cultivation on own roots, including in the ecological system and for the extension to the northern limit of the vine cultivation area. Can be used in vertical cultivation system (pergola, arcade, etc.). It makes very good use of climatic conditions with high temperatures and low rainfall during the summer, low quality lands, etc. Suitable for transport and storage. The creation of plantations of the above-mentioned interspecific genotypes will allow expanding the area of growing rhizogenic grapevine to the north.</p>
MD.108.	
Title	FAVOARE - the new variety of <i>Lavandula angustifolia</i> Mill. (Lavender)
Authors	GONCEARIUC Maria, BUTNARAS Violeta, MASCOTVEVA Svetlana, BOTNARENCO Pantelimon, COTELEA Ludmila, BALMUS Zinaida
Institution	Institute of Genetics, Physiology and Plant Protection
	Patent application v 2021 0006 / 22.02.2021
Description EN	<p>Variety-clone Favoare (Fr.8-5-15v) is part of the early maturity group. Semi-shrub with a height of 68.0 cm, the diameter of the plant is 91.3 cm, spread with 835 floral stems. The leaves of that variety are light green. The shape of the leaves is linear. Spike shape – narrow - conical. The calyx is blue-purple. The corolla is light purple. The length of the</p>

floral stem is 25.5 cm, and the floral spike is 8.5 cm. The flowers are grouped in 6-7 pseudoverdices. Production of ram maternal inflorescences -7.4 t/ha. Essential oil content – 2.077 % (60 % humidity) and 5.157% (dry. matter). Productions of essential oil constitute 155.2 kg/ha, efficiency 20.7 kg/t of essential oil per ton of fresh inflorescences). It is appreciated with a high resistance to frost and wintering of 4.5 points

MD.109.**Title**

SVETLANA - the new variety of *Lavandula angustifolia* Mill. (Lavender)

Authors

GONCEARIUC Maria, MASCOVTEVA Svetlana, BUTNARAS Violeta, BOTNARENCO Pantelimon, BALMUS Zinaida, COTELEA Ludmila.

Institution

Institute of Genetics, Physiology and Plant Protection
Patent application v 2021 0007 / 22.02.2021

**Description
EN**

Lavender variety *Svetlana* is a first-generation hybrid (F₁), with a high heterosis effect on a number important quantitative characters, vegetative multiplied with average vegetation period. The *Svetlana* is a variety frost and winter resistance, to diseases and drought resistant. Plant height is 71.5 cm. At the density of 12.5-20.0 thousand plants per hectare is forms up to 854-1500 floral stems per plant. The productivity of the variety is 7.7 t/ha of inflorescences containing 2.323 % (60 % humidity) and 5.721% (dry. matter) of essential oil. The productions of essential oil constitute 179.2 kg/ha. The yields of the variety are 23.4 kg/t (of essential oil from the of fresh inflorescences). Applications: Agriculture, perfumery, cosmetics, medicine, pharmacology, aromatherapy.

MD.110.**Title**

Process for increasing the storage capacity (storability) of plum fruits

Authors

BUJOREANU Nicolae, NICUTA Alexandru, HAREA Ivan

Institution

Institute of Genetics, Physiology and Plant Protection

Description

Patent MD s2021 0107, application date 2021.12.21

The invention relates to agriculture, in particular to
INTERNATIONAL EXHIBITS

EN horticulture, and can be used to increase the harvest, the quality and the storage capacity of fruit, as well as the reduction of the process of dehydration of the fruits of autumn plum varieties during the storage period.

The essence of the invention consists in treating the plum trees (after the fall of the juvenile fruits) during the vegetation period with the biologically active substance Reglalg 0.05%, the microelements B, Zn, Mn, Mo 0.05% and in the pre-harvest phase (August) with 0.1% CaCl₂, at the rate of 800-1000 l/ha.

The technical result of the invention consists to increase the productivity, the quality, storage capacity and resistance of plum fruits to fungal diseases and tissue dehydration, as a result of their directed growth for long-term storage.

MD.111.

Title **Procedures for increasing seed germination and resistance of beech (*Fagus sylvatica*) plants – THE CYCLE OF INVENTIONS**

Authors ELISOVETCAIA Dina, IVANOVA Raisa, MASCENCO Natalia, BOROVSKAIA Alla

Institution Institute of Genetics, Physiology and Plant Protection

Patent no. Patent no. 1545 MD, application date 2020. 08.19
Patent no. 1546 MD, application date 2020.09.04

Description The cycle of inventions relates to procedures of stimulating seed germination and increasing seedlings resistance and growth of beech (*Fagus sylvatica*). Before germination, beech seeds were treated with solutions of different regulators of growth: gibberellic acid (0.02%), furostanolic steroidal glycosides – capsicoside (0.001%) and flavonoid glycosides – genistifolioside (0.001%), the beech seedlings were treated foliar with the same regulators of growth.

EN The procedure of seed treatment before germination with capsicoside and genistifolioside leads to stimulation of daily seed germination by 18.5-22.2%; significant reduction in the period of total seed germination by 20-22 days, which allows for an earlier sowing of germinated beech seeds; and better adaptation of germinated seeds transferred to the soil: The rate of seedling appearance in the variants treated with genistifolioside and capsicoside is 1.5-2.7 times, and seedling survival – 1.7-3.0 times higher than in control.

Beech plants treated foliarly with capsicoside and genistifolioside significantly exceeded the control plants in height and were at the level of plants treated with gibberellic acid. The chlorophyll index was also significantly higher in plants treated with capsicoside (177.7 g/dm³) and genistifolioside (164.5 g/dm³).

MD.112.**Title**

Flying installation for attracting and capturing harmful insects

Authors

GORBAN Victor, CHICU Boris, TODIRAS Vladimir, VOINEAC Vasile

Institution

Institute of Genetics, Physiology and Plant Protection

Patent no.

Patent no. 1554Y, 2022.03.31

**Description
EN**

The invention relates to agriculture, in particular to mobile installations for capturing harmful insects and reducing their population density. The flying installation for attracting and capturing harmful insects contains a housing (7), in the upper part of which is fixed by means of a suspension frame (8) a multicopter (9) with an electric power source (1), to which is connected an ultraviolet radiation source (2). On the sides of the ultraviolet radiation source (2) are placed reflecting screens (3) with glue, which are in communication with an insect collector (4), equipped with a suction device (5) and a removable insect receiver (6).

The novelty of the claimed proposal is due to the fact that, in order to reduce pest density and increase the efficiency of attracting and exterminating harmful insects, the device with optical radiation source is equipped with half-cylinder reflector screens, suction collector with suction device and detachable from insects. At the same time, the installation, being suspended on a means of transport, such as the small unmanned aerial vehicle of the multicopter type, ensures the operability of carrying out protection measures at the respective level of crop height and insect flight height. The operational and safe extraction and extermination of perennial and field crops pests with the help of the proposed facility will significantly restrict the use of harmful preparations.

MD.113.

Title	<i>MOLDOVA 614</i> – a new variety of winter common wheat (<i>Triticum aestivum</i> L.)
Authors	GORE Andrei, ROTARY Silvia, LYATAMBORG Svetlana, LUPASCU Galina, JELEV Natalia
Institution	Institute of Genetics, Physiology and Plant Protection Registered No. v 2019 0011 2019.08.29
Description EN	The <i>Moldova 614</i> variety was obtained by hybridization of 3 common wheat varieties IS (<i>Kuialnic</i> x <i>Capriana</i>) x IS Moldova 79 with further individual selection from the F ₃ generation. The variety is part of the <i>Erytrospermum</i> variety. Spike has a length of 9.0-11 cm, cylindrical, with 18-22 spikelets per spike. The kernels are oval and red; the weight 1000 grains are 38-42 grams. It contains 13.0-14.0% protein and 27-30% gluten. The number of kernels in the spike varies from 45 to 60. The vegetation period is 268-272 days. The plants have a height of 92.0-102.0 cm, the degree of twinning – 2.5-3.0 strains per plant. The variety is productive and the potential of productivities reaches up to 5.1-7.8 t/ha. It manifests high resistance to drought, wintering and disease (brown and yellow rust, root rot). It is recommended to be sown in optimal terms with the seeding norm of 5-5.5 million grains per 1 ha. The variety is being tested for the third year in the State Commission for Testing Plant Varieties of the Republic of Moldova.

MD.114.

Title	Process for treating common winter wheat grains
Authors	LUPASCU Galina, MACAEV Fliur, GAVZER Svetlana, CRISTEA Nicolai, LUPASCU Lucian, STANGACI Elena, ZVEAGHINTEVA Marina, POGREBNOI Serghei
Institution	Institute of Genetics, Physiology and Plant Protection, Institute of Chemistry MD 1603, 2022.01.21
Description EN	The problem solved by the invention is to extend the range of processes for treating common wheat grains with compounds of class 1,2,4-triazoles to increase the resistance of common wheat plants to the action of the fungus <i>Fusarium oxysporum</i> . The technical result of the invention is that the treatment of common winter wheat grains with the compound (Z) -4,4-dimethyl -1- (2,4-dichlorophenyl) -2- (1H-1,2,4-triazol-1-yl) pent-1-en-3-one in concentrations of

0.005 and 0.01% for 3 hours and subsequent treatment for 18 hours with culture filtrate of *F. oxysporum* contributes to the increase of the vigor index by 30.1 ... 228.49% compared to the nearest solution.

MD.115.**Title**

Process for treating common winter wheat grains

Authors

LUPASCU Galina, MACAEV Fliur, GAVZER Svetlana, CRISTE NICOLAI, LUPASCU LUCIAN, STANGACI Elena, ZVEAGHINTEVA Marina, POGREBNOI Serghei

Institution

Institute of Genetics, Physiology and Plant Protection; Institute of Chemistry
MD 1591, 2021.11.30

**Description
EN**

The problem solved by the invention is the extension of the range of processes for the treatment of common winter wheat grains with compounds of class 1,2,4-triazoles to increase the resistance of wheat plants to the *Fusarium oxysporum* and *Drechslera sorokiniana* action. The technical result of the invention is that the treatment of common winter wheat grains, in the presence of the fungi *F. oxysporum* and *D. sorokiniana*, with the compound (Z) -4,4-dimethyl -1- (4-nitrophenyl) -2- (1H-1,2,4-triazol-1-yl) pent-1-en-3-one in concentrations of 0.005 and 0.01% over 3 hours contributes to the increase dry mass per plant by 10.49... 35.09%, respectively, in the case of *F. oxysporum* and 14.21... 25.81%, respectively, in the case of *D. sorokiniana*, compared to the nearest solution, which denotes that the compound contributes to increasing the resistance of wheat to these pathogens and presents an opportunity to use it in measures to protect common winter wheat from the causative agents of root rot.

MD.116.**Title**

New Tomato Cultivar – *ILICA*

Authors

MAKOVEI Milania, BOTNARI Vasile

Institution

Institute of Genetics, Physiology and Plant Protection

Patent no.

MD 375, 2021. 07. 31.

**Description
EN**

ILICA – New tomato cultivar of determinant type of growth (sp), well developed, with the length of the main shoot of 65-75 cm. Early-ripening variety with a short vegetation period (104 to 107 days). The leaves are ordinary, large with a length of - 31 cm, width - 25 cm. Simple inflorescence of

5-7 flowers. The flowers are orange, of medium size (0.9 – 1.1 cm). The first inflorescence appears after the 6th to 7th node, the next after 2-1-1. Number of inflorescences on the main axis – 4-5. The fruits are medium round, smooth, orange-intensive on the outside and with a red pulp at maturity. Fruit mass 100-110 g., with thick pericarp (0.5-0.6 cm). The fruits have high palatability qualities, contain dry matter – 5.2%, sugar – 3.9%, vitamin C – 34.3 mg/%, total acidity – 0.56%. Total yielding capacity is of 56.6 – 61.8 t/ha, with fruit vendibility exceeding 91.3 – 95.5%. It is resistant to a set of diseases: *stolbur*, *alternaria*, *macrosporium*, relatively resistant to *fusarium*. It is resistant to high temperatures during seedling emergence, heat and drought – in the mature male gametophyte phase.

Recommendation. The cultivar *Ilica* are recommended for fresh use, producing juice, for food nutrition as a dietary product and other tomato products. It is recommended to be grown in the conditions of open soil with a plant density of 52-55 thousand threads per 1 ha, or 5.2 – 5.5 plants per 1m².

Application domain - Agriculture (cultivation in private associations farmers and households in individual).

Homologated in Republic of Moldova – 2019.

MD.117.**Title****New tomato varieties *Solanum lycopersicum* L. MIA****Authors**

SIROMEATNICOV Iulia, BOTNARI Vasile, COTENCO Eugenia, CHIRILOV Eleonora

Institution

Institute of Genetics, Physiology and Plant Protection

Patent no.

Patent no.308 for 2019.08.31

**Description
EN**

The vegetation period is 89-105 days; it is the medium early variety. The fruit is orange color, round-slightly elongated with weigh 49.0-52.0 g, 2-3 seminal lodges. Fruits with high taste qualities, the dry substance content of the fruits is 5.9-6.5%, sugars 6.2-7.6%, ascorbic acid 42.7 - 50.1 mg/%, titratable acidity 0.29-0.35 mg/%. The total harvest of tomato fruit consists 50.2-55.8 t/ha and standard fruit yield 44.9-53.7 t/ha.

**Institute of Microbiology and Biotechnology,
Republic of Moldova**

MD.118.	
Title	<p>Application of coordination compound diaqua-nitrato-(2,4,6-tris(2-pyridyl)-s-triazine)-manganese(II) nitrate as stimulator of protease synthesis in fungal strain <i>Fusarium gibbosum</i> CNMN FD 12.</p>
Authors	<p>CILOCI Alexandra, BACA Svetlana, CLAPCO Steliana, TIURINA Janetta, LABLIUC Svetlana, DVORNINA Elena, BIVOL Cezara, DARII Mariana, KRAVTOV Victor.</p>
Institution	<p>Institute of Microbiology and Biotechnology, Ministry of Education and Research of the Republic of Moldova; Institute of Applied Physics, Ministry of Education and Research of the Republic of Moldova.</p>
Patent no.	<p>10003 / 2022.02.25.</p>
Description EN	<p>According to the invention, the application of the coordination compound diaqua-nitrato-(2,4,6-tris(2-pyridyl)-s-triazine)-manganese(II) nitrate with the formula $[Mn(NO_3)(tpt)(H_2O)_2](NO_3)$ as biostimulator of exocellular protease synthesis in <i>Fusarium gibbosum</i> CNMN FD 12 mycelial fungi strain is claimed. Applications: Industrial Microbiology. <i>The invention was created based on scientific results obtained within the projects 20.80009.5007.28 and 20.80009.5007.15 funded by NARD, Republic of Moldova.</i></p>
MD.119.	
Title	<p>Method of submerged cultivation of fungal strain <i>Rhizopus arrhizus</i> CNMN FD 03 producer of lipases.</p>
Authors	<p>CILOCI Alexandra, CLAPCO Steliana, TIURINA Janeta, DVORNINA Elena, LABLIUC Svetlana, BULHAC Ion, URECHE Dumitru.</p>
Institution	<p>Institute of Microbiology and Biotechnology, Ministry of Education and Research of the Republic of Moldova; Institute of Chemistry, Ministry of Education and Research of the Republic of Moldova. 10017 /2022.03.17.</p>
Description EN	<p>According to the invention, the method includes: obtaining of spore suspension by washing mycelia, grown during 30 days on malt-agar, with sterile distilled water; inoculation</p>

(5% v/v) in liquid nutrient medium; addition of metalocomplex $[\text{Sr}(\text{L})_3] [\text{Co}(\text{NCS})_4]$, where L is dimethyl pyridine-2,6-dicarboxylate, used as biostimulator. Submerged cultivation is performed at temperature of 28...30°C, under continuous stirring (180...200 rot/min), during 24 hours, in nutrient medium containing (g/L): soybean flour - 35,0, $(\text{NH}_4)_2\text{SO}_4$ - 1,0, KH_2PO_4 - 5,0, $[\text{Sr}(\text{L})_3][\text{Co}(\text{SCN})_4]$ - 0,005.

The result of the invention consists in increasing of lipase biosynthesis compared to control and reduction of cultivation duration by 24h.

Applications: Industrial Microbiology

The invention was created based on scientific results obtained within the project 20.80009.5007.28 funded by NARD, Republic of Moldova.

MD.120.
Title

Biologically active preparation based on yeast biomass from the waste of beer industry.

Authors

CHISELIȚA Natalia, CHISELIȚA Oleg, BEȘLIU Alina, EFREMOVA Nadejda, TOFAN Elena, LOZAN Ana, DANILÎȘ Marina.

Institution

Institute of Microbiology and Biotechnology, Ministry of Education and Research of the Republic of Moldova.

a 2021 0016 / 2021.03.30

**Description
EN**

The invention relates to the field of ecology and microbial biotechnology, in particular to the production of a biologically active natural preparation from yeast biomass from wastes from the beer industry which can be used in various fields, including the livestock sector and the food industry. According to the invention, a biologically active natural preparation is claimed, obtained on the basis of yeasts biomass from beer production wastes, by freezing and thawing of the yeast biomass, autolysis of biomass in sodium phosphate buffer (1:1 ratio) at +45°C, for 8 hours, containing: proteins – 64,6±2,6%, carbohydrates - 11,7±2,2%, lipids - 0,13±0,02%, ash 13,5±1,4% and is characterized by a high summary contain of essential amino acids of 55,7 g /100 g of protein.

The invention was created based on scientific results obtained within the project 20.80009.5107.16 "New biologically active microbial preparations for increasing the

reproductive and productive potential of animals of zootechnical interest" funded by NARD, Republic of Moldova.

MD.121.

Title	The procedure for the regulation of reproductive function of sows.
Authors	PÎRLOG Alisa, CARAPIREA Anatol, DARIE Grigorie, CIBOTARU Elena, MATVIENCO Natalia, BEȘLIU Alina, CHISELIȚA Natalia, CHISELIȚA Oleg, EFREMOVA Nadejda, TOFAN Elena.
Institution	Institute of Microbiology and Biotechnology, Ministry of Education and Research of the Republic of Moldova;
Patent	Scientific and Practical Institute of Biotechnologies in Zootechnics and Veterinary Medicine, Ministry of Agriculture and Food Industry of the Republic of Moldova. a 2021 0027 / 2021.04.29.
Description EN	The invention relates to veterinary, zootechnics, especially to the regulation of productive and reproductive function of sows and may be used in order to efficiently use the domestic genofond of valuable pigs. The invention consists in proposing a new procedure for the regulation of reproductive function of sows, with 30 days before gestation and 10 days after gestation, based on the supplementation of basal feed ration with mannoprotein preparation (1 g/100 ml), obtained from the yeast waste from the beer industry in quantity of 10-15 ml per head for daily administration. Positive effects is caused by feed ration supplementation with the mannoprotein biological active preparation which influence on the animal metabolism. The technical result of the invention consist in to increase of live piglets number at gestation with 1,6 per head, compared with control, decreasing of dead born piglets with 1,8 per head, increase to the weight at new-born brood with 1,19 kg, and at 21 days with 0,85 kg compared with control. <i>The invention was created based on scientific results obtained within the project 20.80009.5107.16 "New biologically active microbial preparations for increasing the reproductive and productive potential of animals of zootechnical interest" funded by NARD, Republic of Moldova.</i>

MD.122.

Title	Protective medium for ram semen preservation by refrigeration.
Authors	ROTARI Doina, DARIE Grigore, Maşner Oleg, IURCU Iulian, DJENJERA Irina, BEŞLIU Alina, CHISELIȚA Natalia, CHISELIȚA Oleg, EFREMOVA Nadejda, TOFAN Elena.
Institution	Institute of Microbiology and Biotechnology, Ministry of Education and Research of the Republic of Moldova; Scientific and Practical Institute of Biotechnologies in Zootechnics and Veterinary Medicine, Ministry of Agriculture and Food Industry of the Republic of Moldova.
Patent no.	Nr.10033 / 2022.03.30.
Description EN	<p>The invention relates to veterinary, zootechnics, especially to the regulation of productive and reproductive function of sows and may be used in order to efficiently use the domestic genofond of valuable pigs. The invention consists in proposing a new procedure for the regulation of reproductive function of sows, with 30 days before gestation and 10 days after gestation, based on the supplementation of basal feed ration with mannoprotein preparation (1 g/100 ml), obtained from the yeast waste from the beer industry in quantity of 10-15 ml per head for daily administration. Positive effects is caused by feed ration supplementation with the mannoprotein biological active preparation which influence on the animal metabolism. The technical result of the invention consist in to increase of live piglets number at gestation with 1,6 per head, compared with control, decreasing of dead born piglets with 1,8 per head, increase to the weight at new-born brood with 1,19 kg, and at 21 days with 0,85 kg compared with control.</p> <p><i>The invention was created based on scientific results obtained within the project 20.80009.5107.16 "New biologically active microbial preparations for increasing the reproductive and productive potential of animals of zootechnical interest" funded by NARD, Republic of Moldova.</i></p>

MD.123.

Title	Processes for spirulina biomass production – raw material for the development of anticancer, immunostimulating and antioxidant agents.
Authors	RUDI Ludmila, CEPOI Liliana, CHIRIAC Tatiana, RUDIC Valeriu, DJUR Svetlana, ZINICOVSCAIA Inga, VALUȚA Ana, DUMBRĂVEANU Veronica, MISCU Vera, CEPOI Anastasia, ROTARI Ion, TAȘCĂ Ion, IUSHIN Nichita.
Institution	Institute of Microbiology and Biotechnology, Ministry of Education and Research of the Republic of Moldova
Patent no.	4796 MD/ 2022.02.28, 4542MD / 2018.07.31.
Description EN	<p>The inventions refer to bio- and bionanotechnology, in particular to processes for biomass production of cyanobacterium <i>Spirulina platensis</i>. The proceedings provide the cultivation of <i>Spirulina platensis</i> for 5 days, using water soluble silver nanoparticles - AgNPs with a size of 5nm in a concentration of 0,10-32,5μM. The result of the inventions consists in increasing the production of safety spirulina biomass and lipid content in biomass. In addition, the processes ensure the obtaining of biofunctionalized silver nanoparticles with properties that can be distinguished from the unmodified ones, and also to benefit to the maximum from the unique biological properties of the biomolecules in spirulina. This allows to obtain raw material for the development of anticancer, immunostimulating and antioxidant agents.</p> <p><i>The inventions were created based on scientific results obtained within the project 20.80009.5007.05 „Biofunctionalized metal nanoparticles - obtaining using cyanobacteria and microalgae” funded by NARD, Republic of Moldova.</i></p>

Ghitu Institute of Electronic Engineering and Nanotechnologies, Republic of Moldova

MD.124.**Title**

The Single-crystal Bi–Sn nanowires for use as the branch of low-temperature energy converters

Authors

Albina Nikolaeva, Leonid Konopko, Pavel Bodiul, Ivan Popov, Gheorge Para

Institution

Ghitu Institute of Electronic Engineering and Nanotechnologies, Chisinau MD-2028, Moldova Republic

Patent no.

Patent MD 1537 Z 2021.12.31 Material termoelectric pe baza de bismut

**Description
EN**

The aim of this work was to prepare *p*-type nanowires exhibiting high thermoelectric efficiency for use in miniature thermoelectric power converters in a temperature range of 70–100 K.

Glass-insulated single-crystal Bi–0.02at%Sn wires with diameters of 80 nm to 1 μ m were prepared by liquid-phase casting in accordance with the Ulitovsky method.

It was found that, as a result of size quantization, a semimetal–semiconductor transition occurs in thin Bi–0.02at%Sn wires with a significant dependence of the energy gap on wire diameter d ; therefore, the thermoelectric power (value and sign) significantly depends on the localization of the Fermi level and exhibits a nonmonotonic dependence on wire diameter d . The maximum positive thermoelectric power value, and the force factor occur at $T = 80\text{--}100$ K. in thin wires.

Taking into account that the thermal conductivity in Bi and Bi_{1–x}Sb_x wires and films will decrease due to the surface scattering of carriers, they can be used as *p*-branches in low-temperature energy converters, particularly as micro-coolers in a temperature range of <100 K.

The cooling of infrared detectors to these low temperatures will provide a significant increase in their detectability.

MD.125.

Title (UV) radiation detector
Authors V. MORARI, E. RUSU, V. URSACHI, I. TIGHINEANU
Institution Ghitu Institute of Electronic Engineering and Nanotechnologies
Patent application : No. 9992 / 2022

**Description
EN**

The UV region of the optical spectrum is composed of the subdomains UV-A 400-320 nm, UV-B 320-280 nm, UV-C 280-200 nm, including the bactericidal domains of major importance in the detection and dosimetry of optical radiation in antibacterial treatment, especially in animal husbandry. Thus, the selective radiation photoreceptor (UV) is known based on the structure of $\text{Ag-Zn}_{0.35}\text{Mg}_{0.65}\text{O}/\text{Zn}_{0.65}\text{Mg}_{0.35}\text{O}/\text{p-Si-Al}$, which consists of an absorption film on which a transparent $\text{Zn}_{1-x}\text{Mg}_x\text{O}$ film with x value from 0-0.8, which ensures an energy band at least 0.1 eV higher than that of the absorption film. The compound $\text{Zn}_{1-x}\text{Mg}_x\text{O}$ is a semiconductor with a wide band gap of 3.37 eV - 7.8 eV which corresponds to the absorption of UV radiation in the range of 365 nm - 160 nm. The maximum sensitivity of the photodiode is 460 mA/W at a wavelength of 250 nm. The disadvantage of this type of photoreceptor is the modification of the crystal lattice of the absorption layer from the wurtzite structure to the cubic structure with the increase of the Mg concentration. The novelty of the proposed invention consists in the deposition of chemical solutions by spraying on Si supports of an absorption film ITO: Ga, which allows to obtain a crystallographic structure of a single phase, also moving the spectral range of sensitivity to shorter wavelengths by modifying the content of Ga.

MD.126.

Title Thermostated vacuum gauge
Authors BELOTSEKOVSKII Igor; SIDORENKO Anatolie;
CONDREA Elena; MORARI Roman
Institution Ghitu Institute of Electronic Engineering and Nanotechnologies, Chisinau MD-2028, Moldova Republic of
Description DECISION on registration of the patent «Vacuumetru

EN

termoelectric» Nr. 9908 2021.10.21

BELOTERCOVSCHII Igori; SIDORENKO Anatolie;
CONDREA Elena; MORARI Roman

To improve the accuracy of measurements in the low pressure region, a prototype of the TVG-2 thermoelectric vacuum gauge has been designed and constructed; it includes an electronic unit and a TTC-5 thermocouple transducer, the sensitive element of which is a thin electrically insulating film; heating and measuring circuits are deposited on the surface of the film by vacuum deposition methods; the measuring circuit has the form of a thermocouple array.

To decrease the dependence on ambient temperature, a thermistor is placed near the cold junctions of the thermocouple array, and an ohmic thermostat heater is wound on the outer surface of the transducer housing.

This technical decision has made it possible to expand the range of measured pressures to 1×10^{-5} mmHg and decrease the error in measuring low pressures with the vacuum gauge from 80 to 10%.

MD.127.

Title

**FUZZY CONTROLLED SYSTEM FOR
HYPOTHERMIC BRAIN THERAPY**

Authors

Victor COJOCARU, Teodor FEDORISIN, Rihart GALUS

Institution

**Ghitu Institute of Electronic Engineering and
Nanotechnologies, Chisinau MD-2028, Moldova
Republic of**

Description

EN

Method: It is well known that approximately 50% of heating generated by the human brain is eliminated due to colder flux of the blood in the carotid arteries. Another 50% of heating is evacuated by the surface of the brain which is dissipated to outside using flux of cooled blood at the scalp skin level.

Results: Devices and technology proposed will have significant impact on the treatment methods of patients with various pathologies and will contribute to the elaboration of new curative treatment technologies. The implementation of local device production has advantages in terms of staff training, quick service and quick maintenance.

- Science impact: development of new therapies for non-

invasive hypothermia, training biomedical engineering specialists with applications in innovative medicine, stepping up collaboration activities at regional and European level.

- Socio-economic impact: Reducing the intervention time will reduce the rate of complicated cases and will improve the treatment of patients and return them to normal life.

MD.128.
Title

Stand for testing rockets on solid fuel generating ice-forming nuclei

Authors

E. A. Zasavitsky, D. I. Karagenov and A. S. Sidorenko

Institution

Ghitu Institute of Electronic Engineering and Nanotechnologies, Chisnau, Moldova

Patent no.

Patent application No. s20210019 from 17.03.2021

**Description
EN**

The elaboration relates to the technology for testing rockets and is based on the use of a small aerodynamic stand, which makes it possible to test the yield of various rockets for active impacts on clouds, in particular, rockets with a propulsion engine that operates throughout the entire flight path and uses a new type of solid propellant. These rockets can significantly increase the yield of active crystallization centers. It is significant that the aerosol is characterized by an extremely high temperature threshold for crystallization ($\approx -4^{\circ}\text{C}$) which makes it possible to implement active impacts to artificially increase precipitation and dissipate clouds.

**“Alexandru Ciubotaru” National Botanical Garden,
Republic of Moldova**

MD.129.**Title**

**The cultivar ‘MARIA’ of jerusalem artichoke,
Helianthus tuberosus L.**

Authors

Dr. Victor ȚÎȚEI

Institution

“Alexandru Ciubotaru” National Botanical Garden
(Institute)

**Description
EN**

MD 2020.0027 din 20.10.2020

The new cultivar „MARIA” of Jerusalem artichoke, *Helianthus tuberosus* L., family *Asteraceae* has been created by individual breeding of local ecotypes and introduced ecotypes. The aerial parts can be used as forage for farm animals (green mass, silage, vitaminized flour) and as multi-purpose feedstock for renewable energy production. The tubers may be used as feed, fodder and feedstock for biorafenary. The cultivar „MARIA” can be used as ornamental and melliferous plants. The green mass productivity 65-80 t/ha, with 38-43 % foliage. The biochemical composition and nutritive value of green mass: 86.9-91.7 % OM, 9.8-12.5 % CP, 29.6-36.7% CF, 34.3-36.9% ADF, 49.6-56.2 % NDF, 5.0-6.5 % ADL, 29.3-30.4% Cel, 15.3-19.3% HC, 23.5-26.2% TSS, 543-613g/kg DDM, 524-597g/kg DOM, 11.90-12.25 MJ/kg DE, 9.77-10.06 MJ/kg ME, 5.79-6.08 MJ/kg NEL, RFV=100-117. The ensiled mass was characterized by agreeable colour with specific smell, pH 3.85 - 4.37, 89.1% OM, 13.2 % CP, 30.7 % CF, 32.8% ADF, 52.6% NDF, 3.3% ADL, 29.5 % Cel, 19.8% HC, 9.0% TSS, 60.3% DDM, 52.2% DOM, 12.47 MJ/kg DE, 10.23 MJ/kg ME, 6.26 MJ/kg NEL, RFV=112. The fresh and ensiled mass substrates for anaerobic digestion, have optimal C/N ratio, amount of lignin and hemicellulose, biomethane potential varied from 290 to 329 l/kg ODM. The dry stalks mass contain 83.3% volatil matter, 47.16% C, 5.51% H, 0.31% N, 45.94% O, 0.05% S, 0.04% Cl, 1.03 ash, 17.8 MJ/kg NCV. The tubers contain 237g/kg dry matter with 10.24 % CP, 0.71% EE, 8.12% CF, 8.02 % ash, 0.16% Ca, 0.29% P, 72.90% NFE, 58.29% inulin, 5.10% starch and other carbohydrates, eligible for feed and raw material for the pharmaceutical and food industry. Tubers fodder value is 0.28 nutritive unit/kg, 16.26 g/kg digestible protein and 2.85 MJ/kg ME.

Financially supported- project no. 20.80009.5107.02.

MD.130.

Title	The innovative technology for the establishment industrial melliferous-energy plantation
Authors	Dr. Victor ȚÎȚEI
Institution	“Alexandru Ciubotaru” National Botanical Garden (Institute)
Description	MD 204/ 2016.05.31; MD 207/ 2016.05.31; MD 208/ 2016.05.31 MD; 209/2016.05.31 MD; 20190006/2019.02.19; MD 20190007/2019.02.19.
EN	<p>To face the global food and energy crisis, particular attention needs to be paid to the reassessment of the value of neglected and underutilized crops, and to the mobilization, breeding and cultivation of new plant species. New cultivars of non-traditional crops created at the "Alexandru Ciubotaru" National Botanical Garden (Institute), Chisinau, registered in the Catalogue of Plant Varieties, patented and in processes of patenting at the State Agency for Intellectual Property (AGEPI) in the Republic of Moldova are intended for the establishment industrial melliferous-energy plantation on marginal, degraded, eroded and polluted lands that cannot be profitably cultivated with traditional crops.</p> <p>For the establishment industrial plantation with cv. ‘Vital’ of cup plant, <i>Silphium perfoliatum</i> (MD 204) are necessary 5-10 kg/ha seeds or 28-40 thousand seedlings/ha; the plant spacing should be 70 cm x 50 cm or 70 cm x 35 cm, 45 cm x 45 cm. It is a medium-late source of pollen and nectar for bees (July-September) that makes it possible to obtain 150-220 kg/ha of honey, the dry stems mass potential is 15-20 t/ha with 17.78 MJ/kg NCV and 0.570 l/kg TEP.</p> <p>For the establishment industrial plantation with cv. ‘Energio’ of Virginia mallow, <i>Sida hermaphrodita</i> (MD 207) are necessary 3-5 kg/ha seeds or 28-40 thousand seedlings/ha; the plant spacing should be 70 cm x 50 cm or 70 cm x 35 cm. It is a medium-late source of pollen and nectar for bees (July-September) that makes it possible to obtain 80-120 kg/ha of honey, the stems mass potential – 20 t/ha with 18.09 MJ/kg NCV and 0.597 l/kg TEP.</p> <p>For the foundation of plantations with cv. ‘Melifera’ of lacy phacelia, <i>Phacelia tanacetifolia</i> (MD 208) 6-10 kg/ha seeds incorporated at a depth of 2-3 cm are necessary, it is an early-medium source of pollen and nectar for bees (May-June) with 400-600 kg/ha potential honey, the dry biomass potential 7-9 t/ha with 17.03 MJ/kg NCV and 0.487 l/kg TEP.</p> <p>For establishment industrial plantation with cv. ‘Solar’ of</p>

Jerusalem artichoke, *Helianthus tuberosus* (MD209) are necessary 40-50 thousand tubers /ha; the plant spacing should be 70 cm x 25 cm. It is a late source of pollen and nectar for bees (September) that makes it possible to obtain 30-50 kg/ha of honey, the stems mass potential – 25 t/ha with 17.31 MJ/kg NCV and 0.550 l/kg TEP.

For the creation of industrial plantations with cv. 'Vigor' of milkvetch, *Astragalus galegiformis* (MD 20190006), 8-10 kg/ha scarified seeds incorporated at a depth of 3-4 cm and 30-45 cm between rows are needed. It is an early-medium source of pollen and nectar for bees (May-June), the honey yield is 200-300 kg/ha, the dry biomass potential 10-15 t/ha with with 17.22 MJ/kg NCV and 0.535 l/kg TEP.

For the foundation of industrial plantations with cv. 'Ileana' of Elecampane, *Inula helenium* (MD 20190007), 6-10 kg/ha seeds are needed to be incorporated at a depth of 1-2 cm or 28-40 thousand seedlings / ha with planting scheme 70 cm x 35 cm. It is a medium source of pollen and nectar for bees (June-August) with honey potential of 70-130 kg/ha, dry stems mass potential 10-12 t/ha with with 18.02 MJ/kg NCV and 0.490 l/kg TEP.

Financially supported- project no. 20.80009.5107.02.

The Institute of Emergency Medicine Moldova

MD.131.**Title****DEVICE-FIXATOR FOR THE SYNTHESIS OF
TIBIOFIBULAR SYNDESMOSIS****Authors**KUSTUROVA Anna, KUSTUROV Vladimir, CAPROȘ
Nicolae**Institution****The Institute of Emergency Medicine, The State
University of Medicine&Pharmacology“Nicolae
Testemițanu”****Patent no.****Brevet AGEPI MD nr. 1550 Z din 2022.02.28****Description
EN**

The technical result of the invention is that the screw of the fixator is inserted along a guide needle parallel to the plane of the joint, at an angle of 90° to the line of contact of fragments, which gives the possibility of mutual alignment of the fragments, with the assurance of optimal reposition and stable fixation of the bone fragments of the long tubular bones, which form the joint. Creates a dosed compression between the fragments at the level of the entire consolidation stage, allows extremely efficient fixation of the fragments and without causing additional trauma to the surrounding tissues, at the same time restores the shape and integrity articular ends of the bone.

MD.132.**Title****METHOD FOR DIAGNOSING THE DEGREE OF
ACUTE ISCHEMIA OF THE LOWER LIMBS****Authors****PREDENCIUC Alexandru, CASIAN Dumitru****Institution****The Institute of Emergency Medicine, The State
University of Medicine&Pharmacology“Nicolae
Testemițanu”****Certificate SAIP AGEPI MD seria OȘ 6917 din
02.06.2021****Description
EN**

The invention refers to medicine, namely surgery, and can be applied in the treatment of patients with acute ischemia of the lower extremities.

The problem solved by this invention consists in the diagnosis based on the calculation of the temperature gradient between the patient's forehead and the affected plant of the degree of acute ischemia: IIA (marginal threatened limb viability) or IIB (immediately threatened

limb viability).

The essence of the invention is that after the standard clinical examination of the patient with the help of the infrared thermometer placed at a distance of 5 cm from the skin, the cutaneous temperature in degrees Celsius by tenths at the level of the forehead and at the level of the plantar surface of the forefoot is calculated the difference between the temperature of the forehead and the temperature of the plant and in the case of the difference greater than 10° C, the IIB degree of acute ischemia is established.

MD.133.
Title

**EXTENSIVE DIAPHYSEAL BONE DEFECTS.
RECONSTRUCTION AFTER RESECTION OF BONE
TUMORS**

Authors

**OLARU Andrei, CIUPERCA Victor, CERNAT Victor,
BOROVIC Eduard**

Institution

**The Institute of Emergency Medicine, The Oncology
Institute**

**Certificate SAIP AGEPI MD seria OŞ 6915 din
02.06.2021**

**Description
EN**

Segmental defects of long bones are a common clinical problem in orthopedic surgery. Bone capital loss is usually the result of high-energy trauma or bone resection for necrosis, osteomyelitis, or neoplasm. Reconstruction of extensive diaphyseal tumor bone defects, arising after segmental resection surgery of long tubular Bones, has a number of advantages. The technique with the application of the titanium mesh cage is a one-stage surgical procedure, in which the anatomy and alignment of the limbs are immediately restored and provides sufficient limb stability for an early, unrestricted mobilization, while allowing the healing of bones and soft tissues.

MD.134.
Title

**ADAPTATION AND APPLICATION OF THE
PRIMARY HEALTH CARE ASSESSMENT TOOL.
ORGANIZATION AND CONDUCT OF THE SURVEY
OF PROFESSIONAL DETERMINANTS**

Authors

**CIOCANU Mihail, ZARBAILOV Natalia, ROTARU
Cristina**

Institution

The Institute of Emergency Medicine, The State

University of Medicine&Pharmacology“Nicolae Testemițanu”

Certificate SAIP AGEPI MD seria OȘ 6915 din 02.06.2021

**Description
EN**

The Primary Health Care Assessment Tool is a special questionnaire that contains the characteristics of the health system and primary care practice, with their descriptions according to the degree of development or representation, with the help of which it became possible for the first time to assess the primary health care in Moldova. The questionnaire was adapted and applied within the Research Project “*Evaluation of the effectiveness and development perspective of the family doctors practice in the Republic of Moldova*”.

The tool is of interest with a simple methodology of application, low cost and the property to evaluate the dynamics of the characteristics of the health system and medical practice that need improvement. The adaptation, validation and piloting of the Questionnaire took place in 2017 with the involvement of a group of national experts. The studied factors considered factors with potential influence on the health of the country's population.

Job satisfaction covers various aspects, including economic satisfaction, work satisfaction and psychosocial satisfaction. The survey on professional determinants, professional satisfaction and work motivation of family physicians is a tool through the application of which the leaders (leaders) of the medical organization / institution could create and maintain the internal environment in which staff can become fully involved in achieving the objectives of the organization.

MD.135.

Title

PREDICTION OF MORPHOLOGICAL AND FUNCTIONAL CHANGES IN THE LUNG (SAMCRS_{LUNGS})24 HOURS AFTER TRAUMATIC IMPACT

Authors

ARNAUT Oleg, ROJNOVEANU Gheorghe, ȘANDRU Serghei, CIOCANU Mihail, GRABOVSCI Ion

Institution

The Institute of Emergency Medicine, The State University of Medicine&Pharmacology“Nicolae Testemițanu”

Patent no. Certificate SAIP AGEPI MD seria OȘ 6677 din 01.10.2020

Trauma is dangerous not only by local immediate injuries, but also by morphological and functional changes in other organs of the body, including the lungs due to exposure to various substances secreted in the immune system response, some of which are components of the proteases/antiproteases system. As it can be shown, the extent of these changes in the lungs can be estimated in advance using certain predictive tools for modeling lung damage. After completion, validation and testing in clinical trials, they may be useful in optimizing the therapeutic process of trauma patients.

Description EN Associations with the negative sign between SAMCRS_{lungs} and the concentration of α_2 -macroglobulina₂ after trauma as well as positive associations with the enzymatic activity of most proteases can be explained by the protective or destructive effects, characteristic for the respective substances.

At the same time, the negative correlations between SAMCRS_{lungs} at 24 hours with the value of elastase enzyme activity before trauma as well as the tendencies towards negative associations with aet0, AET24, AECG24, AEE24 can be explained by polymorphic relationships within the protease/antiprotease system as well as by the probable reversal of signs or disappearance of associations at the adjustment in the multivariate analysis. Moreover, before the trauma, the balance of protection/destruction is reached.

MD.136.

Title THE CONTRIBUTION OF THE BLOCKCHAIN BINOMIAL-ACCOUNTING IN THE EXTIRPATION OF THE PHENOMENON OF ECONOMIC CRIME

Authors Mihail CIOCANU, Svetlana MIHAILA, Veronica GROSU, Ioan-Dan TOPOR, Marian SOCOLIUC, Marius-Sorin CIUBOTARIU, Mihaela TULVINSCHI

Institution The Institute of Emergency Medicine, Academia de Studii Economice din RM

Patent no. Patent pending - Aplicatiune AGEPI MD nr2017 din 24.02.2022

Description The effects of the process of globalization and

EN intensification of the digitalization of the economy are being felt more and more on the phenomenon of Economic Crime, which is why the border line that currently delimits legal technologies from illegal ones, depending on how they are regulated or not. In the context of our work is to identify those situations where accounting blockchain would stink as a solution to ensure the safety and legality, transactional and economic financial transactions that reduce and determine the impact of economic phenomena of criminality. The main goal is to: stable relationship between the blockchain concept, communication and criminalization of the economy, and the stability and beneficiary of the creation of blockchain technology in the exchange system. The results obtained consist in the complete mapping of the network that exists between blockchain technology, accounting and economic crime with the help of the cluster method and can be a real support for the legislator, to establish new future research directions in this field and not in ul. for a catechism Importance of stewardship, such as computer scientists, accountants, audits and national governments.

MD.137.

Title **METHOD OF ANALYSIS OF INTEGRATED REPORTING AND SOCIAL RESPONSIBILITY ON BIBLIOMETRIC AND CONTENT**

Authors **Mihail CIOCANU, Svetlana MIHAILA, Veronica GROSU, Ioan-Dan TOPOR, Ana-Carolina COJOCARU, Elena HLACIUC, Marian SOCOLIUC, Marius-Sorin CIUBOTARIU**

Institution **The Institute of Emergency Medicine, Academia de Studii Economice din RM**

Description **Patent pending - Aplicati**
EN **on - AGEPI MD nr2016 din 24.02.2022**
By integrating financial statements with corporate social responsibility (CSR) reports, entities can more effectively communicate their commitment to the environment by making transparent, sustainable reports that reflect much more than just financial issues, being called financial statements. integrated. The topicality of the research topic and the importance of the approached problem lies in the need to offer, both to the academic framework and to the entities, a unified theoretical support on the concept of

integrated reporting and CSR. The aim of this research is to increase the level of knowledge and theoretical research on the concept, evolution and principles of integrated reporting and CSR, in order to build on them an improved model for managing the social, environmental and economic aspects of entities. In order to achieve and highlight the purpose of the research, the following research objectives were established: identification of scientific publications on integrated reporting and CSR; determining the evolutionary stages in the development of integrated reporting; bibliometric analysis of information sources identified through specialized software; delimiting the key concepts of integrated reporting and CSR; formulating conclusions based on the results obtained.

MD.138.
Title
**IMAGING CHARACTERISTICS OF
POSTOPERATIVE SCAR ENDOMETRIOSIS**
Authors
MIȘINA Ana, ZAHARIA Sergiu, MIȘIN Igor
Institution
**The Institute of Emergency Medicine, The Institute of
Mother & Child, The State University of Medicine &
Pharmacology “Nicolae Testemițanu”
Certificate SAIP AGEPI MD seria OȘ 6662 din
06.10.2020**
**Description
EN**

The ultrasound and Doppler methods revealed the following PSE-related imaging criteria: round/oval-shaped volume mass, hypoechoic with hyperechoic contour, major endometrioma size was on average 23.9 ± 2.7 mm (95% CI: 18.25-29.45); whereas the minor size - 15.9 ± 2.1 mm (95% CI: 11.65-20.18); presence of vascularization was found in 11 (91.7%) cases and 1(8.3%) case revealed no vascularization, thus showing a statistically significant difference ($p=0.0001$). There were reported three types of PSE vascularization viz. peripheral, mixed, and central (Figure 1). Vascularization of the formation was assessed by Doppler scan, which revealed vessels related to the cystic component. These study findings allowed establishing the relevant prevalence of PSE with vascularization, compared to avascular endometriomas. CT study criteria characteristic for PSE were the homogeneous masses with presence of linear infiltration radiating peripherally to the neighboring subcutaneous tissue from the central node. MRI study

criteria characteristic for PSE were the presence of micro-hemorrhagic inclusions (Figure 2). MRI is a more specific method than CT for diagnosing PSE due to the ability to better visualize the source with microhemorrhagic inclusions.

MD.139.**Title****MORPHOLOGICAL CHARACTERISTICS OF POSTOPERATIVE SCAR ENDOMETRIOSIS****Authors**

MIȘINA Ana, ZAHARIA Sergiu, MIȘIN Igor, PETROVICI Vergil

Institution

The Institute of Emergency Medicine, The Institute of Mother & Child, The State University of Medicine & Pharmacology "Nicolae Testemițanu"

Certificate SAIP AGEPI MD seria OȘ 6663 din 06.10.2020

**Description
EN**

The macro-microscopic study of colonized endometriotic scar tissue showed that, besides being typically characterized as ectopic endometriosis with cyclic morphological and functional features, it might change into a benign pseudonodular tumor with commonly progressive patterns due to invasion and reproduction aspects, causing the growth of the primary endometriotic lesions. These changes characterize ectopic endometriosis and endometriotic tissues colonized as tumors, so called *abenign ectopic scar endometrioma*. The morphopathology used the term *benign ectopic endometrioma* within this study, characterized by the presence of typical endometrial-like tissue (gland with inactive epithelium, circumscribed by an insignificant cuff of endometriotic stromal vascular network) and transformations of the glandular, glandular-stromal and / or mixed structure through the cystic glandular component. This present research determined the following morphological features: (1) presence of active and inactive evolutionary forms; (2) presence of elastosis within the stroma and tissues; (3) unformed endometriotic globoid formations located remotely from the primary source, resembling endometriotic or stromal-glandular stromal loops, defined as endometriotic satellites; (4) mimicry of the morphological features characteristic for pseudoxandoma, pseudomixoma or fibroelastoma.

Technological College of Chisinau, Moldova

MD.140.
Title
Snowdrop - the source of inspiration for making a keychain
Authors

Malcoci Marina, Malcoci Maria-Eudochia

Institution
Technological College of Chisinau
Patent no.

MD f 2021 0005

Description
EN

The snowdrop is the inspiration for the keychain collection. The snowdrop is the first plant to bloom in early spring, being its harbinger. No one can remain indifferent when the snowdrop blooms from under the heavy, cold carpet of snow. A seemingly fragile plant, too small for how strong it is. Snowdrops convey what they represent: health and prosperity, the power to overcome the obstacles of life, being the flowers of innocence.

Natural leather, waxed yarn and staples were used to make the keychains. The collection is handmade.



VbungVdoor Ltd Moldova

MD.141.

Title Device for Sealing a Wooden Barrel
Authors Vitalie Popa
Institution VbungVdoor Ltd
Patent no. AU 2018203047 / EP 3564354A1

Description EN

This unique patented piece of equipment and technology allows making and/or aging Additive and Preservative Free Wines (No added sulfites wines) without any technological risk or product loss:

Sustainable Stainless Steel Bung for sealing wooden barrels containing fermentable or fermented food or beverage. It allows creating a totally sealed confined space inside the wooden barrels where maceration, fermentation, malolactic fermentation, and aging are conducted under continuous positive and/or negative pressure inside the barrel.

Laboratory and tasting samples are taken out of the barrels without the need of opening the barrels giving full control over oxidation, contamination, and evaporation.

Continuous positive pressure is created naturally by CO₂ from fermentation or artificially using any food-grade gasses (CO₂, N₂, Ar) allowed in Food Industry. Negative pressure is created using any vacuum system.

Wine, Beer, Cider, Vinegar and Spirits (Any beverage or food that uses wooden barrels as part of their technological process during making and /or aging)

Junior Achievement Moldova

MD.142.	
Title	Mupi
Authors	Matei Caolina, mentor Silvia Scortescu
Institution	IPLt Universul
Description EN	Mupi -is a medicinal lollipop made of maple syrup with the addition of medicinal plants, the purpose of production is to treat viruses and seasonal colds, the person is treated when administering for 10 consecutive days the lollipop also made with linden.
MD.143.	
Title	Tuk-Puk
Authors	Rusu Constanta, mentor Silvia Scortescu
Institution	IPLt Universul
Description EN	Organic teddy bear biscuits made from millet, contains sesame seeds, is administered in the morning on an empty stomach, remove bloating, also contains a secret ingredient that keeps you until 2 p.m
MD.144.	
Title	Apun
Authors	Griziuc Renata, mentor Silvia Scortescu
Institution	IPLt Universul
Description EN	Apun is an ecological quilt, it is intended for treatment because it contains medicinal magnets, the purpose is to treat back pain, the cervical part that suffers from improper sleep
MD.145.	
Title	Nano-Tehno Stofix
Authors	Chiriac Victor, Muntean Alexandru, mentor Mariana Lozinschii
Institution	IPLt Universul
Description EN	Stofix -material that does not absorb odor, does not get wet, heat-resistant, are very flexible and elastic. Durable over time.
MD.146.	
Title	Felis panda
Authors	Buca Felicia, mentor Silvia Scortescu
Institution	IPLt Universul
Description EN	Felis panda is dressed with magnets for cats and dogs, clothes treat animals rheumatism and inflammatory diseases, also treats leg pain

Philippines

powered by **TISIAS**

PH.1.

Title

TEACHIGO

Authors

Iman Hadi Vincheh, Ma. Chat Donna V. Ofilas

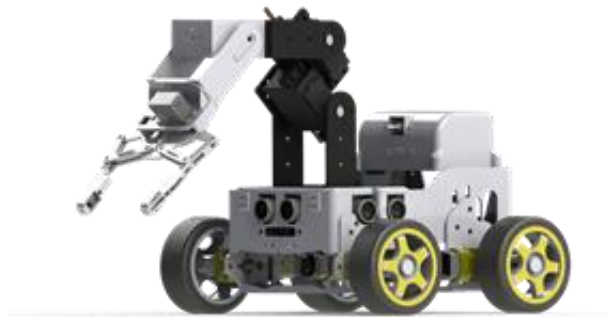
Institution

Farin Technologies OPC

Description

EN

A new Robotic system along with a novel education platform that focuses on fast results education modules with selectable learning paths is introduced that incorporates multiple grounds for innovation, and allows the user to customize it based on their needs. It can be an explorer robot, educate color forming, educate music composing, and teach different steering, and motor type plus robotic arms in simple education modules. It can be used for STEM education, third party robotic system development, and process simulation.



Poland

Represented by **Eurobusiness-Haller**

PL.1.

Title

Multi-gas and multi-point stationary CO / LPG /NO₂ detectors for closed garages and ...many more.

Authors

Mirosław Stecuła, Tadeusz Kapusta

Institution

Przedsiębiorstwo Wdrożeniowe PRO-SERVICE Sp.z o.o.

Patent no.

RCD 002830497-0001

RCD 002830497-0002

RCD 002830497-0003

RCD 002830497-0004

Description EN

It is a world novelty. So far, no one has produced this type of stationary detectors. (Portable multi-gas detectors are manufactured).

The new, unique product group implemented in 2007 and 2009 in the form of multi-gas, two-module gas detectors was a response to the demand for more modern and very functional security devices for closed garages.

The axis of this group, the DUOmaster CO / LPG Two-Gas Garage Detector, was initially intended

only for mandatory protection of underground garages. Detection of gases that may appear there as components of exhaust gases or potential unsealing of car propane-butane tanks.

A little later, the three-gas Tmaster CO / LPG / NO₂ device was created, which also was quickly used by designers and investors following the market's needs.

Until today, several dozen thousands of such devices are secured by several thousand multi-bay garages in many Polish cities as well as in the Netherlands, Belgium and Slovakia.

Class no.

12

PL.2.**Title****Mobile Gas Alarm - Gas Detection Signaling Column
KSDG-4****Authors**

Miroslaw Stecula, Krzysztof Komodziński

Institution

Przedsiębiorstwo Wdrożeniowe PRO-SERVICE Sp.z o.o.

Patent no.

-

**Description
EN**

The mobile detection and signaling column is intended to be adapted wherever there is a need for periodic detection of many hazardous gases, but due to the specificity of the object or its temporary nature, it is not possible (or unprofitable) to use stationary gas detection systems. The column is a cover for detectors that may be exposed to unfavorable environmental conditions that may lead to their flooding with water, or contamination with dust, varnish, mud, or other substances that deteriorate the working and servicing conditions of the detectors. Significant deterioration of the above-mentioned working conditions of the detector without the use of a cover is usually the main cause of its reduced durability or damage. In addition to the detectors, the column has one optical-acoustic signaling device permanently installed to inform about exceeding the concentration of hazardous gases, as well as two sockets for connecting additional, portable signaling devices. As a standard, the signaling devices, both additional and integrated with the column, generate an optical (flash) red signal after exceeding the concentration of the first alarm threshold, and additionally, an acoustic signal (intermittent) after exceeding the concentration of the second alarm threshold of detected gases. Optionally, the signaling devices can be equipped with an additional green lamp, which lights up during the standby mode, if the concentration of the first threshold of any of the detected gases has not been exceeded. In this variant, when the first alarm threshold of any of the detected gases is exceeded, the green lamp goes out.

Poland

Represented by

Association of Polish Inventors and Rationalizers

Stowarzyszenie Polskich Wynalazców i Racjonalizatorów. SPWIR

PL.3.

Title	ExoReha – a printable exoskeleton with free degrees of freedom dedicated to task-oriented remote home kinesiotherapy
Authors	Piotr FALKOWSKI, Bazyli LECZKOWSKI, Julia WILK, Wojciech KINSKI, Zbigniew PILAT
Institution	ŁUKASIEWICZ Research Network – Industrial Research Institute for Automation and Measurements PIAP
Description EN	ExoReha is an exoskeleton for upper limb rehabilitation dedicated to neurological, orthopaedic, post-surgical and trauma patients. It has five degrees of freedom, three of which are driven, and two are the free open plain bearings. This allows full mobility of the shoulder and elbow joints while minimising the device's weight. Due to its compact design, the exoskeleton can be used at home during task-oriented treatment, i.e. based on the tasks most critical for the patient. The device has a relatively low weight (~ 8.4 kg) and can be attached to the body or items available in most homes, such as chairs, beds or wardrobes. What is more, the device is designed to be used by a broad target group, regardless of their degree and type of disabilities, additional diseases, and anatomy. All the main elements of the exoskeleton are manufactured within the FFF / FDM 3D printing technology. Therefore, replacing them with user-tailored parts printed on commonly available devices is possible. To enable full personalisation of exercises using the ExoReha, and in line with the open science concept, the exoskeleton was designed as an open system, easily extendable with additional ICT solutions. Moreover, to ensure remote supervision and adjustments of the training programme, the device has been equipped with an industrial remote access module.

PL.4.**Title** **Eccentric dispenser****Authors** Lukasz Majewski, Emil Sasimowski**Institution** **Lublin University of Technology Faculty of Mechanical Engineering Department of Technology and Polymer Processing**

Description
EN

The subject of the invention is a dispenser for materials that are difficult to sprinkle to the plasticizing system of extruders, injection molding machines or food extruders. The dispenser has a hopper inside which there is a vertical screw connected to a leaf agitator, and both these elements are jointly set in rotation by the drive motor. The material fed to the hopper is continuously mixed by the rotation of the agitator. Under the hopper there is a housing, inside which there is a rotary sleeve equipped with the gear toothing on its outer circumference and an eccentric hole with a diameter larger than the diameter of the vertical screw. The vertical screw passes tangentially through the eccentric hole in the sleeve. The gear toothing of the sleeve is meshed with a worm gear which is set in rotation by a second drive motor. The rotational movement of the agitator forces the material to fall into the eccentric hole. The rotation of the sleeve causes an eccentric movement of the hole around the vertical screw, causing the material to be pushed between its flights. Then, the screw transports the material vertically downwards between its flights to the feeding hole of the plasticizing system and feeds it directly to the processing screws. The setting of the material feeding efficiency consists in the selection of the rotational speed of the vertical screw and the agitator as well as the speed and direction of rotation of the rotating sleeve with an eccentric opening that is cooperating with them. Rotational movements of screw and agitator as well as the rotational sleeve are regulated by two separate drive motors.

PL.5.**Title** **A method of cleaning exhaust gases emitted by diesel engines, in particular, installed at sea transport vessels****Authors** Andrzej Pawelec, Andrzej G. Chmielewski, Toms Torims**Institution** **Institute of Nuclear Chemistry and Technology****Patent no.** P.435454

Description
EN

Currently, maritime transport accounts for a significant share of global emissions. As pollution of the marine environment increases, the scope of activities aimed at

preventing this phenomenon gradually expands. According to the actual regulations of the International Maritime Organization (IMO), an 80-90% reduction in NO_x emission and a 97% reduction in SO₂ emission from marine engines powered by heavy fuel oil are required. Electron beam flue gas treatment technology allows for the simultaneous reduction of SO₂ and NO_x emissions, with the possibility of its application for treatment of exhaust gases from marine Diesel engines. In this case, the flue gases irradiated in the reactor are directed to the scrubber, where they are absorbed in sea water. The method of treatment of flue gases according to the invention consists in irradiating of the flue gases introduced into the reactor with an electron beam from the accelerators while simultaneously spraying the process water from the scrubber circuit at the gas inlet to the reactor, and the process is carried out in a known manner. The process water used in the process is seawater containing an oxidant and an alkaline solution to keep it alkaline and neutralize the absorbed acidic contaminants. The addition of an oxidant in the process water supports the oxidation of SO₂ and NO, thus increasing the efficiency of the entire process. By the use of spraying of part or whole amount of the process water from the scrubber system in the reactor, where the irradiation of flue gases with an electron beam from accelerators causes oxidation of SO₂ and NO to higher oxides, the invention allows for about 5 - 10% more effective flue gas treatment in comparison to the case where process water spraying was not used. Due to the fact that in the case of Diesel exhaust gases the concentrations of nitrogen oxides are very high, the increased efficiency of exhaust gas treatment allows to meet stringent international emission standards.

PL.6.**Title**

Transdermal hydrogel systems modified with active substances supporting skin necrosis treatment

Authors

Magdalena GLAB, Anna DRABCZYK, Sonia KUDLACIK-KRAMARCZYK, Mateusz JAMROZY, Julia WIECZOREK, Mateusz GRUCA, Dominika WANAT, Magdalena KEDZIERSKA, Bozena TYLISZCZAK

Institution

Cracow University of Technology

**Description
EN**

The subject of the invention are transdermal hydrogel systems based on chitosan and modified with active substances including Aloe vera juice, ascorbic acid (vitamin

c) and antibiotic (cefalexin). The developed hydrogel transdermal systems constitute materials with great application potential in the treatment of skin necrosis. This is a chronic and painful disease proceeding with swelling, redness around the wound, and the increased temperature. The composition of developed materials has been designed so as to significantly support the mentioned disease while it is influenced by the properties of both the hydrogel matrices, and the modifier applied. Due to their multi-functionality, the proposed transdermal systems show innovativeness, i.e. they absorb wound exudate, and provide a barrier to microorganisms at the same time. Moreover, active substances introduced into the hydrogels such as antibiotic, vitamin C and Aloe vera juice enhance developed materials with antibacterial properties and promote the wound healing process. As a result, proposed transdermal systems constitute materials with a great application potential for treatment of such diseases as skin necrosis. Importantly, the strong point of developed materials is a method of their synthesis, i.e. the photopolymerization process, which is quick and waste-free, and run with simultaneous sterilization via UV radiation.

PL.7.

Title	Mould clamp for rotational moulding.
Authors	Karolina Glogowska, Janusz Sikora
Institution	University of Technology Faculty of Mechanical Engineering Department of Technology and Polymer Processing
Patent no.	A1 432169.
Description	The object of the patent is a mould clamp for rotational moulding of polymer materials. The purpose of the invention is to extend the use of the U-shaped clamps to various types of moulds. The beneficial effect of the invention is to improve and increase the manufacturing efficiency of products obtained by rotational moulding technology by adjusting the spacing of the mould arms for moulds of different external dimensions. The design of the mould clamp for rotational moulding according to the invention eliminates the need to extend the machine park in order to manufacture new products differing in external dimensions. The clamp has a compact and simple construction, so it can be transported or moved from one work station to another and mounted to another tool system
EN	

of the moulding mixing machine. The mould clamp for rotational moulding is stable and safe to use. Assembling the mould in the clamp involves loosening the connection built based on the third arm and the fourth arm, the bearings and the turnbuckle which can be unscrewed. Then the mould is placed on the mandrels, for mounting the mould and the third arm and the fourth arm are tightened by tightening the turnbuckle.

PL.8**Title**

A mobile system for planning and coordinating border operations to control and block nonlegal migration flows into the EU.

Authors

Mariusz Chmielewski, Jakub Rzepinski, Jakub Nowakowski, Krystian Kisicki, Jakub Kucharski

Institution

Military University of Technology

**Description
EN**

The mobile application dedicated to officers of the Border Guard and other services offers automatic construction of situational awareness and mechanisms of visualization of the current plan of action of services and perpetrators. The application (smartphone) provides the ability to plan and supervise actions by automating tactical and topographic orientation using augmented reality mechanisms. The application is designed to distribute information about potential migrant violations with multimedia documentation to groups of officers and command centers in a distributed manner. Application mechanisms use fusion of mobile device sensors (GPS, accelerometer, gyroscope, magnetometer) for spatial orientation and positioning in relation to current tactical situation. The application enables preparation of situational sketches of border operations, in particular organization of search, reconnaissance, blockade and pursuit operations. The reporting module of the tool allows for automatic preparation of documentation of border operations and their automatic distribution. The application is also equipped with a compass and tactical calculation mechanisms allowing for distance measurements, terrain profiles and flood zones supporting crisis management functions. Key features of the tool include ease of use and deployment on officers' devices, along with a mechanism for automatic grouping of action participants. The innovation in the presented approach is the use of augmented reality techniques is a quick orientation in relation to the current tactical situation which significantly increases the

effectiveness of pursuit and reconnaissance activities in difficult terrain. It is also possible to use the application by the local community supporting the activities of services for security and protection of the EU border.

PL.9.**Title**

Biomedical multisensor for smart clothing augmented with AI based analysis in medicine.

Authors

Mariusz Chmielewski, Tadeusz Sondej, Piotr Sprawka, Robert Gromada, Michal Sobolewski, Jakub Sierzega, Jakub Nowakowski, Jakub Rzepinski, Karolina Marciniak, Lukasz Pytlarczyk, Lukasz Skwarszczow, Mateusz Janowski, Agata Pietraszko

Institution

Military University of Technology, NutPro sp. z .o.o.

Patent no.

RPMA.01.02.00-14-9547/17EU R&D grant

**Description
EN**

An advanced wireless biomedical data analysis module integrated with a dedicated socket and smart clothing integrated electrodes. The integrator together with the analytical system offers the first such a broad spectrum of medical analysis used in long-term medical monitoring, body performance and physiological responses. Such a wide spectrum and accuracy of acquisition of biomedical signals ECG, EMG, GSR, as well as inertial and environmental signals was combined with ergonomics and comfort of use of specialized, breathable smart clothing supervised by modern electronics and analytical mobile application. The comprehensive monitoring system allows precise analysis of many symptoms of diseases as well as biochemical processes of users' physical activity. The use of specialized measurement techniques and long-term studies of human physiological patterns made it possible to develop the system's knowledge base, contained in the mobile application. The software is capable of identifying life-threatening situations and health events, expanding the range of clothing applications in the medical monitoring domain. The integrator is a wireless configurable digital chip operating in wireless bluetooth or standalone mode with recording to a device card. The sensor implements several algorithms for filtering signals and their aggregated characteristics, which in further phases of recognition are transmitted to mobile application which hosts algorithms for biomedical signal patterns analysis, including heart rate dynamic parameters, muscle activity, rhythm of movements, temperature and skin conductance changes.

Poland

Represented by

IBS Global**PL.10.****Title****TCS – Technical Classes Simulator****Authors**Sebastian Kura, Paweł Orlik, Krzysztof Smyczek,
Marcin Lasak, Artur Hausman**Institution****The King John III Sobieski Complex School no 6 in
Jastrzębie-Zdrój, Center for Practical Education in
Jastrzębie-Zdrój****Patent no.**

Know How

Description EN

TCS is a simulator for technical classes in virtual reality, providing knowledge of the installation of the central unit and the basis of electrics in a simple, user-friendly way. Our main assumption is to enable people who do not have access to appropriate equipment to acquire new competencies safely without risk to life or health, and we wanted to reduce the costs necessary to gain the skills contained in our simulator as much as possible. The simulator for assembling a computer in virtual reality is currently the only highly developed product of this type on the market. It enables: transferring knowledge in a simple and friendly way and allows you to acquire new competencies without the risk of losing your life or health. Users can learn new skills at a low cost. The second part of our project is the High Voltage Laboratory. This part of our software allows you to carry out various electrical experiments. Such as: testing the performance of the building's lightning rod, testing the electrical strength of the air, and testing the electrical strength of the oil. Everything is carried out in accordance with safety standards applied in real-life situations.

PL.11.**Title****14-HYDRIDE [14-H]****Authors**

Adam Ciszewski, Mateusz Kozłowski Krzysztof Smyczek Marzena Przygodzka

Institution**The King John III Sobieski Complex School no 6 in Jastrzębie-Zdrój,
Center for Practical Education in Jastrzębie-Zdrój****Description EN**

14-HYDRIDE is Our response to the global warming and need for more convenient way of storing energy - installation which uses carbon dioxide gathered from air, water and energy received from solar panels to run high-pressure synthesis in order to obtain methanol. Concentrating carbon dioxide from air is possible due to DAC (direct air capture) system which pushes air through an absorber. Water is electrolyzed in special PEM (polymer electrolyte membrane) electrolyzer that allows running this process in high pressure and efficiency. Synthesis undergo in chemical reactor filled with enhanced catalyst that results with outstanding one-pass carbon dioxide conversion of 95%. Methanol is a universal fuel and can be used in various ways to transpose energy, it can be mixed with gasoline to improve combustion, it can be used with fuel cells as direct way of making electricity that finds use in cars. We find its application in home heating systems, mainly because nearly 50% of pollution is made by single-family households. Our installation combines existing ecological technologies towards gaining their advantages to make technology, that is not only friendly for environment but profitable as well - which is key to embracing any technology into our lives.

Poland

PL.12.

Title

A composition of lightweight cement slurry

Authors

Marcin Kremieniewski, Miłosz Kędzierski, Ewa Kałna
Oil and Gas Institute, Poland

Institution
Patent

P. 432612

Description EN

The invention is a composition of lightweight cement slurry with increased tightness for sealing boreholes and for use in building industry, as well as for special applications where it is important to obtain low permeability of the product. Lightweight cement slurry with increased tightness can be used in the petroleum industry for boreholes with a high risk of gas migration, where high tightness is required.

The invention is a composition of lightweight cement slurry with increased tightness for sealing boreholes and for use in building industry, as well as for special applications where it is important to obtain low permeability of the product. Lightweight cement slurry with increased tightness can be used in the petroleum industry for boreholes with a high risk of gas migration, where high tightness is required.

PL.13.

Title

Heat exchanger with a burner designed to burn hydrogen

Authors

Tomasz Siuda

Institution

Oil and Gas Institute, Poland

Patent

P. 440324

Description EN

The subject of the invention is a spiral-cylindrical heat exchanger with a burner and a combustion chamber, adapted to burn hydrogen in a safe and effective manner, enabling the heating of the medium used in heating, with particular emphasis on the household sector. The heat exchanger has a thermal power of 10 kW, which corresponds to a typical heat demand for a single-family house. The exchanger can be used in single and dual-function gas boilers.

In the constructed heating system, hydrogen is burned by

diffusion with an excess of air ratio of $1.5 \div 3.0$. This lowers the combustion temperature and eliminates the need for expensive construction materials. At the same time, it does not adversely affect the thermal efficiency of the exchanger. The proposed solution eliminates the risk of flashback. In addition, thanks to the possibility of free flow of ambient air to various zones of the combustion chamber, the solution allows you to control NOx emissions from hydrogen combustion.

Although the combustion of hydrogen in the ambient air is associated with NOx emissions, due to the lack of CO2 emissions, the hydrogen gas boiler is an ecological appliance.

The continuous development of hydrolysers that improve efficiency and the use of energy from renewable sources may contribute to a significant drop in the price of hydrogen on the market. Its availability and price similar to that of natural gas may help to decarbonise many sectors of the economy, including households.

PL.14.

Title	Agglomerate of a mixture of sawdust from coniferous wood and miscanthus enriched with a composition of additives
Authors	Grażyna Żak, Michał Wojtasik, Jarosław Markowski, Robert Wojtowicz, Mateusz Rataj, Tadeusz Kwilosz, Stefan Ptak
Institution	Oil and Gas Institute, Poland
Patent	P.440561
Description	The subject of the invention is an agglomerate of a mixture of sawdust from coniferous wood and miscanthus enriched with a composition of additives that reduces the level of emission of toxic exhaust components.
EN	Combustion tests of agglomerate samples in a pellet stove model AIRPELL 8 by Defro with a nominal heat output of 8 kW were tested and the content of carbon monoxide (II) and OGC in the flue gas was measured. The results of the average 25-minute content of CO and OGC emitted during the combustion of agglomerate are

presented in Figures 1 and 2 and compared with the results of the agglomerate without additives and with iron (III) oxide only.

The enrichment of the agglomerate of the mixture of sawdust from coniferous wood and miscanthus with a composition of additives (potassium carbonate and iron (III) oxide) showing synergy of action allows to reduce the emission of organic carbon compounds from its combustion by approx. 99% and CO by approx. 98% compared to agglomerate of a mixture of sawdust from coniferous wood and miscanthus without additives, as well as about 63% in the case of OGC and about 60% in the case of CO in relation to the agglomerate of a mixture of sawdust from coniferous wood and miscanthus containing iron (III) oxide used individually.

The invention is intended for use by individual consumers or heating plants.

Saudi Arabia

SA.1.

Title	City (Here Is Your Investment Headquarters)
Authors	Jawaher Saeed Sharar Alotaibi, Yusra Anas Mohammed Zuhd, Heeash Faiz Ali Alshehri, Reem Jumah M Alanazi, Faizah Sanhut Saad Alotaibi, and Amnah Husain Ali Mohammad.
Institution	60th Secondary School, 87th Secondary School and 33rd Secondary School
Patent no.	-
Description EN	<p>The development of basic cognitive skills (reading - scientific - mathematical) among students.</p> <p>By building a city with an educational Minecraft game, so that the learner builds a city that we called here is your investment headquarters. We aim to invest the students' basic skills in achieving the skills of the 21st century, which in turn achieves the fourth goal of Sustainability goals, which is good learning</p> <p>We worked to urge learners to build this city, which consists of four buildings, each building with a skill from the three skills, in addition to the central control building.</p> <p>So that when the student enters the game, he meets a character who explains to him the method of the game inside this building, so a pre-test is done on this skill. He gets out of the building only after the task is finished, and then the student gets a code and a certificate of passing, and the same method is used in the other two buildings, according to the design of the game inside each building, as well as the programs used in each building. Then, at the end of the stage, he moves to the central building to enter the code in the designated place, then the student chooses his gift from Through technical programs, and then sends the gift image in the electronic wall program to motivate the learners to continue playing.</p>

SA.2.**Title**

Design a Built-in Keyboard System to Change Button Coding with a Display-to-Display Icons not Included in Traditional Keyboards

Authors

Mahmoud Umar Alhrbi

Institution

Bakkah School for Gifted Students

Patent no.

-

Description EN

Most users of multiple languages or users of scientific symbols find it difficult to use the computer keyboard to change the language, because the panels are dedicated to the two languages to the fullest and in writing emojis or writing scientific symbols in research and mathematical symbols. The solution for this problem is to add a small digital screen on top of each button in the keyboard and through which the symbols or languages required of the user are displayed. The feature for this solution is to facilitate the use of the keyboard in computers and develop them to be unified for all languages and have a new generation of computer keyboard in addition to the ease and simplicity of making it.

SA.3.**Title**

Wavelet transform based method for influenza, tonsillectomy and Covid-19 diseases modeling by speech signal

Authors

Rania. A. Alharbey, Sara Alzahrani. Khaled Daqrouq

Description EN

A new approach for pathological effects on speech signal detection is proposed. The study investigated influenza's, tonsillectomy's and COVID-19' pathological effects on the speech signal. The proposed method is based on using the recorded data speech signal of the adult Saudi patients to model the pathological features of the disease symptoms that affect the human vocal tract. The method is based on wavelet transform together with linear predicting coding (LPCW) and with various classifiers. **The purpose** of this method is to find out a new recognition that can distinguish between the systems influenza/normal, tonsillectomy /normal and COVID-19/Normal. **The method** (LPCW) obtained very quick result by just catching the speech signal of the patient. Results of the detector are succeeded due to its high performance, fast and accuracy reaches over than 89\% for all the classifiers. Specially for patients infected with Covid-19/Normal the accuracy reaches 91.7% consistent with clinical data.

Taiwan

Represented by **WIIPA**

TW.1.

Title

AI table tennis robot

Authors

Kun-Mao Chen, Chieh-Yi Lee, Chun-Hsiung Lee,
JIANG, YI-MING, LI, CHENG-EN

Institution

Cheng-Shiu University

Patent no.

I740720

Description EN

This topic proposes that the "AI Billiard Robot" uses AI image recognition technology to identify the players and even the billiard rackets that it is playing against, and can adjust the ball path and speed of the shot. In recent years, more and more people have begun to realize the importance of health, so many gyms have gradually opened, which makes us notice that many ball games have automatic ball machines, such as baseball and tennis, but there are very few people in billiards. Therefore, we hope to make a ball machine that can be lightly carried and has a multi-function mode, so that people can enjoy entertainment while exercising.

TW.2.

Title

All-round disinfection robot

Authors

Chiung-Wen Liao, Chun-Hsiung Lee, Wen-Ya Su,
Cheng-Chung Hsu, Shuo-An Lee

Institution

Cheng Shiu University/ National Taipei University of
Technology

Patent no.

M583845

Description EN

(1) Reduce the chance of epidemic prevention personnel being exposed to the virus, making the front-line epidemic prevention personnel safer.
(2) Remotely control the disinfection ultraviolet lamp switch to prevent the epidemic prevention personnel from contacting or looking directly at the ultraviolet light and causing harm.
(3) The anti-epidemic device can automatically travel to the space that needs to be disinfected and count the number of people, reducing the workload of anti-epidemic personnel.

TW.3.

Title **An active substance of Morchella, its use and a composition thereof for improving the reproductive function**

Authors Chen Chin-Chu, Wu Szu-Yin, Chang Hsiao-Ling, Chen Yen-Po

Institution GRAPE KING BIO

Patent no. 16/019,722

Description EN The present invention provides an active substance Morchella, its use and a composition thereof for improving disturbance of reproductive function, especially, for manufacturing a pharmaceutical composition to improve disturbance of reproductive function induced by obesity or metabolic syndrome . The composition with the active substance of Morchella can effectively improve the type of testis tissue and sperm, increase content of testosterone in blood, and reduce the oxidation stress of sperm.

TW.4.

Title **Anti-fall Closet**

Authors Wang Xin, Chung Anderson, Chung Kai-Hsin, Yang Chih Yao, Yang Hao-Cheng

Institution Hsinchu County American School/ Taipei Kang Chiao Xiugang Campus\

Patent no. 111200132

Description EN Taiwan is an earthquake-prone country; whenever an earthquake strikes, tall closets always tend to fall, thus resulting in adults and children getting hurt. Because of this issue, we developed a closet that is fall proof, eliminating closets falling by all chance.

TW.5.

Title **Anti-fall Coaster**

Authors Hsieh Hao-Pin, Yuan Ching-Chien, Fu Bei-Bei, Liang Chih-Yuan

Institution Kornell Academy

Patent no. 110213855

Description EN After this work is placed in a teacup, the center of gravity of the teacup can be lowered, and the teacup during the journey will not be easily dumped due to shaking, causing the liquid in the cup to spill out.

TW.6.**Title****Automatic Yarn Packing Device****Authors**

Yi-Hsien LIN, Yu-Zen TSAI, Xin-Yu ZHONG, Shan-Yu LIANG, Wei-Ti TU

Institution

CHENG SHIU UNIVERSITY

Patent no.

M614566

Description EN

The yarn winding machine is a machine that winds a large bundle of yarn into small balls of yarn. At present, the yarn winding machine can also have the function of automatically bundling the yarn balls to save manpower and time, but the yarn baling machines in the prior art have no weight sensor unit. The whole process is basically manual operation, which is slow and inefficient.

An automatic yarn packing device includes a base, a yarn reel and an integrated processing unit. The yarn reel is arranged on the base, and further includes a reel, a turntable and a weight sensor for controlling the yarn so that the yarn is wound on it. The turntable is connected to the reel, and the turntable is used to control the rotation of the reel. The weight sensor is arranged on the base to measure the weight of the yarn on the reel to generate a weight value. An integrated processing unit is arranged in the base and connected to the turntable and the weight sensor and which is used to control the rotation of the turntable according to the weight value. The turntable controls the rotation of the reel so that the yarn is wound on the reel to form a ball of yarn on the reel.

TW.7.**Title****Autonomous vehicle group handling robot****Authors**

Fa-Shian Chang, I-Chang Hsu, Shang-Chi Su, Jia-Hong Wu, Cheng-Fang Chen

Institution

Cheng Shiu University / Chung-Shan Industrial & Commercial School

Patent no.

M619331

Description EN

The present invention is a design of a group-type multi-functional handling robot, which uses the concept of group integration to improve the high cost of building multiple machines due to the limitation of a single

machine in the past.

When a single machine is used, it can carry out moving raw material handling, environmental reconnaissance and patrol, firefighting, plant monitoring and other functions within its load range. When multi-machine group integration, the handling capacity is improved and linearly superimposed, which is beneficial to the plant zone. The distribution of parts assembly and manufacturing and integrated flow path, and reduce the need to replace the loading machine due to the increase in the weight of the integrated module. In addition, the machine is equipped with optical detection and area map construction, combined with intelligent control for production and warehousing systems, which greatly improves Production efficiency and proper rate.

TW.8.

Title

Cyclone Drying Device

Authors

Yeh Chung-Wei, Chiang Chih-Huang, Hsu Uzu-Kuei, Kung Jen-Yu

Institution

Air Force Institute of Technology

Patent

I703252

Description EN

A cyclone drying device includes a main body, an airflow guiding member, and an exhaust pipe. The airflow guiding member is closed at the open end of the main body, and has an inflow portion connected with the housing space. The inflow portion is connected with a wind guiding equipment, which produces air flow guides into the housing space. The exhaust pipe is disposed along the axis, passed through with the airflow guiding member, and radially provided with a hanger, allowing the air flow to dry the clothes.

TW.9.

Title

Disinfect Drying Box

Authors

Wu Wan-Yun, Wu Chia-Ying

Institution

Kornell Academy

Patent

M624822

Description EN

We will be putting wet items in the drying box, by using hair dryer which infuse hot air to dry the item. This can dry stuff quickly and efficient, and with the UV light, this can also be a sterilization box.

TW.10.**Title****Distance Warning System****Authors**

Kang Tsai-Hua, Chien Wei, Liao Shu-Han, Lin Je-Home, Hsia Wei- Liang,
HungKuo Delin University of Technology

Institution

Lunghwa University of Science and Technology
Committee of eCloud Mobile, Chinese Professional
Chenshern Co., Ltd.

Patent no.

National Taipei University
M616126

**Description
EN**

The present invention provides a vehicle distance warning system, including: at least one object distance sensing device, which is arranged at the front of a car; and an alarm device, which is electrically connected to the object distance sensing device, when the object distance sensing device is When sensing that the distance between the car and an object is lower than a threshold value, the alarm system sends out an alarm to remind the driver. This can effectively reduce the risk of collision when the driver is in poor spirits and is too close to the object in front.

TW.11.**Title****Drip Sensor****Authors**

Guan Ting Liu, Yang Lung Shih, Jou-Wen Lu, Yang Chen Shih, Chung Yi- Chen

Institution

National Taipei University of Technology, Taipei Tech and Chinese Culture University

Patent no.

M613135

Description EN

This creation system provides an instillation sensor, which is mainly used when the patient is hanging instillation, and is used for the auxiliary point. A detector is installed on the drip bottle, and the detector is electrically connected to a sounding device; when the drip in the auxiliary drip bottle is about to be used up, the detector detects the lower liquid level in the auxiliary drip bottle and immediately informs The buzzer on the sounding device emits a warning sound to inform the medical staff to replace the drip bottle in time

TW.12.

Title	Intelligent Monitoring Range Hood
Authors	Lin Heng-Jiun, Chiu Ling, Chang Chen-Jui, Kuo Yu-Yu, Hu Tsai-Chen, Lo Pei-Hsin
Institution	Hsinchu County Chupei City Hsing Lung Primary School/ Hsinchu County Cheng-Gong Junior High School/ Hsinchu County Dong Xing Junior High School
Patent	M617946
Description EN	Cooking oil fumes do great harm to health. The most important task of range hoods is to exhaust harmful air pollutants in time. Hence, our device “Intelligent Monitoring Range Hood” is designed to detect the core flame heat of a gas stove and exhaust air pollutants by controlling the speed of its extract fans as there are excessive cooking oil fumes around. In terms of fire safety, the LED and buzzer are turned on and a warning is sent through wi-fi when the gas stove has worked for over 30 minutes. In regard to cooking aids, a temperature sensor and a timer are installed to display the temperature in the pot simultaneously in order to notify the appropriate time to put in the ingredients or to turn off the stove.

TW.13.

Title	Intelligent non-contact control switch elevator
Authors	Chiu Pin Ju, Lin Wen Chieh, Li Shan Chien, Chen Shih Wei, Chuang Shih Ching
Institution	Kao Yuan University
Patent	M625605
Description EN	A kind of non-contact type restraint opening, avoidance direct contact opening, low-lying sown bacterial virus poisonous mechanism; After the APP for the electric household, the user's handset execution 1 APP, the root setting command, the control order, the export service transfer, the electric elevator, and the designated elevator.

TW.14.**Title****IOT Temperature control extension cord****Authors**

Chun-Te Lee, Huang-Kuang Kung, Ching-Yun Hsu,
Che Jen Hsieh, Yun-Ling Ke

Institution

Cheng Shiu University

Patent no.

M569098

Description EN

Today, the world's electricity consumption is growing rapidly, and therefore energy demand is also increasing. In the past few decades, various measures have been taken to improve equipment and system design to increase production and transmission efficiency and reduce power consumption.. This article proposes a novel Internet of Things (IoT)-based temperature control power extender with two working modes of cooling and heating to solve power shortage. The power is turned on or off accurately and timely through the temperature sensing element, thereby avoiding unnecessary power consumption to achieve the purpose of energy-saving.

This work can directly power on or off the power extender through the Internet. It can also use a 2.4G Wi-Fi wireless transmission to transmit real-time temperature information, switch status and master-slave mode, etc. Related data can be controlled, collected, and uploaded to the cloud. Each proposed power extender's temperature setting in a large-scale field can be set uniformly, and no staffing is wasted to set the temperature separately. Taking a general industrial electric fan as an example, if it is changed to this temperature control extension cable to drive, and assuming that the industrial electric fan is activated for 900 seconds per hour, its power-saving rate is 74.75%.\

TW.15.**Title****Labor Saving Shining Sleeves****Authors**

Hsu Hsin-Ying, Chung Hsing-Tsen

Institution

National Hsinchu Girls' Senior High School

Patent no.

M624803

Description EN

When directing traffic, police will put on reflective sleeves and traffic batons. After a period of time, their arms will receive lots of pressure and cause soreness and pain. To overcome the problem, we combine LED light bulbs and sleeves to make Labor Saving Shining

Sleeves. Using our product, police will not need to use traffic batons, and they can easily direct the traffic. Also, the burden of the police can be decreased, and it also can guarantee their safety. Most importantly, it can be easily carried around.

TW.16.**Title**

Lactobacillus plantarum strain, composition comprising the same, method of producing the same and its use for inhibiting or reducing oral pathogens

Authors

Chen Chin-Chu, Chen Yen-Lien, Lin Shin-Wei, Chen Yen-Po

Institution

GRAPE KING BIO

Patent no.

I733207

Description EN

The present invention provides a *Lactobacillus plantarum* strain, a composition containing the same, a method of producing the same and its use for inhibiting or reducing oral pathogens. The abovementioned strain is *Lactobacillus plantarum* GDK7, which can inhibit or reduce *Streptococcus mutans*, the bacteria causing teeth cavities and/ or *Prevotella* spp., the bacteria causing periodontal disease.

TW.17.**Title**

Laundry Auxiliary Structure

Authors

Huan-Mei Chu, Chun-Te Lee, Chih-Ping Chiang, Tzai-Der Wang, Chien-Heng Lin

Institution

Cheng-Shiu University

Patent no.

M568865

Description EN

Laundry is the daily job in every family. Nowadays, washing machines are the most popular tools for washing because of the efficiency and convenience. However, the clothes will get knotting, deforming or damaging by the spinning process of washing machine. Unfortunately, the laundry bags in the market now cannot solve the problem yet.

Our team reforms the original laundry bags. First, we print the washing balls in 3D printing technology to clip and fix the clothes. Second, we reform the zip of laundry bag to □ type. These two innovations could fix the clothes to avoid the knotting problem and improve the crease-resistance and detergency of the laundry bags.

TW.18.

Title	Lost Killer
Authors	Chen Hsieh-Ping, Chen Hsing-Feng, Li Ze-Yu, Lin Wen-Xin
Institution	Cheng-Shiu University
Patent no.	M556757
Description EN	<p>Many of the smart guide modules “Lost Killer “ are combined into one floor, which can be used in the exhibition hall, and the guide floor is laid on the aisle. The user only needs to scan the QR code at the door and download the special APP for the smart guide floor. After the mobile phone is connected to the floor under your feet by bluetooth, the location name and representative color of each booth will be displayed on the APP. After selecting the target booth on the mobile phone, the floor will light up with the color of the light, and pedestrians only need to follow the light color to guide. This guide floor can be used in exhibition grounds, hospitals or parks where guidance is required.</p>

TW.19.

Title	Lotus seat floating light atomization humidifier
Authors	Chang Hsin I, Li Yi Hsiu, Chang Wen-Yu, Lin Yi Zhen, Ya Peng Liu
Institution	Jen-Teh Junior College of Medicine, Nursing and Management
Patent no.	M603722
Description EN	<p>This creation is a pool landscape mist generator that automatically adapts to the height of the water level by buoyancy, and successfully achieves the maximum mist generation efficiency. It uses the upper lotus seat decoration to hide the atomizer and floating module and turn it into a garden landscape. One of the beautiful installations is especially suitable for use in temples, Buddhist halls, or places with religious beliefs. With the lotus head floating in the pool, the mist is drifting out, and you can achieve everywhere in a fairyland. A misty situation.</p>

TW.20.

Title	Multi-functional toddler walker
Authors	Mei-Ling Chuang, Yi-Shiuan Tsai, Yi-Jiun Ye, Sung-Jia Huang, Zi-Yi Guo
Institution	Cheng Shiu University
Patent no.	M620470
Description EN	<p>Our toddler walker is different from others you see on the market. The body of our toddler walker can be disassembled for children to assemble, which is composed of two rectangular blocks, one has numbers and fruit patterns on it, and the other has different kinds of geometric shapes on it. Children can play many small games through assembling and matching the blocks together.</p> <p>Advantages: 1. It can help children recognize patterns such as fruits, numbers, and shapes.</p> <p>2. It can stimulate children's creativity, hand-eye coordination and muscle development.</p> <p>3. Children can play many small games through assembling and matching the blocks together.</p>
Class no.	

TW.21.

Title	Physical Electronic Experimental Device
Authors	Kang Tsai-Hua, Chien Wei, Liao Shu-Han, Lin Je-Home, Lee Kuo-Hsien
Institution	HungKuo Delin University of Technology Lunghwa University of Science and Technology Committee of eCloud Mobile, Chinese Professional Chenshern Co., Ltd. WearTech Co., Ltd.
Patent no.	M618983
Description EN	<p>This creation department provides a physical electronic experimental device, which is multifunctional in operation, convenient and quick in testing, and is suitable for use in modern laboratories.</p>

TW.22.

Title Pinhole Card
Authors Kuan Hsien-Hsiang
Institution SCI-EXCELLENCES Co. Ltd
Patent M624848
Description EN This card can be used by myopic people. When the glasses are not around or damaged, they can be used immediately to solve the problem of not being able to see clearly. It is presented in the form of cards and can help people add a deep impression about the inventor.

TW.23.

Title **Portable Access control gateway system with face recognition and optical sterilization**
Authors Fa-Shian Chang, Xiu Xian Sone, Cheng-Fang Chen
 Jing-Zhe Yan, Ting-Jun Wang
Institution Cheng Shiu University / Li Chih Senior High School
Patent M617207
Description EN The invention is a portable whole-body ultraviolet sterilant spraying disinfection and body temperature identification access control system, which is foldable and portable and easy to move. It is set up at the entrance of a tent or a building in an emergency to perform disinfection while identifying personnel and recording body temperature.

TW.24.

Title **Rescue Bag**
Authors Cheng Yu-Hsin
Institution National Hsinchu Girls' Senior High School
Patent no. M624823
Description EN This product uses combinable structures as well as different sizes of attached bags to make a multifunctional "rescue bag." Not merely could it carry lots of entities, but also carry ladders, stretchers, lifebuoy, hammock, etcetera. In accordance with different needs, the bag itself could be adjusted into different sizes, making the best suitable "rescue bag."

TW.25.**Title****Security device with one time unlocking link and socialized message notification function****Authors**

Wei-Kuei Chen, Qi-Xiang Xu, Sheng-Kai Huang, Si-Wei Li, Yu-Kai Zhang

Institution

Chien Hsin University of Science and Technology

Patent no.

111200467

This work integrates two innovative functions into the same IoT device, which are introduced as follows:

1. One-time unlock link:

Suppose the following three situations happened to us, how would we deal with it?

- (1) The gas switch that may have left the house but cannot be turned off immediately when returning home.
- (2) When I went to work in the company, I realized that I arrived too early and the door was not open.
- (3) Living in a community or building without administrators, when a visitor comes to visit, you must personally help the visitor to open the door.

In order to solve the above problems, we propose a device in which the administrator can distribute a one-time key to others for a single unlocking procedure. In our proposed system, the user does not need to touch the general door lock. The system will use contact elements such as keyboards and fingerprint readers. Under the concerns of the current covid-19 epidemic, the risk of infection caused by touching the doorknob when opening the door can be greatly reduced.

**Description
EN**

2. Socialized message notification function:

Traditional farm managers use manpower to protect crops. If the crops with high economic value, farmers often need to stay overnight in the farm in order to avoid crops being stolen when they are close to the harvest stage. This management method not only wastes manpower, but also there may also be concerns about personal safety. When a suspicious person or animal enters the surveillance area of the surveillance device, the following actions will be executed in sequence: the lighting equipment is activated, the horn device makes a loud noise to deter intruders, the recording equipment activates the recording function and synchronously returns the image data to the monitoring system, immediately notify relevant persons in the farm by means of messages or e-mails that there is a situation in the farm, so that appropriate treatment can be taken. At present, the monitoring devices on the market need to perform one-to-one setting actions between the monitoring device and

the camera. If 50 people want to monitor the same camera equipment, they need to perform 50 link setting actions. If there are 20 cameras, a total of $50 \times 20 = 1,000$ needs to be set. If you use this invention, no matter how many people want to monitor the same camera equipment, you only need to perform the setting action once.

The two functions provided in this creation are all systems designed and implemented based on Line APP. The hardware cost of the device is below 70 USD, and it is easy to combine with the existing door lock system and has a small size, easy to install and reduce the risk of contracting COVID-19, it is a very practical innovation.

TW.26.

Title Solar panel cleaning robot with composite traveling mechanism

Authors Fa-Shian Chang, Chia-Yin Chien, Shang-Chi Su, Guan-Qun Lu, Shang-You Xie

Institution Cheng Shiu University / Chung-Shan Industrial & Commercial School

Patent no. I740462

Description
EN

The invention is a composite carrier with climbing and anti-skid functions, which can be used for carrying and cleaning functions of large-area devices, especially large-area solar power generation of green energy, among which the cleaning of large-area solar panels. The design of the robot includes a carrier with first walls on the left and right sides, and four sets of power wheels are respectively placed in front of and behind the first wall, and the four sets of power wheels are positioned on the carrier. , and the aforementioned vehicle is respectively provided with two sets of mutually symmetrical lifting crawler power mechanisms between two adjacent power wheel sets, and the aforementioned four groups of power wheel sets and two sets of lifting crawler power mechanisms are respectively provided with power elements, In this way, the vehicle has six sets of power to assist it in various types of movement operations. The robot can easily cross the connection and spacing of large-area solar panels to perform effective cleaning work, and specifically improve work efficiency.

TW.27.

Title	Structural improvement of catapult glider with lights
Authors	Yang Chen Shih, Guan Ting Liu, Yang Lung Shih, Chung Yi- Chen, Jou-Wen- Lu
Institution	National Taipei University of Technology, Taipei Tech and Chinese Culture University
Patent no.	M613537
Description EN	This creation system provides a structural improvement of a catapult glider with lights, the main features of which are: a luminous body is respectively installed on the two wings to provide light for the glider; the front end of the fuselage is provided with a plurality of hook grooves for elastic body selection Hook · to control the height and distance of the glider flying; the fixed rod can adjust the two wings into a 90-degree parallel expansion shape or a 45-degree angle in the ejection state.

TW.28.

Title	Structure improvement of massage hammer with sound
Authors	Chung Yi- Chen, Jou-Wen- Lu, Yang Chen Shih, Guan Ting Liu, Yang Lung Shih
Institution	National Taipei University of Technology, Taipei Tech and Chinese Culture University
Patent no.	M612725
Description EN	This creation provides an improved massage hammer with sound, which is a massager composed of a rod body, a circuit board, a sound generator and a battery cover; Board and sounder are installed in. Batteries can be installed in the inner compartment of the handle; when the user holds the handle of the stick by hand, When the hammer hits the body, the elastic element on the circuit board is in electrical contact with the conductive ring, which makes the sound generator emit sound.

TW.29.

Title	The structure improvement of the flashlight of the charging stand
Authors	Jou-Wen Lu, Yang Chen Shih, Guan Ting Liu, Chung Yi- Chen, Yang Lung Shih
Institution	National Taipei University of Technology, Taipei Tech

Patent no.	and Chinese Culture University M613537
Description EN	This creation system provides a structural improvement of a catapult glider with lights, the main features of which are: a luminous body is respectively installed on the two wings to provide light for the glider; the front end of the fuselage is provided with a plurality of hook grooves for elastic body selection Hook · to control the height and distance of the glider flying; the fixed rod can adjust the two wings into a 90-degree parallel expansion shape or a 45-degree angle in the ejection state.

TW.30.

Title	Toothbrush Dryer
Authors	Chung Yi Chen, Yang Chen Shih, Jou-Wen Lu, Guan Ting Liu, Yang Lung Shih
Institution	National Taipei University of Technology, Taipei Tech and Chinese Culture University
Patent no.	M611499
Description EN	The present invention provides a toothbrush drying device, which includes a box body, a base and a drying component, wherein the base is placed under the box body, the drying component is installed inside the base, and the inner edge of the upper cover of the two casings of the box body is provided with at least A brush handle slot, the brush handle slot can be embedded in the handle of the toothbrush, and the bristles at the other end of the toothbrush are placed on the base. When the drying component is plugged in, its electric heating tube can dry the bristles of the toothbrush to prevent bacteria. Breeder.

TW.31.

Title	Application of Extended Reality Technology of Metaverse Concept in Medical Education
Authors	Chen Ying-Hsin, Tai Ming-Cheng, Hsu Hsiu-Chu, Cheng Hsueh-Ju, Chen Ming Hsi
Institution	Show Chwan Memorial Hospital Hualien Armed Forces General Hospital National Defense Medical Center
Patent no.	M618616
Description EN	The global new crown pneumonia epidemic, the virus

brings panic, but also brings new technological innovation. The Metaverse is an interactive and immersive experience that can collaborate and share a virtual three-dimensional world. XR virtual reality is used to achieve continuous learning and extensive knowledge sharing. The Metaverse has no borders and connects people in different regions. The application of extended reality medical education breaks through space constraints, allowing medical personnel, students, and enterprise technicians to receive training and practice through simulation, so as to ensure that the entire learning system can be synchronized with technology, as if experiencing the real environment. Visual, auditory and tactile methods and virtual objects are introduced into the zero-touch economy online and digital. The system will give appropriate real-time responses to produce more realistic interactions. We can see different aspects of the world, and medical education will have more major breakthroughs in technology.

TW.32.

Title	Remote Gesture Drone Carrying Disinfectant Smart Service
Authors	Chen Ying-Hsin, Huang Ping-Wen, Hsu Hsiu-Chu, Lai Yu-Hua, Wu Tai-Cheng
Institution	Show Chwan Memorial Hospital National Defense Medical Center National Taipei University of Business
Patent	I724858
Description EN	The global new crown pneumonia epidemic continues to spread, bringing changes to human life. The distance between people is no longer as far as it was when the epidemic was severe. In response to this great change, "zero-contact technology" intelligent epidemic prevention and disinfection Gesture drones carry disinfectant smart services, detect the environment through video and gestures, accurately transmit real-time image data, locate, calculate, make disinfection, sterilization without dead ends, natural disinfectant, can be used for food or drinking water, environment disinfection, Do not let the virus into the field, let the innovative precision smart medical and health

technology, inhibit the spread of the virus, and truly check the health of the people, all-round epidemic prevention, distance, disinfection smart service measures have become an important part of life, and can be widely used in schools. Stations, airports, hospitals, etc., not only reduce labor time costs, but also improve epidemic prevention energy, saving more lives efficiently.

TW.33.

Title	Smart Door Lock
Authors	Teen-Hang Meen, Jenn-Kai Tsai, Yu-Nan Lu, Tung-Lung Wu, Siya Wang National Formosa University
Institution	Zhaoqing University International Institute of Knowledge Innovation and Invention
Patent	I693536
Description EN	This design is an extended application from a general door lock at homes to a smart door lock. We use the set WIFI module to connect the sensor within the door lock with the smartphone together to achieve the Internet of Things effect. There are five ways to unlock the smart door lock such as fixed password, fingerprint, near-field communication (NFC), QR-Code, and dynamic password. These five methods come with a total of 325 orientation to unlock the door lock. By going through a couple of specific methods set by users to unlock the smart door lock and the real-time monitoring display on the mobile APP, the security of the smart door lock is greatly enhanced.

Thailand

By ATIP

TH.1.

Title

VGet: Natural High Carotenoids and Dietary Fiber Soup

Authors

Asst. Prof. Dr.Kanittada Thongkao,
Asst. Prof. Ampornsri Pornpitakdamrong,
Asst. Prof. Dr.Yuttana Sudjaroen

Institution

Suan Suanandha Rajabhat University, Thailand

Patent no.

2103003189/2022

Description

EN

Cnidoscopus chayamansa (Mc Vaugh) leaf has high nutritive value and health promoting benefits. Soup made from *C. chayamansa* (Mc Vaugh) leaf has “Umami” taste and can be use as natural food seasoning instead of chemical additives or animal ingredients. This invention is new instant soup, which processed from organic spinach tree and other vegetables that good for healthy consumers and vegans. Instant soup and its vegetable are simple to prepare and ready to eat. Nutritive value of instant soup (10 g) is high protein (3 g), dietary fiber (2 g) and vitamin A (176 µg) with low calories (35 calories, calories from fat: 10) and sodium (570 mg). None of saturated fat and cholesterol contained. All ingredients are originated from plants.

Class no.

3



TH.2.**Title****ANTCO: Thai herbal lozenge****Authors**Asst.Prof.Dr.Yuttana Sudjaroen,
Asst.Prof.Dr.Kanittada Thongkao,
Asst.Prof.Dr. Kowit Suwannahong**Institution**¹Suan Suanandha Rajabhat University, Thailand
²Burapha University, Thailand**Patent no.**

2103003190/2022

Description EN

New Thai herbal lozenges is antitussive and expectorant for sore throat relief. It contains herbal mixture including *Glycyrrhiza glabra* root, *Phyllanthus emblica* fruit, *Coriandrum sativum* seed, *Terminalia chebula* gall, *Cuminum cyminum* seed, *Terminalia bellirica* fruit and *Boesenbergia rotunda* (L.) Mansf. root. Herbs were weighed and grinded homogenously and formulate mixed. Herbal mixture was extracted with ethanol by maceration (72 h). Herbal mixture was added with excipients, flavors and other ingredients and dried. Each lozenge was produced by tablet compressing machine. Herbal mixture analysis was found saponins (510.14 ± 12.95 mg SE/g), phenolic compounds (53.22 ± 0.29 mg GAE/g) and flavonoid (11.76 ± 0.45 mg QE/g). There is strongly antioxidant as DPPH scavenger ($IC_{50} = 0.10 \pm 0.0$ mg/ml) and inhibited *Staphylococcus aureus* by disc diffusion method. There is also possessed strong anti-inflammation by inhibition of NO production from LPS-induced macrophage cell (RAW 264.7), and is preferable effect when compared with triamcinolone acetonide (1 mg/ml). Non-toxicity of herbal mixture against human skin fibroblast cells.

Class no.

4



TH.3.	
Title	Karanda⁺ plus Pro
Authors	Wanida Wonsawat, Kanchana Sitlaothawon, Chariwat Pitsanu Wong, Naat Piyasat
Institution	Faculty of Science and Technology Suan Sunandha Rajabhat University
Patent no.	2203000684/2020
Description EN	<p>Karanda⁺ plus Pro is a healthy gummy made from Thai fruit <i>Carissa carandas</i>. The gummy is made of concentrated karanda juice added with acid-tolerant and heat resistant microorganism <i>Bacillus coagulans</i>. Its containing 10^7 CFU <i>B.coagulans</i> spores were added to 95 g of gummies product. Then total anthocyanin was determined with pH differential method. It was found that cyanidin-3-glucoside and pelargonidin-3-glucoside are at 214.25 ± 6.41 mg/L and 128.20 ± 29.98 mg/L respectively. Vitamin C in juice was found at 0.44 ± 0.15 mg/g with in-house redox titration method. Vitamin B2, citric acid, fructose and glucose were analysis by ALS laboratory group (Thailand). Therefore it is showed that Karanda juice is rich in vitamin B2, vitamin C, anthocyanin, citric acid, fructose and glucose. The sweet taste from palmyra syrup which is low GI sugar for control sugar level in blood were used in this gummy. Furthermore the presence of <i>Salmonella sp</i> and <i>S. aureus</i> were determined and showed that Karanda gummy have lower amount than Thai FDA standard.</p> <p>These results demonstrated that Karanda fruit is enriched with many healthy substances. Natural berry flavors and color of probiotic gummy is great-tasting for booting your health, restoring gut health and immune booster with chewing and easy to take. Sensory test of Karanda gummy was confirmed with maximal likeness score at 5 ± 0.00 by rating scale method.</p>
Class no.	3

TH.4.**Title**

EMBICOLL : Health Supplement Jelly from Indian Gooseberry

Authors

Mrs.Natnaporn Aeknarajindawat,
Mr.Ratthawit Watchanapeechasak,
Mr.Natthachai Aeknarajindawat,
Mr.Nonlacha Naphoom, and
Mr.Wattachai Boonsaner

Institution

SCG GRAND Co., Ltd.

Patent no.

2203000686

**Description
EN**

Indian gooseberry jelly stick is a dietary supplement with innovative formulation “*Syrnix*”, an innovation for helping to boost gastrointestinal tract for absorbing optimal nutrients. By using nano-biorobotics technology in “*Syrnix*” formulation, key substances will be encapsulated, slow released to intestines therefore still remain in the body for longer time.

As antioxidant dietary supplement, it contains of essential ingredients such as dipeptide collagen, *Emblica* sp. extract, Syrnix, konjac powder, carrageenan, citric acid, trisodium citrate and locust bean gum. The antioxidant activity of Indian gooseberry extract tested by DPPH scavenging assay. It was found that the inhibition value of IC50 was 2.68 mg. /ml. Peptide granules help to increase collagen in the skin layer. The antioxidant helps to nourish skin, firm, smooth and young. After testing and follow-up program in a group of volunteers, it significantly improved skin elasticity at 12 weeks statistically (0.72; $p < 0.001$).

Class no.

3



TH.5.**Title**

VIPVUP™: Skin care serum from Himalayan pink salt

Authors

Mrs.Natnaporn Aeknarajindawat
Mr.Ratthawit Watchanapeechasak
Mr.Jukkaphan Onsila
Mr.Nonlacha Naphoom
Mr.Wattachai Boonsaner

Institution

WOKE UP TOWN Co., Ltd.

Description EN

VIPVUP™ is a modern skin care serum made from himalayan pink salt mixed with Biogum-4, tranexamic acid, niacinamide, *Scutellaria baicalensis* root extract, *Sephora flavescens* root extract, *Glycyrrhiza inflata* root extract, etc. The serum has properties to reduce acne, melasma, dark spots, and wrinkles. In addition, it can nourish, moisturize and protect skin from pollution. Moreover, it does not contain perfume, parabens, alcohol, oils, and substances that are harmful to skin. Therefore it is suitable for all skin types especially susceptible skin.

The follow-up program of test sample between the ages of 30-63 years from 50 people has been continuously evaluated for 4 & 8 weeks. It was found that VIPVUP™ can increase skin elasticity (R2 ratio = 0.68 & 0.72; $p < 0.001$) skin radiant (Gloss DSC value = 4.90 & 5.08; $p < 0.001$) skin moisture (Moisture level = 84.33 & 86.45; $p < 0.001$), serum can reduce Melanin pigment (Melanin index = 213.7 & 209.3; $p < 0.001$) skin roughness (SEr = 2.51 & 2.27; $p < 0.001$) skin flake (SEsc = 0.58 & 0.55; $p < 0.001$) wrinkles (SEw = 58.46 & 57.21; $p < 0.001$)

Class no.

4



Thailand

By TISIAS

TH.6.

Title	Muvtivate (Muscle and Movement Stimulation Versatility Tool- for elderly)
Authors	Master Thipok Tungsiripat Miss Chiratchaya Hemrungronj Miss Nara Sthapitanonda Master Siranat Tovikkai Miss Nathasiri Tovikkai
Institution	Chulalongkorn University Demonstration Secondary School, Bangkok Patana School, King's College International School Bangkok
Patent no.	Patent Pending

Description EN	<p>Muvtivate is a fun and portable exercise device focusing on bedridden patients and immobile elderly who mostly spend their time without movement until their muscles become fatigue. It aims to support elderly the chance to be able to stand up, continue to walk and overall improvement in health. Muvtivate features various biofeedback games and exercise programs targeting on different muscles that will be beneficial for the elderly. Muvtivate is practical to exercise anywhere and any times, even can be used in bed. The biofeedback games in Muvtivate intend to stimulate whole body joint and muscle movements with different actions and help users to exercise in various ways in order to do multi-task and control brain and muscles coordination to decrease the risk of falling. Health monitoring devices, i.e. heart rate monitor and pulse oximeter are installed on the biosensor to monitor users' health and safety and to keep track of users' progress and ensure the best results during practice.</p>
Class no.	4

TH.7.**Title****Surveyor Walker****(Automatic Balance Stair Climbing Walker)**

Miss Supitchaya Hemrungronj

Miss Kullanat Tovikkai

Authors

Mister Korn Hemrungronj

Miss Jaomai Tungsiripat

Mister Marjimar Suvichasophon

Institution**Triam Udom Suksa School and Chulalongkorn****University Demonstration Secondary School****Patent no.**

Patent Pending

Description EN

Surveyor Walker is the innovative walker specially designed to assist the elderly and patients who suffer from physical disabilities, joint pains, muscle abnormalities and diseases that cause unstable balance, such as Parkinson's disease, Alzheimer's diseases, orthopedic patients, stroke patients. They suffered from unstable balance problem and face with difficult limitation to walk everywhere, to walk up and down the stairs and slope safely without support from others and who feel uncomfortable to walk with assistive devices, i.e., canes, crutches or other ordinary walkers). It is made from carbon fibre and Nylon. The design is slim, light weight and easy to fold to bring everywhere under affordable budget. Its tilt and height will be adjusted itself by pressing automatic adjustment button to fit the user's need and to fit every stair and slope on every move. The automatic balance level check sensor will calculate and adjust all legs to provide smooth and secure step. The Emergency call device, IOT tracking function and heart rate monitoring system are installed to provide more safety for user in any unexpected situation. Surveyor Walker is highly adaptive, allowing the user to go anywhere independently. Only one device can go everywhere.

Class no.

4

TH.8.

Title	Less Snore More Sleep
Authors	Jaomai Tungsiripat Marjimar Suvichasopon Korn Hemrungronj Thanyanan Poonbundansin
Institution	Chulalongkorn University Demonstration Secondary School and Kamnoetvidya Science Academy
Patent no.	Patent Pending
Description EN	Insufficient sleep caused by snoring is crucial problem to our cognitive functioning, physical and mental health including marriage relationship. Moreover, loud snoring is one of the biggest sign of Obstructive Sleep apnea, the most severe life-threatening form of snoring. Less snore more sleep (LSMS) is a novel anti-snoring system comprises of LSMS Application and LSMS pillow with 8 air bags and pressure sensors built in. LSMS App linked with snoring detection by AI and head repositioning helper: a 2-step AI algorithm to precisely control air flow that is medically effective with a special head tilt algorithm like maneuvers in medical practice. The 8 air bags system specially designed to promote deep sleep. The first 4 air bags operate with pressure sensors to reposition head effectively, the 5th & 6th air bags promote head tilt chin lift position for opening airway in case of snoring and sleep apnea. The 7th & 8th air bags promote sleeping on the side and prolong deep sleep. The ergonomics design and AI algorithm function of LSMS pillow promote comfort and quality sleep by allowing natural movement throughout sleep period. The airbag technology is supported by Air Lumba Co., who is specialized in the airbag industry.
Class no.	4

TH.9.**Title****Bamboo Board****Authors**

Assistant Professor Thongtep Sirisoda

Institution**Rajamangala University of Technology Thanyaburi,
Thailand****Patent no.**

Patent application No. 2003002108

Description EN

Bamboo has the potential to be a source of wood for the future. There are several interesting characteristics, such as fast-growing (3 years, it is applicable), it is easy to grow and propagate. Use fewer plantations nationwide. The wood has a unique pattern. High strength and toughness, and it is easy to dry and process. Bamboo can benefit directly or indirectly. Bamboo is now increasingly crucial to the national economy. Both industrial and export, and found that in the bamboo products manufacturing industry, there is a large amount of bamboo waste left over. As a result of the problem of bamboo waste, the inventor then came up with a formula for producing veneer from bamboo waste. Production procedures recognize the importance of growing income for farmers and more marketing channels to bring knowledge about bamboo. It is helpful to develop the area, which brings the creation of farmers' careers to earn more income. The crafting of plywood from waste bamboo waste is unique in materials and production processes, measuring 1.20 centimeters wide and 2.40 centimeters long and ranging in thickness from 4, 6, 10, and 12 centimeters.

Class no.

3

TH.10.**Title**

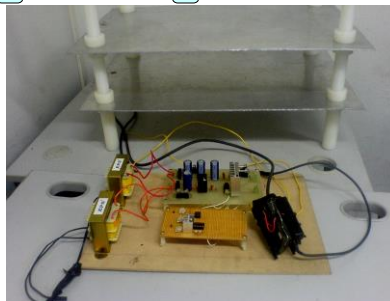
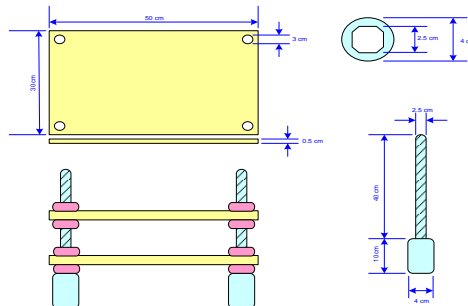
Rice Grain Separate Machine Using Corona Electric Field Force

Authors

Siseerot Ketkaew

Description EN

This innovation presents a rice seed separate machine using corona electric field force. High voltage theory, physics and also principle of static electricity are applied. The designed and implemented equipment are composed to generate an electric field. When rice grains are taken and passed through electric field between two plate electrodes, force of electric field can drift imperfect rice grains having less weight via breaking up plate. DC high voltage source making electric field force comprises of a flyback converter and controlling of the switching by IC # 555 at switching frequency 15 kHz and a flyback transformer # TLF14649. They are used to build up a voltage from 24 Vdc to 5 kVdc for plane electrode plates.

Class no.

Turkey

By Turkish Inventors And Innovators Association

TR.1.

Title

Intravenous line holder:portable robotic version

Authors

Prof .Dr.Yosef Rafiee Byraami, Dr. Ali Karimian, Maryam Azarara

Patent

-

Robotic vascularity vein finding device and establishing venous cannulation for IV THERAPY

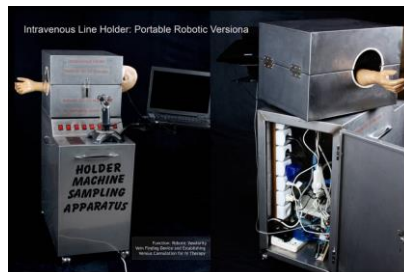
Application and advantages :

- Preparing vessel on completely mechanized method
- Facilitating and accelerating access to veins
- No need for treatment personal to contact with patient's tissue
- Permanent monitoring of vascularity
- Smartly locating of the precise anatomic position of veins
- Manual accountability of device robotic
- Usability of device as an educational assistance tools in clinical skills.
- Preventing and avoiding invasive procedures as surgical technics
- Rotationability of robot arm for 210 degrees rotation of its joint for 130 degree with lead to enough control of patient hand and vascularity position
- Automatic observance of academic regulations required for intravenous treatment

Description EN

Class no.

4



INTERNATIONAL EXHIBITS

TR.2.**Title**

**Anti spermatic retro vaginal prophylactic irrigator.
Home edition**

Authors

**Prof .Dr.Yosef Rafiee Byraami, Alehe Seyedrasooli,
Maryam Azarara**

Patent

-

Function: preventing from pregnancy fighting with unwanted pregnancies family planning management and population control

Implications and advantages

Removing and clearing all substance in man ejaculation woman ejaculation fertilized sperm cell

Preventing and treating transmitted sexual infections STD infections cleaning vaginal smell.washing and disinfecting vaginal mucus on basis of vagina self cleaning stimulation .

Stabilizing desired PH and vagina fluoro microorganism and preventing from bacterial and fungous infections

Simulation and accomplishing G post orgasm and semen ejaculation in women followed by desired sensation arising from its pleasure .willingness to sexual intercourse when using the device and consequently helping treat menstruation premature ejzculation in aconformity to physical regulation $W=MG, f=ma$

Possibility to have natural sexual intercourse relying on full ejaculation and discharging semen inside the vagina and no need to use any anti pregnancy device and methods currently used all over the world including surgical methods physical items .chemical drug and periodic abstinence.

Description EN

The possibility to do kegal exercises to enhance pubococcyxius muscle strength and vaginal dilation by device operation and soothing induction while women use the device and patient who need to the mentioned CBT exercises as well as pregnant women .

Class no.

TR.3.**Title**

Production system of fish food supplement based on Artemia and Artemia cysts

Authors

NASER MIRZAEIKIA

Institution

AKFEED CO.LTD

As a small crustacean, Artemia is one of the most important live foods in aquaculture, especially shrimp and caviar. Due to its small size, production of resistant (cyst) and maintainable eggs, high nutritional value (protein and pigment), high growth rate and reaching sexual maturity in a short time (less than 3 weeks), bio-use Live and frozen masses, the use of decapsulated and hatched cysts, as well as other benefits, are recognized .as a strategic being in aquaculture worldwide

Description EN

The increasing production of fish (edible and sturgeon) and crustaceans (shrimp and crabs) in the world and the dependence of hatcheries (habitats) on this creature (in two forms of biomass and cyst) has caused a high need for Artemia in the world, especially Feel West Asia, the Middle East and Europe. Since in hatcheries of fish and shrimp (in more than 95% of cases) Artemia is an integral part of the production process (appropriate size, pigment and good taste are the most important reasons for using Artemia), so breeding Artemia as a food Alive is essential in the country. Artemia breeding should be done according to regional needs (West Asia, Europe and the Middle East) in aquaculture (edible and ornamental fish, as well as crustaceans such as shrimp and crabs). For example, due to the dispersion of hatcheries and sturgeon breeders, hatcheries and shrimp breeding sites, Caspian salmon hatcheries in the Middle East and Europe, as well as ornamental fish breeding sites and halls around the world, there is a need for .breeding sites. Artemia is essential for these areas Artemia-related products (cyst including: matters related to principled harvesting, diapause removal, contamination determination, initial processing, final processing, drying and packaging, production of dehydrated and wet dehydrated cysts, hatch-capable dehydrated cysts with a shelf life of more than 6 Moon without the need for refrigerators and biomass Artemia

including: live Artemia - disinfected - and enriched and frozen Normal and enriched, Artemia in different stages of life based on size, especially Naples Artemia enriched, Artemia flakes, Artemia powder , Artemia Essay, Artemia paste and Artemia extract - the products introduced with the new formulation do not need a refrigerator and only the dry cyst that can be supplied needs a refrigerator -) is completely achievable. Also, in order to achieve more product (cyst and biomass) in swimming pools and production of magnetic cysts and cysts enriched with plant extracts (anti-viral), a research team will be formed in this field and in the form of research projects, Feasibility study and product production at laboratory, pilot and commercial levels According to statistics, Turkey annually imports 70 tons of dry cysts at a price of \$ 60 to \$ 80 (good quality and .standard) per kilogram

If this product is produced and processed in Turkey, it will be offered at a price of 45 to 50 \$, and in addition to a reasonable price, employment will also be created

TR.4.
Title

Alkaline ionized water production device for human drinking and agricultural irrigation water consumption

Authors

Dr.Arash Momeni

Institution

MEGHNATIS SAZAN HAYAT COMPANY

Patent

-

Description EN

In this invention, water is converted to alkaline water after 7 hours by magnetic fields and through electromagnetic waves without any other substance being added to it.

The advantage of this device is that no additives are added to the water. And that the water is placed in a pitcher or a container of mineral water near the device and its greed does not change.

The power consumption of the device is about 10 watts

TR.5.**Title**

Smart passenger and object transportation software (PIKAAP)

Authors

Houman Esmaeili, Dr. Mehrdad Fojlaley

Institution

GUILAN SCIENCE AND TECHNOLOGY PARK

Patent

The pickup software team, which operates in three areas: taxi (pickup), motor courier (pickup bike) and motorbox (pickup box), instead of focusing separately on the passenger and driver, expands its activities and undertakes activities and cooperation. With the management of agencies and wireless taxis and any transportation system that includes a number of drivers. In fact, pickup software allows drivers to manage their location on the map. Information such as how long each driver has been online, how many services each driver has performed and how many services have been canceled by the driver. The pickup team, in addition to managing the drivers, has also provided passenger software.

Another benefit of pickup software is the allocation of a percentage of online pickup software transactions to the driver's agents's account, which generates revenue and employment for the agents.

Description EN

Another important point is the possibility of choice for passengers in the city who can request a driver with any representative that the passenger is interested in, which means that for example, if the passenger is interested in wireless taxi, he can request a driver from a wireless representative or If he is interested in the representative of the agency, he can send his request to the representative of the agency and be transferred to the desired destination with satisfaction and security.

Another advantage of pickup software is operator software, which means that all agents that have a telephone answering operator are given a separate application through which they can receive requests that are referred to them by phone. And send to drivers This will cause all calls to be registered in software and prevent manual registration, so calls that are not registered through the software will be recorded

systematically.

With the latest programming methods, the pickup software team has been able to enable operators to communicate with drivers wirelessly (without the need for a wireless device) through the operator application, and can provide good management for drivers and passengers. Bring.

General features of pickup software:

- Definition of unlimited number of passengers
- Define an unlimited number of drivers
- Define an unlimited number of operators
- Automatic storage of driver and subscriber information
- Simultaneous management of telephone and Internet requests

Ukraine

UA.1.

Title	State-Of-The-Art Technologies of Imitation of Mural Painting from the Kyivan Rus and Baroque Periods in the Reconstructed St. Michael Golden-Domed Cathedral in Kyiv
Authors	Yulia IVASHKO, Ivan BUZIN, Dominika KUŚNIERZ-KRUPA, Justyna KOBYLARCZYK, Andrii DMYTRENKO, Łukasz BEDNARZ
Institution	¹ Kyiv National University of Construction and Architecture, 31 Povitroflotskyi Avenue, 03037 Kyiv, Ukraine. ² Ukrrestavratsiia Corporation, 6 Boryspilska Street, 02099 Kyiv, Ukraine. ³ Cracow University of Technology, 24 Warszawska Street, 31-155 Cracow, Poland. ⁴ National University "Yuri Kondratyuk Poltava Polytechnic", 24 Pershotravnevyi Avenue, 36011 Poltava, Ukraine. ⁵ Wroclaw University of Science and Technology, 27 Wybrzeze Wyspianskiego Street, 50-370 Wroclaw, Poland.
Description EN	<p>The research work deals with the issue of destroyed architectural monuments restitution that remains disputable. Based on compliance with the world practice of restitution that is recognized at the legislative level, an example of restitution of a unique object of Ukraine is described – St. Michael's Golden-Domed Cathedral in Kyiv, destroyed in the 1930s and completely reconstructed nowadays by the specialists of Ukrrestavratsiia Corporation. The work focuses on state-of-the-art technologies of mural painting for imitation ancient Rus frescoes and baroque mural paintings. Taking into consideration that photographic materials and evidence of interior decoration were not sufficient, and the fact that the cathedral and monastery are functional, that imparted its peculiarity and called for painting the murals using up-to-date durable painting technologies, instead of the sophisticated and less durable technique of the ancient Rus frescoes, mural painting was used in the image-bearing system of frescoes, but in the state-of-the-art techniques of Keim's process or mineral painting. The possibilities of strengthening and monitoring cracked masonry structures that are the base of reconstructed frescoes are also presented.</p>

United States of America

By *TISIAS*

US.1.	
Title	Lishanski vibrating transport device and associated method for movement of objects on vertical, horizontal, and inclined basic surfaced
Authors	D. Grigori Lishanski and Oleg Lishanski
Institution	Science & Technology Group LCC
Patent no.	US Patent 10, 214 398 B2
Description EN	<p>A device and method for moving cargo on inclined, horizontal, or vertical surfaces utilizes frictional forces selectively applied using induced mechanical vibrations on a loaded platform in conjunction with the force of gravity acting on the platform. The platform is vibrated to pivot or shift the platform relative to a support structure, engaging a portion of the platform secured to the platform with the support structure. At the furthest extent of this motion, the platform is pulled against the support structure by gravity, disengaging the portion from the support structure. In turn the pivot point for the device is shifted to the point of engagement between the platform and the support structure, which enables the portion of the platform to move upwardly along the support structure. The alternation of this engagement of the platform with the support structure causes the platform to move along the support structure.</p>
Class no.	8



US.2.**Title****Lishanski Vibratory Cavitation Pump****Authors**

D. Grigori Lishanski and Oleg Lishanski

Institution**Science & Technology Group LCC****Patent no.**

US Patent US 9,062,664 B2 and US 8,353,213

Description EN

The vibratory cavitation pump includes a working cylinder with an inlet for a liquid and an outlet for a liquid, a cylinder, a piston attached to the rod, a plate attached to the rod at a distance from the piston, an activator, movably sliding installed on the rod between the piston and the plate, and a pumping mechanism working with the rod to move the rod in relation to the working cylinder. The slip activator creates cavitation in the pumped liquid to facilitate pumping of liquids such as high viscosity liquids. The pump may also include an outer cylinder around the slave cylinder to impart a rotational motion to the incoming fluid, thereby enhancing the cavitation created in the fluid by the pump, facilitating the displacement of the fluid.

Class no.

2



Vietnam

By Dr. Phan Quoc Nguyen, Vietnam National University, Hanoi

VN.1.

Title

Inventive Evidence - based Biomedicine Ecosystem (Neuroscience, Sport, Art, Spirituality) For Austistic Transformational Coaching (Drugless & Non-invasive Approach)

Authors

Phan Quoc Viet, Vu Van Chuc, Luu Anh Chuc

Institution

Tam Viet Company, Address: B1202, 395 Lac Long Quan Street, Hanoi, Vietnam

Patent

-
*“Autistic children takes up 1% of the world population”.
 Online and offline gaming are also the reasons to the worsen the situation, especially during the recent time of Covid-19, everyone is quarantined at home.*



Result:

- More than 200 children were well trained and showed pronounced improvements.
- After 3 to 6 months, these autistic children have the confidence to perform in front of big crowds like conventions and schools.
- Children became Vietnam and Asia records holder.
- On 26/08/2018, WorldKings Organization accredited Dr. Phan Quoc Viet the Content is King achievement for his “Method of training and coaching autistic children successfully become record holders”.

Description

EN

December 2021, World Invention Intellectual Property Associations - WIIPA” accredited Dr. Phan Quoc Viet Gold Medal & Special Prize for “Evidence – based Eco System for Austistic Transformational Coaching” on the occasion of 2021 KIDE.

Class

VN.2.	
Title	SMART WATER QUALITY CONTROL SYSTEM IN SALMON TANKS
Authors	1. Duong Yen Nhi, class 11 Chemistry Ngo Huu Thien, class 10 Chemistry
Institution	Lao Cai High School For Gifted Students, Lao Cai Province, Vietnam
Patent	Patent Application No: 2-2022-00051 The system is made up of 5 types of sensors: turbidity sensor, dissolved oxygen concentration sensor, pH amplitude sensor, temperature sensor and water level sensor. Salmon tanks are usually located at the foot of the hillside where there is abundant water flow suitable for the breeding and growing conditions of fish. The rains wash away layers of rock along with the water flows into the tanks, causing a very rapid physiologic transformation of the water in a very short period of time. This affects the safe development of the fish. The system has two operating modes: manual mode and automatic mode:
Description EN	Turbidity sensor. Dissolved oxygen concentration sensor. PH sensor. Temperature sensor: Water level sensor: when the water level in the tanks is too low, the system will automatically activate the pumping of water from the storage tank into the fish tanks. The entire process of changing the parameters and processing of the device is operated automatically, and information is then automatically sent to the app and webpage to alert the system users. After spending a period of time on conducting the research, we succeeded in: - building a complete alarm system for salmon tanks with smooth operation. - programing a control app on androi phone. - writing a web-controlled interface on the computer. - conducting experiments at 3 salmon farms in Sa Pa district, and at Sa Pa Cold Water Fisheries Research Center, gaining great appreciation for the project's practical application.
Class	

VN.3.	
Title	Purification, characterization and thermostability enhancement of xylanase from <i>Aspergillus oryzae</i> isolated in Vietnam
Authors	TRAN NGUYEN HUNG, NGUYEN TRUNG KIEN, HOANG TRAN THANH
Institution	DAO DUY TU HIGH SCHOOL, HANOI, Vietnam
Patent	Patent Application No: 2-2022-00141
Description EN	<p>Xylanases are produced by many bacteria and fungi, among which <i>Aspergillus oryzae</i> is considered as a potential source. In this study, a xylanase was isolated and purified from the crude culture filtrate of <i>Aspergillus oryzae</i> after 4 days of growth on the optimal culture (g/L) containing: 2 NaNO₃, 1 K₂HPO₄, 0.5 MgSO₄, 0.5 KCl, 10 soybean powder, 40 corn cobs, pH 7.0 under liquid-state fermentation. After two steps purification process including gel filtration chromatography (Sephadex G-200) incorporating with anion-exchange chromatography (DEAE-cellulose), obtained xylanase was purified with the yield and purity of 28% and 11 fold, respectively. The molecular mass of the purified xylanase determined by SDS-PAGE was 21 kDa with a specific activity of 6712 IU/mg towards 1% (w/v) of birch wood xylan. Temperature optimum was 60°C. The enzyme was thermostable in the temperature range of 37-50°C with a high residual activity of 62-74% (656- 779 U/mg protein). The biochemical characteristics suggested that the xylanase has a potential application, including use as a feed enzyme or using hydrolysis to produce environmentally friendly Bio-products.</p>
Class	
VN.4.	
Title	Cooling system for buildings
Authors	HOANG TRUNG HIEU, NGUYEN HOANG BINH, NGUYEN TRUNG HIEU
Institution	DAO DUY TU HIGH SCHOOL, THAI NGUYEN Province, Vietnam
Patent	Patent Application No: 2-2022-02184

Description
EN

Our invention is a cooling system for buildings based on the circulating and storing of the calcium carbonate-mixed-water solution for radiative cooling and thermal energy storage. The key principles of the system are: very good reflection in the visible and near-infrared spectrum, high thermal emission in the infrared atmospheric window region, and high specific heat capacity for large energy storability. The prototype system that was built includes a solar absorption-emission panel, water storage, pumps, and an electronic control unit. It was built and tested in the climatic conditions of Hanoi showing the system can contribute to reducing: building temperature, the energy consumption of air conditioners, the sunlight heating effect, and global warming.

Class

VN.5.

Title

Toilet Disinfection System

Authors

Pham Gia Bao, Le Thu Nga, Vuong Hai Yen

Pham Gia Bao, 08/13/2006, 10A1, High School for Gifted Students, Hanoi National University of Education.

Institution

Le Thu Nga, 17/01/2005, 11D, Foreign Language Specialized School.

Vuong Hai Yen, 16/11/2004, 12A5, Ly Thuong Kiet High School.

Patent

Pending

Description

EN

Toilet infection is a problem that has not been completely solved yet. Besides, with the development of new viruses like Covid-19 will cause many dangers to human health. Therefore, in this invention, a toilet disinfection system has been developed to limit infection in the toilet. The system works on the principle of automatic misting made from NaCl to kill bacteria. When the toilet user flushes the toilet, the sensor located at the position of the toilet flush will send a signal to the central controller (Aduino) so that the processor sends a signal to the ultrasonic generator, creating a mist. for 2% saline solution. Salt water mist will be sprayed on the toilet to stick, push the toilet bacteria to the ground. Due to the ultrasonic fogging, the fineness of the mist is small, the density is high, so it has the ability to stick to the toilet bacteria and bring them down to the ground. The bacteria, when attached to the salt water that falls to the

ground, will have enough contact time and will be inactivated. When a toilet has many toilets placed next to each other, as is the case at airports, hospitals, and schools, the mist duct system is extended and expanded to the number of toilets correspondingly. The opening of the hose to discharge the mist is controlled by the central processor, which controls each opening motor corresponding to the toilet bowls. With this invention, the salt water mist will be able to kill the growth of toilet bacteria, reduce the possibility of cross-contamination of toilet bacteria to the user, and at the same time have the ability to kill bacteria when dropped. down to the ground.

Class

4

NATIONAL EXHIBITORS

Universities
Research Institutes
Companies
Individuals

University POLITEHNICA of Bucharest

RO.1.	
	CUSTOM MADE IMPLANT FROM
Title EN	BIORESORBABLE MATERIALS FOR INTERNAL FIXATION OF LONG BONE FRACTURES
Authors	Florin MICULESCU, Otilia ILIE, Augustin SEMENESCU, Mihnea-Cosmin COSTOIU, Valeriu GHEORGHITĂ, Alexandru MARIN
Institution	University POLITEHNICA Bucharest, RO, EU
Patent no.	Patent application RO 00257 /2021
	The invention relates to a process for obtaining a unique, biodegradable, customized implant for the internal fixation of long bones, whose physical properties are predetermined by controlling the specific geometric parameters of the holes on its surface.
Description EN	The implant meets the mechanical and biological requirements for bone regeneration and eliminates the need for secondary surgery, being a less invasive method for internal fixation of long bone fractures.
	The technical problem is solved by obtaining a customized cylindrical bone fixation product, which can be made of polymeric, ceramic or bioresorbable composite materials, in a one-component or two-component way, with holes on the implant surface of different geometries and sizes and holes specific for screw fixing.
Class no.	4. Medicine - Health Care - Cosmetics

RO.2.	
	MANUFACTURING PROCESS OF A PRODUCT
	DESTINED FOR BONE DEFECTS
Title EN	RECONSTRUCTION, BASED ON HYDROXIAPATITE AND BIOGENIC BIPHASIC CALCIUM PHOSPHATE
Authors	Florin MICULESCU, Aura-Cătălina MOCANU, George STAN, Iulian Vasile ANTONIAC, Mihnea Cosmin COSTOIU, Ștefan Ioan VOICU, Marian MICULESCU, Ileana Mariana MATEȘ, Augustin SEMENESCU
Institution	University POLITEHNICA Bucharest, RO, EU
Patent no.	Patent application RO 00258 /2021
Description EN	The invention relates to the manufacturing process of a product destined for bone defects reconstruction, based on

hydroxyapatite and biogenic biphasic calcium phosphate, with a controlled ratio between hydroxyapatite/tricalcium phosphate. All calcium phosphates result from the thermal dissociation of calcium carbonate in form of dolomitic marble and seashells, and treatment of calcium hydroxide solution with phosphoric acid (range: 100–130% x calculated stoichiometric amount).

Class no.

4. Medicine - Health Care - Cosmetics

RO.3.

Title EN

MECHANICAL DEVICE WITH ULTRASOUND FOR QUALITY CONTROL OF TREES

Authors

PETRICEANU Constantin, PETRICEANU Alexandru Daniel, COSTOIU Mihnea Cosmin, SEMENESCU Augustin, GÎDIUȚĂ Ioana, DIACICOV Călin-Marian, CHIVU Oana Roxana

Institution

University POLITEHNICA Bucharest, RO, EU

Patent no.

Patent application RO 00638 /2021

**Description
EN**

The invention relates to the creation of a control device capable of assessing the quality of tree trunks by a method which does not involve their damage. This is useful for identifying and deciding which trees are healthy and which are affected by various structural problems and need to be cut down. The mechanical ultrasonic device for controlling the quality of the standing shafts, according to the invention, consists of: impact head, active part of the impact head (changes after wear), drive unit (electric motor plus transmission mechanism), four acoustic sensors, sliding sensors, shaft strap, circumference adjustment mechanism, control circuit box and power supply, connectors, tablet with evaluation software, evaluation software.

3. Agriculture and Food Industry

RO.4.

Title EN

ANTIFRICTION ALLOYS IMPROVED BY MICROALLOYING

Authors

AVRAM Vasile, SEMENESCU Augustin, CSÁKI Ioana, STOICA Nicolae Alexandru

Institution

University POLITEHNICA Bucharest, RO, EU

Patent no.

Patent application RO 00495 /2021

**Description
EN**

The invention relates to antifriction alloys YSn83 micro-alloyed with Ca and Mg conferring properties for improved

lubrication properties. The friction coefficient values are between 0.0663 and 0.1286, a value with 59% improved within the base alloy. The present invention represents a technical progress due to the fact the optimized compositions for the antifriction alloy have a uniform structure resulting in the alloy improvement the tribological properties of the mentioned alloy. For this invention we used Ca and Mg due to the fact that they present a low toxicity.

6. Mechanical Engineering - Metallurgy

RO.5.

Title EN **Alloys for tribological applications**
Authors AVRAM Vasile, SEMENESCU Augustin, CSÁKI Ioana, STOICA Alina Maria
Institution University POLITEHNICA Bucharest, RO, EU
Patent no. Patent application RO 00494 /2021
Description EN The invention relates to antifriction alloys YPbSn10Ca and YPbSn10Mg with superior properties in comparison with the commercial alloy YPbSn10. The friction coefficient values are between 0.087 and 0.1126, a value with 66% improved within the base alloy. The present invention represents a technical progress due to the fact the optimized compositions for the antifriction alloy have a uniform structure in which the hard and soft phases are uniformly distributed in the alloy improvement the tribological properties of the mentioned alloy.
 For this invention we used Ca and Mg due to the fact that they present a low toxicity. These elements could segregate at the grain dimensions/ dendrites and reducing interface energy grain/dendrite, stopping the movement or grain slipping.

Class no.

5

RO.6.

Title EN **Nanostructured surface coated with doped hydroxyapatite to enhance the bioactivity of titanium**
Authors Diana M. Vranceanu, Elena Ungureanu, Cosmin M. Cotrut
Institution **University Politehnica of Bucharest**
Patent no. Patent application No. A/00714/2021
Description EN The invention relates to a biocompatible material, obtained by electrochemical techniques, in the form of nanostructured

surface with titanium dioxide nanotube with an inner diameter between 70 and 75 μm , high degree of wettability highlighted by a contact angle between 15° and 20° , a roughness between 130 nm and 160 nm, and which is covered with coatings of hydroxyapatite doped with Zn or Mg in an amount of 0.50 (± 0.05) at.% Mg or 0.80 (± 0.02) at.% Zn, with a Ca/P ratio between 1.55 and 1.57, a crystallinity between 44% and 47% and with superior bioactivity ability at 37°C such as that of biomineralization in SBF on the 21st day and a good degradation in PBS on the 21st day.

Class no.

4

RO.7.

Title EN

PHOTOCATALYSIS AND DEVICE IMPLEMENTING SAME

Authors

Cristian PREDESCU, Ruxandra VIDU, Ecaterina MATEI, Andra Mihaela PREDESCU, Mirela Gabriela SOHACIU, Andrei Constantin BERBECARU, Grigore VLAD

Institution

University POLITEHNICA Bucharest, RO, EU

Patent no.

Patent application US 2021/0261443 A1

Description
EN

The present invention relates to a process providing a photocatalytic treatment of water in a baffled wastewater purification tank. Specifically, the invention relates to a method for controlling the fluid flow using photocatalytic baffles, resulting in improved surface area for the photocatalytic reaction photon efficiency. Photocatalytic baffles are pads coated with a photocatalytic material or pads that have attached a photocatalytic film. In both cases, the surface of the photocatalytic baffles can be regenerated or replaced. The present invention also includes an improved photoreactor design which allows controlled circulation of the fluid under illumination, in which the pollutants present in water constantly move towards and attached to the deflecting baffle surface where the reaction takes place. The method of the present invention further allows the calculation of the time required to increase photocatalytic efficiency under conditions of continuous illumination for certain pollutants. The present invention is useful in the removal of organic contaminants from liquid phases, including aqueous and organic liquids,

gas phases, and in the purification of pharmaceutical and industrial waste waters.

Class no.

1

RO.8.

Title EN

COMPOSITION OF PHBV/PCL AND NANOEMULSION OF NISINE AND DILL ESSENTIAL OIL AND METHOD FOR ITS OBTAINING

Authors

Maria RÂPĂ, Elisabeta Elena Popa, Andrei Constantin BERBECARU, Ecaterina MATEI, Andra Mihaela PREDESCU, Cristian PREDESCU, Paul Alexandru POPESCU, Amalia Carmen MITELUT, Mona Elena POPA

Institution

University POLITEHNICA Bucharest, RO, EU

Patent no.

Patent application RO 00072/2022

**Description
EN**

The invention relates to a composition based on a nanoemulsion of nisine and dill essential oil embedded in poly(vinyl alcohol) (PVA) solution to cover a poly(hydroxybutyrate-co-valerate)/poly(caprolactone) (PHBV/PCL) film and to a process for making antimicrobial, antifungal and biodegradable food packaging. In this purpose, the solutions of 8% PHBV and 10% PCL in dichloromethane (DCM), respectively were stirring at 60°C for 30 minutes and 400 rpm, and then mixed together in a volumetric ratio of 1:1. Nisine and dill essential oil nanoemulsion was encapsulated in 10% PVA solution. The process, according to the invention, consists in the co-axial electrospinning of the mixture of components, with a flow rate of the PVA solution between 4 to 5 mL/h, a flow rate of the nisine and dill essential oil nanoemulsion in the range of 0.8...1.0 mL/h, a voltage in the range of 21.63...22.64 kV and the distance between the needle-collector tip of 14 cm.

RO.9.

Title EN

HIGH ENTROPY ALLOY TYPE AlCrFeCoNi RESISTANT TO DYNAMIC STRESS AND OBTAINING PROCEDURE

Authors

GEANTĂ Victor, VOICULESCU Ionelia, CHERECHEȘ Tudor, LIXANDRU, Paul, DRAGNEA, Daniel, ZECHERU Teodora, MATACHE Liviu Cristian

Institution

University POLITEHNICA of Bucharest

Patent no.	RO 132387 B1/30.09.2021
Description EN	The high entropy alloy AlCrCoFeNi is a metallic material resistant to mechanical stresses performed with high deformation speeds, that has high hardness and toughness, and is composed of five metallic elements of advanced purity, having the chemical composition located in the value ranges, as follows: Al = 6, 50 - 8 , 80,%, Cr = 21 - 22,%, Fe = 22 - 23.50%, Co = 23 - 25%, Ni = 23 - 25%, with a density of 7.4 - 7.6 kg/dm ³ and liquid temperature of 1350-1400°C. Before the heat treatments, the material has average hardness values of 400-535 HV0.1 and after specific heat treatments it has a hardness of 700-950 HV0.1, with associated toughness expressed by the values of breaking energy (Charpy test) of 55 - 70 J at a test temperature of 20°C. The alloy is obtained by a duplex process of melting and homogenization in a vacuum induction furnace under an inert argon atmosphere, combined with vacuum arc remelting (VAR process) to homogenize the chemical composition, granular structure and finish of the microstructure, followed by treatment. The plates obtained by casting in metal molds with variable dimensions are then subjected to heat treatment at 720-800°C for 48-72 hours, followed by cooling in air.
Class no.	Invention Classification: 6 & 7

RO.10.

Title EN	LABORATORY PLANT FOR ULTRA-FAST SOLIDIFIED METAL BANDS OBTAINING IN INERT ATMOSPHERE IN SINGLE AND / OR DUAL BAND SYSTEM - SPINBAND
Authors	GEANTĂ Victor, VOICULESCU Ionelia, KELEMEN Gyorgy, MOLNAR Gabor-Jozsef, BINCHICIU Emilia Florina
Institution	University POLITEHNICA of Bucharest
Patent no.	Patent application No. A/00139/29.03.2021
Description EN	The present invention relates to a laboratory plant for complex metallurgical processing which makes it possible to obtain ultra-fast solidified metal bands, equipped with a medium frequency converter, under controlled atmosphere in which are placed two inductor coils, fed separately or concomitant, as required. Each workstation is made of copper pipe with a circular or rectangular section, forcibly cooled by water. Depending on the number of inductors used

(one or two), the installation allows to obtain ultra- fast solidified metal bands, in the "single band" or "dual band" configuration. The two inductors can be placed in parallel both vertically and at a certain angle of inclination relative to the vertical axis, located at a certain distance from each other, depending on the rotational speed of the copper disc that performs the fast solidification of the melted alloy. The coil inductors are powered sequentially by a medium frequency converter which converts AC current with a frequency of 50 Hz into medium frequency energy, necessary for the heating and induction melting of metals and alloys. The power components of converter are cooled with water by means of an integrated system (cooler) placed outside them. The laboratory plant allows the ultra-fast heating, melting and solidification of compact materials with weights of 100 - 500 g, placed in quartz or boron nitride crucibles. The melted metal is quickly projected on a copper drum ($\varnothing 250 \times 60$ mm), cooled with inert gas, which rotates at a peripheral speed of more than 30 m/s (2300 rpm) that allows to obtain solidification speeds of the order of 104 - 107K/s, obtaining amorphous bands in single or dual configuration with different physical, chemical or mechanical properties on each faces. The bands are then co-rolled using a rolling system placed downstream of the solidification drum. The new material can be used in various applications in the medical and industrial fields.

Class no.

Invention Classification: 5, 6 & 7

RO.11.

Title EN

**MULTI-COMPONENT HETEROGENEOUS
ASSEMBLY BETWEEN HIGH ENTROPY ALLOYS
AND STRUCTURAL STEELS DESIGNED TO MAKE
SHIELDS AGAINST DYNAMIC PENETRATORS**

Authors

VOICULESCU Ionelia, GEANTĂ Victor, ȘTEFĂNOIU
Radu, SCUTELNICU Elena, SAVU Ionel Dănuț, MITRICĂ
Dumitru., ROTARIU Adrian

Institution

University POLITEHNICA of Bucharest

Patent no.

Patent APPLICATION A/00317 / 7.06.2021

Description

EN

The invention relates to the dissimilar assembly between structural steels and high entropy alloys (HEA) from alloying systems AlCrCoFeNi, AlCoFeMnNi and CrFeMoTaTiZr, characterized in that they can be obtained

by welding or soldering, being attached to the existing metal structure of military vehicles, in order to provide additional protection for their critical areas (on which dynamic penetrators can trigger the explosion, ignition of the vehicle or hitting personnel), as it has a wide variety of shapes and dimensions, ability to combine or overlap to increase impact resistance. The high entropy alloys (HEA) can be manufactured by casting in molds with the desired configuration (fig. 1), the metal matrix being obtained in electric induction furnace with air or vacuum or in a vacuum remelting installation. The filler materials used for welding were commercial electrodes or wires of Ni, Cr and Fe-rich, and those for brazing were commercial coated rods made of Cu-Ag-Zn or Cu-Zn alloys. The welding of the multi-component assembly was performed using MMA and GTAW processes. The assembly behavior during welding and brazing was assessed based on dynamic impact tests (using 7.62mm caliber incendiary projectile and plastic explosive with bearing steel balls), as well as by analyzes of the microstructure of the joint area (fig.2).

Class no. Invention Classification: 6 & 12

RO.12.

Title EN

Wastewater treatment technology at high-potential sewage treatment plants with antibiotics, pesticides or other biologically active substances

Authors

Denisa FICAI, Georgiana DOLETE, Alexa-Maria CROITORU, Marcela POPA, Laura-Florentina BOANȚĂ, Dan Eduard MIHAIESCU, Anton FICAI, Ecaterina ANDRONESCU, Carmen CHIFIRIUC

Institution

University POLITEHNICA of Bucharest

Patent no.

Patent application A/00707/24.11.2021

Description EN

The novelty of the patent application is especially related to the simultaneous adsorption and degradation of the pollutants (especially antibiotics) from different wastewater plants (hospital and urban). The use of the porous support loaded with photo-catalysts doped with suitable elements can be efficient in visible light thus, during the night these nanostructures will just adsorb but, during the day they will also degrade the antibiotics (or other pollutants from water). The proposed methodology is easy to be applied (only one additional tank is necessary and due to the consistent reduction

of the antibiotics' level the antibiotic resistance will be reduced significantly. The use of doped photo-catalyst can be active in daily light which means that during the night the porous adsorbent are adsorbing the pollutants and during the day these are destroyed. As a consequence of the antibiotic removal from these wastewater, the existent bacterial cells are not exposed to antibiotics at sub-therapeutical level and no resistance is developed.

Class no. 1

RO.13.

Title EN **Siloxane-based solution for the cleaning and conservation of the natural and synthetic surfaces / Soluții de impregnare pe bază de siloxani cu rol de curățare și conservare pentru substraturi naturale și sintetice**

Authors Liliana MARINESCU, Laura – Florentina BOANȚĂ, Anton FICAI, Denisa FICAI, Ecaterina ANDRONESCU, Mariana Carmen CHIFIRIUC, Alina-Maria HOLBAN;

Institution **University POLITEHNICA of Bucharest**

Patent no. Patent application A/00356 / 22.06.2021

Description EN The novelties are related to the generation of the antimicrobial surface by two functionalization steps, the first related to silanisation and the second with decoration. Both steps lead to covalent bonding so, no leakage will appear and thus no negative environmental impacts are foreseen.

The implementation would be suitable for the treatment of the cultural heritage masterpieces but also for tanks in sewage treatment plants, in pools, in private buildings, in construction kits, etc.

Class no. 7 / 1

RO.14.

Title EN **Nanotechnology-based processes for treating various natural or synthetic substrates in order to induce antimicrobial, antibiofilm, antifungal, antialgic or even antiviral activity**

Authors Liliana MARINESCU, Laura-Florentina BOANȚĂ, Anton FICAI, Denisa FICAI, Ecaterina ANDRONESCU

Institution **University Politehnica of Bucharest**

Patent no. A0075/2021

Description EN The invention consists in developing new systems for the treatment of various substrates such as: natural stone, brick,

concrete, glass, etc. and the related treatment method. The proposed system consists in the use of organo-siloxane functionalization agents based on (RO)₃Si- CaHbSH. The proposed solutions will have a variable content of functionalizing agents and solvent, especially alcohols that will increase the penetration depth. These functionalizing agents have multiple roles, by condensation they form network-type structures that repair existing cracks and at the same time confer the selective permeability of the substrate while the presence of functional groups will induce new properties, including self-cleaning, antimicrobial, antifungal, antibiofilm especially if decorated with proper nanoparticles such as Ag, Cu or Au being effective in the case of civil or special constructions (dams, swimming pools, treatment plants), monuments, etc. Surface treatment will be done by any available technique, such as: sprays, brushing, roller application, etc. The application can be done in one layer or in multiple layers, in which case it is recommended to apply successive layers, oriented perpendicular to each other to ensure a uniform application.

Class no.

7

RO.15.

Title EN

Antimicrobial composition based on cellulose and ZnO loaded with citronellol for restoring paper from documents affected by the microorganisms

Authors

OPREA Ovidiu-Cristian, FICAI Anton, FICAI Denisa, MOTELICA Ludmila, ANDRONESCU Ecaterina, TRUȘCA Roxana Doina

Institution

University Politehnica of Bucharest

Patent no.

Patent application No. A00615 /06.10.2021

Description
EN

The present invention relates to the production of cellulose-based gel compositions with citronellol-loaded ZnO nanoparticles for the restoration of paper documents, which will provide long-lasting antimicrobial protection. Due to the activity of microorganisms, the cellulosic support can be damaged, from the appearance of spots to the complete destruction. The cellulose derivative gel, with ZnO nanoparticles loaded with citronellol, by rapid drying, forms a cellulose film that will repair the damaged areas (cracks, holes with missing material, etc.). The gel can also be

inserted under the letters that came off the original support due to the degradation of the cellulosic material. By fast drying it will act like a real glue, but having the same composition, based on cellulose. Because the composition contains ZnO nanoparticles, the cellulose film remaining after drying has antimicrobial activity and no longer allows the development of microorganisms on the treated area. The loaded citronellol will potentiate antimicrobial activity through synergism. If desired, the gel can be applied evenly over the entire page, after drying forming a protective film over the inscription, with antimicrobial activity, which will seal and protect virtually the entire document. Thus, immediately after application, by evaporation of the solvent, a cellulose film with a thickness of microns can be obtained, which is much thinner than the thinnest Japanese paper.

Class no.

4

Technical University of Cluj-Napoca, România

RO.16.	
Title EN	Parallel robot for the recovery of lower limb mobility
Authors	Pislă Doina, Bîrlescu Iosif, Vaida Călin, Gherman Bogdan, Tucan Paul, Carbone Giuseppe, Plitea Nicolae
Institution	Technical University of Cluj-Napoca
Patent no.	Patent OSIM: RO133814 -B1/29.10.2021
Description EN	RAISE is a parallel robotic system with which you can recover the mobility of the 3 main joints of the lower limb (hip, knee, and ankle), by moving them, each segment of the lower limb being supported and moved in a controlled manner. RAISE presents a modular structure, having two modules, namely: a module designed to recover the flexion / extension and abduction / adduction of the hip and flexion / extension of the knee; the second module is attached to the first and is intended for the recovery of the dorsiflexion / flexion and inversion / eversion movements of the ankle.
Class no.	4
RO.17.	
Title EN	Parallel robot for the motor rehabilitation of the lower limbs
Authors	Pislă Doina Liana, Gherman Bogdan George, Nadăș Iuliu Adrian, Pop Nicoleta Maria, Crăciun Cristea Florin, Tucan Paul George Mihai, Vaida Liviu Calin, Carbone Giuseppe, Bîrlescu Iosif, Plitea Nicolae
Institution	Technical University of Cluj-Napoca
Patent no.	Patent OSIM: RO133815 -B1/29.10.2021
Description EN	RECOVER is a parallel robotic system designed for the post stroke rehabilitation of the lower limbs for bedridden patients. The robotic system consists of two parallel robotic modules which are connected to each other to achieve the rehabilitation of the main joints of the lower limb. The first rehabilitation robotic module (the hip/knee module) is based on a 2-DOF (degree of freedom) planar mechanism, and it is designed for hip and knee flexion and extension. The second rehabilitation robotic module (the ankle module) is based on a 2-DOF spatial spherical mechanism which guides a mobile platform together with the patients' foot in spherical motion achieving the ankle flexion/extension and inversion/eversion motions.
Class no.	4

RO.18.	
Title EN	Laparoscopic instrument for accurate extraluminal location of a colorectal tumor
Authors	Bogdan Mocan, Vasile Bintintan
Institution	Technical University of Cluj-Napoca
Patent no.	Patent OSIM: RO131186 -B1/29.04.2021
Description EN	<p>The invention relates to a laparoscopic instrument which facilitates the accurate position of a tumor in the colon tract in the abdominal laparoscopic surgery and also with possible applications in open surgery. Precise location of a rectal tumor is required to decide the appropriate line of distal resection but current methods like bimanual palpation is approximatively and very subjective, lacking the needed "surgical" precision.</p> <p>The principle for precise identification of tumor location is that the tumor will be made "visible" for the laparoscopic instrument by placing sensing trackers close to its margins.</p>
Class no.	4
RO.19.	
Title EN	Equipment and process of decontamination by washing of heavy metal polluted soils
Authors	Dr. ing. Damian Gianina Elena, Prof. dr. ing. Micle Valer
Institution	Technical University of Cluj-Napoca
Patent no.	Patent OSIM: RO133822 -B1/29.04.2021
Description EN	<p>The process uses a suitable mixing and shredding equipment where the contaminated soil together with the washing solution containing potassium salts of humic acids and chitosan is introduced into the attrition chamber, inclined at 1° with respect to the horizontal plane. The stirring of the mixture in the attrition chamber is performed with 12 mixing blades arranged on a rotating shaft and inclined at 3° with respect to the rotating shaft. The rotating shaft is driven by an electric motor. This decontamination process and equipment for washing of heavy metal polluted soils ensures a high contact of the soil particles with the washing solution, which leads to high efficiency. By using this process and equipment the need for soil sorting on small particle size prior the decontamination is eliminated, and it is also an ecological process due to the nature of the washing agents used.</p>
Class no.	1

RO.20.	
Title EN	Sandwich panel based on hemp shives and fibers, and the modality of obtaining it
Authors	Iștoan Raluca, Tămaș-Gavrea Daniela-Roxana, Manea Daniela Lucia, Vasile Ovidiu
Institution	Technical University of Cluj-Napoca
Patent no.	Patent OSIM: RO133611 -B1/30.06.2021
Description EN	<p>The invention relates to a sandwich panel based on hemp shives and fibers, and the method to obtain it, which has the applicability in the construction sector. The sandwich panel is designed with three layers: a low-density core defined by the hemp waste fibers with a cement binder and a thin skin-layer bonded to each side, prepared from hemp shives, and hydrated lime-cement binder. The panel is used as a partition element with significant acoustic and thermal properties, and it archive a part of sustainable development requirements. The panel was analyzed in four ways: (a) without perforations, (b) with perforations of 1 cm diameter and 10% degree of perforation, (c) with perforations of 1 cm diameter and 20% degree of perforation (d) with perforations of 1 cm diameter and 30% degree of perforation.</p> <p>The physical characteristics of the sandwich panel are:</p> <p>(a) without perforations: sound absorption coefficient $\alpha_{\max} = 0.56$ at 350 Hz, thermal conductivity $\lambda = 0.068$ [W/mK], density $\rho = 413$ [kg/m³].</p> <p>(b) with perforations: sound absorption coefficient $\alpha > 0,80$ on the range frequencies between 650 - 1080 Hz, with $\alpha_{\max} = 0,97$ (810 - 860 Hz)</p> <p>(c) with perforations: sound absorption coefficient $\alpha > 0,80$ on the range frequencies between 970 - 1350 Hz, with $\alpha_{\max} = 0,85$ (1090 - 1200 Hz)</p> <p>(d) with perforations: sound absorption coefficient $\alpha > 0,80$ on the range frequencies between 880 - 1740 Hz, with $\alpha_{\max} = 0,95$ (1140 - 1250 Hz)</p>
Class no.	7

RO.21.	
Title EN	Eco- innovative concrete based on cement and recycled waste glass and PET (polyethylene terephthalate) for applications in construction "BESTIPET"
Authors	Corbu Ofelia-Cornelia, Szilagyi Henriette, Pirgariu Gabriel

Institution	Technical University of Cluj-Napoca
Patent no.	Patent OSIM: RO133833 -B1/29.04.2021
Description EN	The invention relates to the obtaining of a new eco-innovative, sustainable concrete, based on cement and recycled waste in the form of artificial glass aggregate and PET flakes (Polyethylene Terephthalate), as raw material, which successfully replace the non-renewable natural aggregates (waste involving high storage and storage costs). The eco-innovative concrete was made within the research-development-innovation project - "CHECKS OF INNOVATION" 266 CI / 2018 in order to develop the SMEs, where the beneficiary company, NEW NCR RECICLARE S.R.L. becomes the final recycler. The beneficiary of the research having the main activity object: collection, recovery of the waste and concrete products manufacturing, obtained the Technical Approval no. 001SC-02/635-2019 for alveolar concrete blocks for the purpose of commercialization.
Class no.	7

RO.22.

Title EN	Actuator with telescopic sliders
Authors	Năsui Vasile
Institution	Technical University of Cluj-Napoca
Patent no.	Patent OSIM: RO130517 -B1/30.07.2021
Description EN	Telescopic slide actuator is equipped with a gear motor that drives a transmission cable attached to a sliding support which slides another slide. The slide has a transmission cable that is connected to the body of the actuator lower branch and upper branch to the next slide. Extension mechanism is obtained by simultaneous translational motion of both runners with a race speed and increased, having a small size and constructive simplicity. Electromechanical linear actuators are superior to other elements of actuation or control of the movements of some mechanisms.
Class no.	5

RO.23.

Title EN	Family of parallel modular robots with active translation joints for sils surgery
Authors	Pîslă Doina Liana, Bîrlescu Iosif, Vaida Călin, Tucan Paul George Mihai, Gherman Bogdan George, Plitea Nicolae

Institution	Technical University of Cluj-Napoca
Patent no.	Patent application OSIM: A/00733/03.12.2021
Description EN	The present family of robots is designed for the single incision laparoscopic surgery, a type of minimally invasive surgery where the surgical instruments are inserted within the operating field through a single trocar. The main feature of this family of robots is the use of parallel modules with 6-DOF (degrees of freedom) for the positioning of a mobile platform that guides the laparoscope. The mobile platform holds (mounted) two orientation platforms with 3-DOF for the surgical instruments. The first solution of the family represents a 6-DOF parallel robot with rectangular frame and three identical kinematic chains, two of which are positioned vertically and the third in a horizontal position. The second solution represents a 6-DOF parallel robot with triangular frame and three identical kinematic chains mounted in a horizontal plane using a triangular configuration.
Class no.	4

RO.24.

Title EN	Family of modular robots for sils surgery with kinematic constraint of the insertion point in the body
Authors	Vaida Călin, Pîslă Doina Liana, Bîrlescu Iosif, Gherman Bogdan George, Tucan Paul George Mihai, Plitea Nicolae
Institution	Technical University of Cluj-Napoca
Patent no.	Patent application OSIM: A/00734/03.12.2021
Description EN	The present invention relates to a family of hybrid robotic systems designed for single incision laparoscopic surgery, which is a type of minimally invasive surgery, where all the surgical instruments are inserted through a single trocar. The main feature of this family of robots is the use of a cartesian module with 3-DOF (degrees of freedom) for the positioning of the mobile platform, which in turn holds (mounted) three platforms with 3-DOF for the surgical instruments' orientation. The first solution of the family is a robotic system composed of a Cartesian module and three parallelogram modules for the instruments orientations. The second solution of the uses the same Cartesian positioning module and three spherical modules for the orientation of the instruments.
Class no.	4

RO.25.	
Title EN	ToF Normal estimation for pulse based ToF camera using CNN
Authors	Szilard Molnar, Levente Tamas
Institution	Technical University of Cluj-Napoca
Patent no.	Patent application OSIM: A/00559/17.09.2021
Description EN	A system and method for automatically computing spatial surface normals in 3D data from the pulse based Time-of-Flight(ToF) cameras is provided. Moreover, the system comprises a component which is using convolutional neural network (CNN) for computing the normals of a 3D pointcloud sensed and returned from the ToF camera depth images. The CNN is based on the 3 channel composition of information which is trained on a large real and synthetic dataset, for which an automatic 3D point processing chain is used to determine the normals. During the evaluation mode, the CNN is able to compute the normals of the pointcloud from the ToF camera, ensuring a fast and robust normal estimation for the pointclouds.
Class no.	10
RO.26.	
Title EN	MPI Planar correction of pulse based ToF camera using CNN
Authors	Marian-Leontin Pop, Levente Tamas
Institution	Technical University of Cluj-Napoca
Patent no.	Patent application OSIM: A/00560/17.09.2021
Description EN	A system and method for automatically eliminating the multi-path interference on planar surfaces caused artifacts for the pulse based Time-of-Flight(ToF) cameras is provided. Moreover, the system comprises a component which is using convolutional neural network (CNN) for the elimination of the artifacts sensed and returned from the ToF camera depth images. The CNN is based on the 3 channel composition of information which is trained on a large real and synthetic dataset, for which an automatic 3D point processing chain is extracting and marking the correct ground planar information. During the evaluation mode, the CNN is able to correct in a seamless manner the artifacts on the planar patches from the ToF camera, ensuring a reduced MPI.
Class no.	10

RO.27.	
Title EN	Automatic thermal management device of a battery that equips an electric vehicle
Authors	Mariasiu Florin, Buidin I.C. Thomas
Institution	Technical University of Cluj-Napoca
Patent no.	Patent application OSIM: A/00403/14.07.2021
Description EN	The problem solved by the invention of the automatic thermal management device of a battery equipped with an electric vehicle is the maintenance of a predetermined temperature (desired by the manufacturer according to the dynamic performance of the electric vehicle) inside the battery housing by natural ventilation (with air from external environment) of the electrochemical cells, due to adjustable ventilation slots as opening according to the thermal stress inside the battery housing.
	The automatic thermal management device of a battery equipped with an electric vehicle is characterized in that the opening or closing of the ventilation slots is done sequentially by a bimetallic lever, depending on the temperature inside the battery, without external energy consumption.
Class no.	8
RO.28.	
Title EN	Soil stabilization with plastic waste materials (PET)
Authors	Ana-Maria Trîmbițaș (Urian), Nicoleta Maria Ilieș, Andor Csongor Nagy, Ovidiu Nemeș
Institution	Technical University of Cluj-Napoca
Patent no.	Patent pending
Description EN	Nowadays, the researchers are trying to find innovative solutions for the reuse of different types of wastes generated by living or by different industries. Wastes like tire shreds, glass fibers, polypropylene, polyester, polyethylene are mixed with soil in order to obtain an increase on the shear parameters.
	The aim of this research is to observe the variation of the shear parameters for clay mixed with polyethylene terephthalate waste. To investigate the effects of polyethylene waste on the strength of the soil, a series of test have been performed on the mixture. The initial experimental results show that there is a significant improvement on the shear parameters. This increase is depending on the amount of waste plastic added to the clay.
Class no.	7

RO.29.	
Title EN	Innovative use of sheep wool for obtaining new materials with sound-absorbing properties
Authors	Simona Ioana Borlea (Mureșan), Ancuța-Elena Tiuc, Ovidiu Nemeș
Institution	Technical University of Cluj-Napoca
Patent no.	Patent pending
Description EN	<p>The aim of this study is to obtain new materials with sound absorbing properties using the sheep's wool as raw material. Seven new materials were obtained by hot pressing ($60 \div 80$ °C and $0.05 \div 6$ MPa) of wool fibers and one by cold pressing. Results shown that by the simply hot pressing of the wool, a new product is obtained which can be processed and easily manipulated. The obtained materials have very good sound absorption properties with acoustic absorption coefficient values over 0.7 for the frequency range $800 \div 3150$ Hz; the results prove that the sheep wool has a comparable sound absorption performance to that of mineral wool or recycled polyurethane foam. Hot pressed materials have a much higher density than cold pressed materials. The density of materials made from hot pressed sheep's wool increases with increasing pressure.</p>
Class no.	7
RO.30.	
Title EN	Strengthening the built heritage with modern solutions
Authors	M. eng. Kis Alpár-Sándor
Institution	Technical University of Cluj-Napoca
Patent no.	Patent pending
Description EN	<p>The history of building technology shows that before the classical mechanical theories, the construction of monumental buildings was based on empirical considerations, similarities with natural forms, intuition and centuries of building experience, older models of structures that performed well during their period of use, elementary geometrical and constructive rules and basic mechanical models.</p> <p>The age of computers has opened up new horizons for the possibility of expanding the range of techniques and materials used to rehabilitate historic buildings. New experimental methods and numerical analysis calculations</p>

make it possible to solve complex problems that previously could not be dealt with, thus making it possible to develop modern techniques and materials for the rehabilitation of historic buildings.

Having strict legislative requirements to minimize the impact of the whole rehabilitation process on the historic monument status of buildings, due to the need to carry out complex works with short implementation deadlines imposed without the possibility of exceeding the allocated budget, modern alternative methods are highly sought after. The techniques, systems and materials for rehabilitation developed nowadays represent the future in the field as:

- They are non-invasive, allowing the possibility of preserving the original architectural and structural configuration of the building;
- They are versatile, so they can be adapted according to structural needs;
- They can be customized to each type of historical material;
- They do not increase the structure's own weight, thanks to their low weight;

They can be carried out quickly without costly equipment with low skilled personnel while causing minimal disturbance.

Class no.

7

“Gheorghe Asachi” Technical University of Iasi

RO.31.

Title EN

**INTEGRATING ENVIRONMENTAL
BIOREMEDIATION WITH BIOMASS VALORIZATION
AND CRITICAL RAW MATERIALS RECOVERY BY
PHYTOMINING (PHYTOMIN)**

<http://phytomin.3host.ro>

Authors

Prof.univ.dr.eng. Maria Gavrilescu (Project Director);

Members Research Team: Laura Bulgariu, Dan Alexandru Gavrilescu, Mariana Diaconu, Petronela Cozma, Raluca-Maria Hlihor, Isabela-Maria Simion, Elena-Diana Ungureanu-Comăniță, Maria Apostol, Mariana Minuț, Ionela Cătălina Vasilachi, Maria Paiu

Institution

”Gheorghe Asachi” Technical University of Iasi, Romania

”Cristofor Simionescu” Faculty of Chemical Engineering and Environmental Protection

Description
EN

The project **PHYTOMIN** aims to **develop an experimental demonstration process** working as an integrated system, by exploring and demonstrating innovative, integrated and eco-efficient solutions based on **secondary raw materials extraction by an *in situ* phytomining approach for the recovery of high-value and critical metals from sub-economic sources represented by polluted sites together with their concurrent bioremediation.** The project will use selected plants to phytoextract and bioaccumulate heavy metals from soils, followed by biomass harvesting and valorization, and metal recovery by appropriate methods (thermal or chemical extraction from biomass). **PHYTOMIN** will develop and validate a global innovative and integrated laboratory process and model able to cope with the cleaning up and restoration of every possible contaminated soil or agriculture land, by combining innovative solutions, methods and technologies specific to environmental engineering and management, coupled with advanced modeling, optimization and simulation.

The fundamental objective of **PHYTOMIN** project is connected to the concept of circular economy and has the potential to generate **new business opportunities** that aim both for the recovery of (high value, critical) metals, ensuring **the use of secondary resources that can then be reused in other production processes, as well as the remediation of some sites**, which can be rendered to the agricultural circuit. **PHYTOMIN** is expected to result in a **feasible experimentally advanced solution materialized by the development and validation of a laboratory technology with**

high potential for scale-up at pilot scale, which will allow the recovery of high-value metals from various sources as polluted soils, waste dumping sites.

Class no.

RO.32.

Title EN

Absorption of Cu (II) ions from aqueous media using lavender waste as biosorbent

Authors

Alexandra Tanasă, Adrian Catalin Puitel, Daniela Şuteu *

Institution

Technical University “Gheorghe Asachi”, Iasi, Faculty of Chemical Engineering and Environmental Protection “Cristofor Simionescu”

**Description
EN**

Significant amounts of waste resulting from agro-industrial processing can be used in various processes such as: digestion processes, extraction of useful products or use as biosorbents in wastewater treatment.

This paper presents the preliminary experimental results of the lavender wastes - results after extraction of lavender essential oil by steam distillation, for the removal of Cu (II) ions from aqueous media.

There were studied the influence of main operational parameters (i.e. pH, temperature, contact time, biosorbent dose, metallic ion concentration) on the biosorption process efficiency. Also, the sorption isotherms were drawn, which show the influence of temperature and the initial concentration of the metal species on the process and which allow the calculation of the quantitative quantities characteristic of the process. The processing of sorption isotherms will also allow the drawing of preliminary conclusions regarding the biosorption mechanism.

RO.33.

Title EN

Biosorbents based on the residual biomass of *Saccharomyces pastorianus* for the recovery of Methylene blue cationic dyes from aqueous media

Authors

Alexandra Tanasă, Alexandra Cristina Blaga, Carmen Zaharia, Daniela Şuteu

Institution

Technical University “Gheorghe Asachi”, Iasi, Faculty of Chemical Engineering and Environmental Protection “Cristofor Simionescu”

**Description
EN**

The use of industrial residual biomass as a biosorbent is a direction considered in the context of circular economy and sustainable development principles. The aim of this study is to investigate the biosorptive properties of *Saccharomyces*

pastorianus (*S. pastorianus*) microbial residual biomass. The *S. pastorianus* cells, resulting as by-product from beer manufacturing process, was immobilized and encapsulated in sodium [alginate and was used as biosorbent for the removal of Methylene Blue \(cationic dye\)](#) in a batch system, from aqueous solutions. In order to evaluate the biosorptive potential, the influence of certain physical parameters such as temperature, pH solution, amount of biosorbent, dye concentration and phases contact time were investigated in case of batch biosorption process of Methylene Blue dye.

Class no.

The obtained results confirm that the studied residual biomass encapsulated and immobilized in sodium alginate could be considered as new efficient type of biosorbents and considered as applicable in the retention of textile dyes in industrial effluents before their discharge into sewage systems. These results constitute the base for further studies aimed at deepening the knowledge of biosorption processes with biosorption equilibrium modeling, thermodynamic calculations and kinetic studies to establish the biosorption mechanism, as well as identifying optimal conditions for use in industrial processes.

This work was supported by a Grant of The Romanian Ministry of Research and Innovation, CCDI-UEFISCDI, project number PN-III-P2-2.1-PED-2019-1063, within PNCDI III.

RO.34.**Title EN**

Antioxidant Scavenging of O/W Emulsion Based on N-Prolyl Palmitoyl Tripeptide-56 Acetate and Bakuchiol Complex

Authors

Simona Barna¹, Claudia Maxim¹, Adriana Trifan², Andreea - Nicoleta Verdeș¹, Delia Turcov¹ and Daniela Șuteu¹

Institution

¹“Gheorghe Asachi” Technical University of Iasi, Faculty of Chemical Engineering and Environmental Protection, Iași, România

² University of Medicine and Pharmacy ”Grigore T. Popa”, Faculty of Pharmacy, Department of Pharmacognosy, Iasi, Romania

Description EN

The objective of this study was to evaluate antioxidant activity of a pharmaceutical O/W emulsions containing a synergistic biologically active complex based on a plant-derived meroterpene phenol, bakuchiol (BAK) [1- (4-hydroxyphenyl) - 3,7- dimethyl-3-vinyl-1,6-octadiene] and a peptide as a n-prolyl

palmitoyl tripeptide-56 acetate (TPA) and also to evaluate the optimal concentration of this active complex for skin application at the efficiency and the safety level of this complex. Bakuchiol is a active substance found in the species *Psoralea corylifolia* which exhibits antioxidant and antibacterial activity and it is an alternative to the retinoids. The n-prolyl palmitoyl tripeptide-56 acetate is a small peptide which has been reported to stimulate the production of elastin, fibronectin, glucosaminoglycan and collagens.

O/W emulsions were prepared using a non-ionic, non-ethoxylated emulsification system able to build-up anisotropic lamellar phases O/W from vegetal oils, by means of totally natural ingredients. As a dispersed phase, we use a mixt of vegetable oil and as a continuous phase *Lavandula latifolia* hydrosol. There were formulated three emulsions with different concentrations in active complex (0.5% BAK + 0.5% TPA, 1% BAK + 1% TPA, 1% BAK + 2% TPA). DPPH and ABTS assay was used to evaluate the antioxidant activity of the active complex (BAK /TPA) and of emulsions containing this biologically active complex.

The results suggested that the biologically active complex alone showed good antioxidant activity. This research confirmed that the proportions used for preparing emulsions with BAK and TPA are suitable for topical use due to their antioxidant effect and to the potential utilization in antiaging therapy.

RO.35.

Title EN	Obtaining plant extracts from the native spontaneous flora as a source of active principles for dermatocosmetic products
Authors	<u>Turcov Delia</u> ^{1*} , Barna Ana Simona ¹ , Adriana Trifan ² , Suteu Daniela ^{1*}
Institution	¹ Technical University "Gheorghe Asachi", Iasi, Faculty of Chemical Engineering and Environmental Protection "Cristofor Simionescu"
Description EN	² Faculty of Pharmacy, University of Medicine and Pharmacy "Grigore T. Popa" Iasi, 700115 Iasi, Romania
Class no.	Scientific medical literature continues to bring strong evidence about the link between free radicals and a large variety of pathologies, including some of century diseases: cancer, neurodegenerative and cardio-vascular pathology, inflammatory pathologies. Attention is drawn to the alarmingly increasing

oxidative stress, maintained by modern lifestyle and environment changes.

Therefore, antioxidant ingredients for food, pharmaceutical and dermatocosmetic industry attract special interest exerted on natural sources and safe, reliable and cost-effective extraction methods. Vegetal compounds bring valuable advantages like non-proteic, low-molecular ingredients, but also some important challenging points in terms of quality and safety standards of technology. Both spontaneous flora and cultures offers multiple possibilities of operation, with a technological potential not yet reached.

The aim of this paper is the study of alcoholic extracts obtained from plant grown in the area of Moldova (Romania): *Crocus sativus* L and [*Galium verum*](#) L using various liquid-solid extraction techniques (maceration, hot reflux extraction, ultrasound-assisted extraction). The vegetal extracts are characterized qualitatively (based on UV-VIS spectra and antioxidant action) and quantitatively, by determining the total content of polyphenols and flavonoids - compounds responsible for the antioxidant action. Some of the extracts were incorporated into commercial emulsions and preliminarily characterized by studying the stability according to a number of parameters.

The obtained results showed that the extracts obtained have a higher content of flavonoids than of polyphenols and antioxidant action, all these being in close dependence on the extraction technique and the parameters followed in the development of each process.

RO.36.

Title EN

New lithium salts with antidepressant action

Authors

Ștefanache Alina, Mocanu Anca Mihaela, Cernătescu Corina, Oniscu Corneliu

Institution

“Grigore T.Popa” University of Medicine and Pharmacy of Iasi, Faculty of Pharmacy

“Gheorghe Asachi” Technical University of Iasi, Faculty of “Cristofor Simionescu” Chemical Engineering and

Environmental Protection

Patent

RO130826/2019

Description EN

This patent invention relates to novel lithium salts of dimethylamidodisulfonyl-chloro /alkyl-alkyl-aryloxy-alkyl-carboxylic acids with antidepressant action and to a synthesis method for them. It is known that inorganic lithium salts (lithium carbonate and lithium halides) as well as lithium salts of some organic acids (lithium citrate, lithium orotate, lithium

aspartate) are used in therapy to treat depression and of other CNS disorders. The technical problem solved by this patent consists in the elaboration of a new method for obtaining lithium salts of dimethylamidodisulfonyl-chloro / alkyl-alkyl-aryloxy-alkyl-carboxylic acids, characterized by antidepressant action, low toxicity and high therapeutic effects, by using a nonpolluting technology, easy to make, as well as a low consumption of materials and a superior quality of the final products.

RO.37.**Title EN**

Methodology for producing and verifying therapeutic footwear by applying loading elements

Authors

Ghebuță Florea, Sârghe Bogdan, Costea Mariana, Mihai Aura

Institution

Gheorghe Asachi Technical University of Iasi

Patent

RO134086 (A2)

**Description
EN**

The invention relates to a method of producing and verifying therapeutic footwear. The method includes the steps for checking walking with an inshoe device, foot scanning, plantar footprint, anthropometric and biomechanical data processing, 3D footwear modelling, 3D visualization and customer approval of the 3D model, 2D footwear design, therapeutic component modelling, manufacture of footwear and therapeutic components 1, verification of walking with inner device and footwear and therapeutic components 1, modification and adjustment of footwear and therapeutic components 1, manufacture of footwear and therapeutic components 2, verification of walking with inner device and footwear and therapeutic components 2.

Class no.

9

RO.38.**Title EN**

Method for calibrating plantar pressures by correlating pressure values and corresponding colours from the source image and the target image

Authors

Necula Lucian, Costea Mariana, Sarghie Bogdan Theodor, Mihai Aura, Ghebuta Florea

Institution

Gheorghe Asachi Technical University of Iasi

Patent

RO134658 (A2)

**Description
EN**

The invention relates to a method of calibrating plantar pressures by correlating the values of the corresponding pressures and colours from a source image with those from an image

considered standard. The results obtained using the methodology proposed in this patent support the use of neural networks to make colour predictions in order to obtain the isobaric representation of a colour image obtained using a desktop colour scanner.

Class no.

9

RO.39.

Title EN

DicSHOEnary-Language guide for footwear and leather industry, 2020-1-TR01-KA202-092689

Authors

Mariana Costea, Aura Mihai, Arina Seul

Institution

Gheorghe Asachi Technical University of Iasi

The objective of the project is to increase language skills, level of professional education, flexibility and increased employability in the footwear sector.

Description

EN

The main goal of this project is to create a multilingual database (vocational terminology) available for the footwear sector, to promote innovation in the field and for efficient collaboration. A list of vocabulary words and definitions related to footwear will be added, including terms about quality, new technologies, managerial activities, sales, etc.

RO.40.

Title EN

DigitalFABLAB-Footwear virtual learning by doing - Transition from analogue practices to digital education, 2020-1-PT01-KA226-VET-094924

Authors

Mariana Costea, Aura Mihai, Arina Seul

Institution

Gheorghe Asachi Technical University of Iasi

The objective of the project is to achieve the following results:

- Joint digital international course "Training through virtual practice" for footwear manufacturing, fully anchored in digital strategies.

Description

EN

- Virtual laboratory for footwear and corresponding contents in Augmented Reality (AR). It also includes a course for trainers, teachers and instructors on how to use tools to develop innovative and engaging content in AR.

- Common training methodology for augmented reality (RA) learning itineraries that includes textbooks for teachers, instructors and trainees, and training opportunities for end-users.

RO.41.

Title EN **REILEAP- Reinforcing capacities of HEIs for leather products in Uzbekistan-Kazakhstan**

Authors Aura Mihai, Bogdan Rusu, Arina Seul, Mariana Costea

Institution **Gheorghe Asachi Technical University of Iasi**

Description EN

The REILEAP project aims to fill the gap in the area of specialized services for the leather sector with the establishment of Leather centres in Uzbekistan and Kazakhstan utilizing the experience and expertise of EU partners in the area of services for the leather and leather products sector, which includes all materials and products, from untreated skins to the final product, like footwear, accessories, and clothing sector, which are indispensable to innovate and produce high-added value products. The project aims to enhance the modernisation and competitiveness of the EU Textile, Clothing, Leather, and Footwear (TCLF) sectors through the development of a sustainable upskilling and reskilling strategy, which is supported by a communication campaign to attract social, economic and political actors.

RO.42.

Title EN **LEIA - Innovative Training for the Leather Goods sector across Europe**

Authors Aura Mihai, Arina Seul, Alexandra Bodoga, Mariana Costea

Institution **Gheorghe Asachi Technical University of Iasi**

Description EN

The project envisages to design, develop and pilot a new profile and training opportunities in ICT and work-based learning combined with trainers/learners mobility actions, in line with the actual needs of the companies and mainstream it at European and National level, boosting the sector workforce upskill, promoting the entrepreneurship of new talent designers and the development of a new generation of high-skilled leather goods manufacturers, oriented to high-end products to strengthen the high-end leather goods manufacturing across Europe.

RO.43.

Title EN **DiaSHOE - Digital Education for Diabetic Foot Control**

Authors Aura Mihai, Mariana Costea, Arina Seul

Institution **Gheorghe Asachi Technical University of Iasi**

Description EN The project's overall aim is to inform and guide footwear manufacturers, patients, informal caregivers, healthcare workers,

and shoe-store clerks to best to tackle this issue through prevention and skills development.

The project will produce 3 Digital Education Packages for different target groups:

- Digital Education Package for designers, footwear technicians, and product managers
- Digital Education Package for health technicians and shoe shop assistants
- Self-care Digital Education Package targeting patients, their families, informal caregivers, and school teachers/educators.

RO.44.

Title EN	HYBRID MECHATRONIC SYSTEM - NEUROPROSTHESIS FOR ARM RECOVERY IN PATIENTS WITH NEUROMOTOR IMPAIRMENT
Authors	Poboroniuc Marian-Silviu, Bulboaca Angelo, Irimia Danut-Constantin, Bulboaca Adriana, Olaru Radu
Institution	GHEORGHE ASACHI Technical University of Iasi, Faculty of Electrical Engineering / Rehabilitation Hospital of Cluj-Napoca
Patent	RO130961/30.08.2021

Description EN

The proposed hybrid exoskeleton&FES device supports combined motions at the entire arm level and works towards recovering main control at the arm level, for stroke patients. Based on a kinematic model of the upper limb, and the planned electrodes placement over the upper limb, to provide Functional Electrical Stimulation (FES), the exoskeleton (see pictures) has been configured for easiness in donning and doffing, anatomic adaptation and actuation system to satisfy the required torques. The control strategy is based on the kinematic model of the exoskeleton. Limited clinical trials have been already performed and have proven the device effectiveness. The main advantage of the proposed rehabilitation device is the combination of electrical stimulation of muscles with exoskeleton, promising a better recovery of arm movements in stroke patients (Acknowledgement: UEFISCDI grants: 25PTE/2020, 180/2012).

RO.45.

Title EN	Transducer for Converting Breathing Movements into Electrical Signals
Authors	Cristian Foşalău, Cristian Zet
Institution	“Gheorghe Asachi” Technical University of Iaşi, Romania
Patent	Patent application No. A00068/2022
Description EN	<p>The invention refers to a transducer devoted to measuring and monitoring respiration by converting movements due to chest breathing into electrical signal. The transducer works on the principle of varying the impedance of an amorphous magnetic wire by the stressimpedance effect under the action of a force produced by the movements due to respiration.</p> <p>The sensitive elements consist of four amorphous magnetic wires of CoxFeySizBt composition mounted in parallel directions, being subjected to the action of forces caused by chest movements. The sensitive elements are electrically mounted in a bridge configuration supplied with alternating current of a certain frequency, thus assuring a high sensitivity for the transducer and also immunity to disturbing magnetic fields. The transducer is attached, via a flexible belt, around the subject's chest. The chest movements produce, through the flexible belt, a force on the active elements proportional to the amplitude of the movement which in turn causes variations in the impedance of the active elements and, finally, an electrical signal at the bridge terminals. The detected alternating signal is further applied to appropriate electronic processing circuits and transformed into a continuous signal proportional to the amplitude of the breath.</p> <p>The advantages of the invention are very good sensitivity, high signal-to-noise ratio, robustness and low price,</p> <p>As applications, the transducer may be useful for people who perform physical maintenance activities, for diagnosing patients with respiratory diseases, for assessing physical performance of sportsmen or for assessing the stress state of a person who carries out intense activities like driving.</p>

RO.46.

Title EN	Brain computer interface to control a humanoid/mechanical robot
Authors	Mitocaru Alexandru, Poboroniuc Marian Silviu, Irimia Danut-Constantin
Institution	GHEORGHE ASACHI Technical University of Iasi,

Faculty of Electrical Engineering**Description
EN**

A Brain Computer-Interface is a revolutionary control method that utilizes the electrical potentials that are naturally present in the human brain. While it may not be a new input device anymore, having already been widely used in research laboratories, its use as an input device is still in its infancy. The present paper aims to present the results of a system that employs a Brain-Computer Interface to control the humanoid robot NAO from Softbanks Robotics. The Brain Computer Interface uses the P300 paradigm to detect changes in the Electroencephalogram that appear as a result to the appearance of an external stimulus.

The application could help those patients with advanced stages of neuromotor disorders such as cerebral palsy or amyotrophic lateral sclerosis (ALS) that have lost part of their ability to control parts of their bodies, or even bring to life the idea of controlling a robot as a video-game avatar.

RO.47.**Title EN**

The importance of Monte Carlo - based technologies in operational management

Authors

Adrian Vilcu¹, Ionuț Viorel Herghiligiu¹, Ioan-Bogdan Robu²

Institution

¹ **Gheorhe Asachi Technical University of Iași**

² **Alexandru Ioan Cuza University of Iasi**

**Description
EN**

The research focuses on the study of the importance of the Monte Carlo (MC) probabilistic method in solving operational management problems. MC is a numerical method that simulates physical processes by the probabilistic phenomenon with known statistical parameters. It is a simple method based on the law of large numbers (formulated by Jakob Bernoulli) for random variables. The Monte Carlo method generates random numbers according to known statistical distributions whose values satisfy the constraints of solving problems. The applicability of the MC method is remarkable: statistics and probability theory, the field of reliability of technical systems, operational management issues with discrete optimization functions, problems in the areas of physics, chemistry and finance. When transfer functions for problems that define complex phenomena cannot be expressed by mathematical expressions or are difficult to determine, MC is the method that can investigate the effects of variations of independent variables

on dependent variables. Thus a technical or economic process described by an input/output model can be equated to a statistical model that can be solved by the MC method. The research studies a mathematical and statistical modelled technical system and compares the results obtained by the MC method with other methods (mathematical, evolutionary, artificial intelligence) applied to these models. The quality of the results and the need to use an MC method instead of a classical mathematical model will be analysed.

RO.48.**Title EN****PICK AND PLACE ROBOTIC SYSTEM**

Țica Narcis-Ioan, Nistor Mihai, Cocea-Lionescu Constantin, Manda Andrei-Virgil

Authors

Students 1st year, Master degree specialization: Applied Fluid Mechanics, Faculty of Machine Manufacturing and Industrial Management

Dănuț Zahariea, Professor, Department of Fluid Mechanics, Fluid Machinery and Fluid Power Systems

Institution**Technical University “Gheorghe Asachi” of Iași**

Faculty of Machine Manufacturing and Industrial Management

This research project will present a pick-and-place robotic system that was built using building blocks from the LEGO Mindstorms Education EV3 Core Set.

The pick-and-place robotic system is composed by the following main components: the robotic arm, the conveyor system, the quality control system, the safety system, the robotic control system, and the video-monitoring system.

Description EN

The principal application for which this pick-and-place robotic system has been designed is the inspection of the products moving on a conveyor belt from different phases of production. The good products will reach the next, or final production phase, while the defective products will be detected and removed from the conveyor belt before it reaches the next production phase. Given the global situation generated by the COVID 19 pandemic, when we say defective or good products, we can also think of products contaminated or not with different viruses and pathogens..

RO.49.

Title EN	ROBOTOOL Mobile Robot Teșu Ionuț Gabriel, Apur Ovidiu-Adi, Grasu Constantin, Bodescu Emilian
Authors	Students 3 rd year, Bachelor degree specialization: Fluid Machines and Systems, Faculty of Machine Manufacturing and Industrial Management Dănuț Zahariaea , Professor, Department of Fluid Mechanics, Fluid Machinery and Fluid Power Systems
Institution	Technical University “Gheorghe Asachi” of Iași Faculty of Machine Manufacturing and Industrial Management The ROBOTOOL Mobile Robot was built using LEGO Mindstorms Education EV3 Core Set. The main components of this robot are: <ol style="list-style-type: none"> 1. The robotic control system. 2. The propulsion system consisting of two electric motors. 3. The video-monitoring system composed by a video camera operated by a third electric motor by means of a two-stage gear reducer.
Description EN	The main functions of this robot are: <ol style="list-style-type: none"> 1. Access to dangerous areas, with a high degree of industrial, chemical, bacteriological and radioactive hazard. 2. Remote control function using a smartphone. 3. Real-time video monitoring function with a remotely operated 360-degree surveillance video camera with real-time video signal transmission to a tablet. The main application of this robot is: Ground mobile video surveillance systems for rescue & security operations.

RO.50.

Title EN	Customized adjustable total temporomandibular prosthesis for children suffering from ankylosis
Authors	Adrian-Gabriel Ionescu, Neculai-Eugen Seghedin
Institution	Universitatea Tehnica "Gheorghe Asachi" Iași
Patent	RO133813A2 / Patent application No. 00515/2018 The invention consists of a customized total temporomandibular prosthesis that can adjust the mandibular complex after unilateral or bilateral joint disarticulation due to severe, recurrent ankylosis primarily in the case of growing patients.
Description EN	

The first component of the prosthesis is the component of the

mandibular branch made from Titanium alloy that follows the anatomical shape of the mandible. Superior, parallel to the condylectomy plane, contains a flat surface for a stable attach of the condylar capsule component and a fixing system that allows easy installation and subsequent change.

The capsule component contains a rack and pinion mechanism disposed within a specific angle according to a growth vector of the current age segment and allows the external action with a minimal abord.

The condylar head component mimics the anatomical shape of the condyle and is articulated with the lower surface of the fossa component made of high-density polyethylene which shape is generated by the path described by the rotation and translation movements of the components over the maximum opening and closing of the jaw.

Thus, on screwing the pinion from the exterior, the rack is driven upwards within the maximum rack path and elongates the mandibular branch.

The invention can be exploited industrially to manage severe-recurrent ankylosis in the case of growing children by implanting an adjustable minimally invasive driven temporomandibular prosthesis.

RO.51.

Title EN	Intelligent system for conception and design of the optimal support solutions for technological devices based on fuzzy approach techniques
Authors	Neculai Eugen Seghedin, Marius Pislaru, Dragos-Florin Chitariu
Institution	"Gheorghe Asachi" Technical University of Iași
Description EN	The choice of the optimal constructive-functional variants of supports, from the possible ones, must be made on the basis of value analyzes, using systems of criteria that start, mainly, from the advantages and disadvantages of each of the variants. The project aims to develop an expert system of performance indicators, based on fuzzy modelling techniques, which can be implemented in industrial firms for monitoring the performance indicators that can contribute to an optimal design of support variant. For situations which are difficult to be approached by means of traditional modelling techniques there are proposed, as viable alternatives, the modelling techniques based on fuzzy logic.

As a consequence, the goal of this research is to develop an integrated framework for using fuzzy logic with the purpose of determining the specific support design parameters, and also of ensuring an increased adaptability of the industrial firm to the technological environment.

In this field, the fuzzy modelling approach is very new and involves defining, delineating and analyzing the system which will perform the pre-defined functions. These functions will result from the architecture of the proposed system of design support variant indicators.

The research theme originality consists in developing an integrated framework that combines the advantages provided by fuzzy techniques in order to develop specific solutions to support innovative policies for design of technological devices.

In establishing / selection of the optimal variants for clamping fixtures and various subassemblies, both quantifiable criteria and subjectively expressed criteria can be used, with the help of natural language. In this case, in order to reduce the degree of uncertainty related to establishing the optimal variants of clamping fixtures, specific elements of fuzzy logic can be used.

RO.52.

Title EN

Hydroabrasive wear test system of metallic materials used in hydraulic machines

Authors

Cătălin-Andrei Țugui, Petrică Vizureanu, Andrei Victor Sandu

Institution

„Gheorghe Asachi” Technical University of Iasi

Patent

RO 135607 A2

Description EN

The present invention relates to an installation for hydroabrasive wear testing of metallic materials used in hydraulic machines, which operates in environments with combined stresses, of water and abrasive particles, of materials used in the construction of pumps, hydraulic turbines, etc. which allows adjusting the position of the samples and varying the percentage of abrasive particles in the total amount of water. The installation for hydroabrasive wear testing of materials has the advantage of combining several types of settings for testing samples in water with different concentrations of abrasive particles. The specimens are subjected to the process of testing for hydroabrasive wear to establish the approximate number of operating hours of a part (turbine blade), until the moment when the resistance to hydroabrasive wear decrease, and finally, the failure of material occur.

University Politehnica of Timișoara

RO.53.

Title EN	SELF-ADAPTIVE GEARBOX FOR PEDAL VEHICLES
Authors	Romeo CĂTĂLINOIU, Sorin-Aurel RAȚIU, Imre-Zsolt MIKLOS
Institution	University Politehnica of Timișoara, Faculty of Engineering Hunedoara
Patent	Patent application No. A/00007/2022

Description EN

The invention relates to a gearbox intended to ensure the propulsion of a recreational transport vehicle: (bicycles, pedal boats, tricycles, pedal carts, mopeds), in order to reduce energy consumption during cycling.

At the current stage of construction solutions, the propulsion of vehicles with pedal mechanism is achieved by means of a chain transmission between two sprockets, which requires the cyclist to periodically select a certain gear (a certain gear ratio), depending on road conditions, in the goal of overcoming the resistant moment as easily as possible.

The present invention eliminates this disadvantage by introducing in the transmission assembly a self-adaptive gearbox that allows continuous variation of the transmission ratio depending on the value of the resistive torque (M_c).

In terms of value, the transmission ratio can vary between two fixed values, chosen constructively, so that the driver does not have to change the transmission ratios very often, the pedaling rhythm becoming much lighter.

RO.54.

Title EN	Device for Determining the Value of Large Diameters
Authors	Gabriel Nicolae Popa, Corina Maria Diniș, Iosif Popa
Institution	Faculty of Engineering Hunedoara, Politehnica University of Timișoara
Patent	RO 131654/30.06.2021

Description EN

The device for measuring parts of large inner or outer diameters is formed by a rectangular metal frame, four metal arms having the same height, a comparator, which can be mechanical or with digital display, with the non-linear scale dial (for the mechanical comparator), from a movable rod with a ball contact piece at the end. The non-linear scale has

two areas: for measuring the inside diameters (concave surfaces) and for measuring the outside diameters (convex surfaces). The comparator is mounted in the center of the rectangle (at the intersection of the diagonals) of the support of the measuring device.

RO.55.

Title EN	Economical System for Automatic Adjustment of the Power Factor, with Capacitor Banks, in Three-Phase Low-Voltage Installations
Authors	Gabriel Nicolae Popa, Corina Maria Diniş, Iosif Popa
Institution	Faculty of Engineering Hunedoara, Politehnica University of Timișoara
Patent	A/00491/04.08.2020
Description EN	The invention relates to an economical system for automatic regulation of the power factor with capacitor banks in three-phase low-voltage installations. The technical problem is the realization of an economical system of automatic regulation of the power factor, with capacitor banks, from three-phase low voltage installations, which uses a three-phase solid state relay common to all stages of capacitor banks to improve the power factor in three-phase low-voltage installations. It consists of a current transformer (which measures current in a phase), a VAR-metric controller with microprocessor, two small capacity PLCs, a three-phase solid state relay, twelve electromagnetic contactors and six capacitor banks.

RO.56.

Title EN	Electronic Time Relay with All Usual Functions
Authors	Gabriel Nicolae Popa, Iosif Popa, Sorin Ioan Deaconu
Institution	Faculty of Engineering Hunedoara, Politehnica University of Timișoara
Patent	RO 129042/28.10.2016
Description EN	The electronic time relay with all usual functions performs, depending on the position of some setting switches, the delay of the attraction or the release or the retention in the attracted state for a certain time or the delay of the attraction or the release of the electromagnetic relay's mobile armature, the electronic relay having usual logic gates and three AND-NOR gates performing with the setting switches, an electronic switch, through which the control is transmitted

from an external electrical contact to the electromagnetic relay, the delays being realized by means of two time electronic circuits made of resistors, capacitors and diodes.

RO.57.**Title EN****Dry Cylindrical Type Electrostatic Precipitator with Parallelepiped Housing****Authors**

Gabriel Nicolae Popa

Institution**Faculty of Engineering Hunedoara, Politehnica University of Timișoara****Patent**

A/00399/20.06.2017

**Description
EN**

The invention relates to a dry cylindrical type electrostatic precipitator with a parallelepiped housing, according to the invention, for low power plants that used fossil fuels or dry wood. The first two sections work on the electrostatic principle. The precipitator consists at the bottom, a gas distributor, two electric sections connected in series (without changing the gas flow), used to collect dust particles with larger diameters, which can be supplied from two high voltage sources, which can operate at different voltage levels, and even with different forms of voltage. The collecting electrodes are cylindrical type and the discharge electrodes can be uninsulated or insulated. The third collection section consists of an electrostatically charged fiber filter for collecting small particles.

RO.58.**Title EN****Procedure for the drinking water treatment****Authors**

Florica Manea, Katalin Bodor, Ilie Vlaicu, Nicoleta Lungar, Aniela Pop, Rodica Pode

Institution**Politehnica University of Timisoara/AQUATIM COMPANY****Patent**

Patent application No. 132097/2021

**Description
EN**

The invention relates to a procedure for the advanced treatment of drinking water, for the treatment of industrial and waste effluents and for the treatment of municipal wastewater, based on a modular installation, which includes an electrolyzer equipped with boron-doped diamond electrodes. The application of the proposed process is based on the reactions obtained with boron-doped diamond electrodes, which can function both as an electrooxidation/electroreduction and electro-disinfection

process. The operation of the electrolyzer in the process of anodic oxidation by applying an appropriate polarity allows the removal of ammonium, nitrite and organic loading from the water. By simply changing the polarity of the electrolyzer, the conditions of a cathodic process are ensured, which allows the removal of nitrate from the water. The process for treating drinking water according to the invention has the following advantages: high degree of removal from the water of several types of pollutants / impurities (organic loading, ammonium, nitrite, nitrate, microorganisms), simple operation with the possibility of total automation and high versatility.

RO.59.**Title EN****Method for integrating real life assets in to the metaverse with real-time database security****Authors**

Andrei CRISAN

Institution**Politehnica University of Timisoara****Patent**

OSIM A / 00100 / 25.02.2022

The patent refers to the use of the digital twins of real-life 3D assets (e.g. buildings, details, statues, art, etc.) in a virtual environment that will allow for:

**Description
EN**

- Secure access to database.
- Realtime user interaction with the asset in the virtual space.
- Realtime user interaction in the virtual space.
- User contribution to information database.
- Create/transact NFTs.
- Online corporate meetings in historic setups.

RO.60.**Title EN**

Increasing the competitiveness of UPT by setting up the Center for Innovation and Technology Transfer
Politehnica 2020 - CITT Politehnica 2020 - Research project no. POR/824/1/1/140100 (7185/20.10.2021)

Authors

MARSAVINA Liviu, MIHAESCU Vlad, NEGREA Petru,
 BIRTOK-BANEASA Corneliu, BUDIUL BERGHIAN
 Adina, SIRBU Roxana

Institution**Politehnica University of Timișoara****Patent****Description****EN**

The growth of innovation in the West Region of Romania

(Timis County) can be achieved by establishing and operationalizing a Center for Innovation and Technology Transfer within the Polytechnic University of Timisoara.

The purpose of establishing this CITT is to provide support to innovation and technology transfer entities in areas of intelligent specialization, namely: Information and communication technologies, space and security, Eco-nano-technologies and advanced materials and Energy, environment and climate change.

The Innovation and Technology Transfer Center aims are:

- Increases the level of attractiveness for international research partnerships;
- Organize international events that contribute to improving the impact of the region at national and international level;
- Involves young researchers and PhD students in research projects;
- increases the managerial efficiency and the orientation towards concrete and timely results of the jointly developed projects;
- know-how regarding the transformation of the research results into market successes, respectively the bearing of the costs related to this approach.

RO.61.

Title EN

IMPLEMENTATION OF THE INDUSTRY 4.0 IN THE FESTO DIDACTIC EDUCATIONAL SYSTEMS MPS 203 - *Research project no. 9510/2018*

Authors

Gelu-Ovidiu TIRIAN

Institution

Faculty of Engineering Hunedoara, Politehnica University of Timișoara

Patent

**Description
EN**

When designing automated assembly systems according to the Industry 4.0 reference architecture, it is important to rely on them and try to implement them into devices and systems according to the Topdown model according to the Industry 4.0 reference architecture model. When designing automated assembly systems, it is possible to use several key elements of Industry 4.0, which belong to the basic nine technologies of Industry 4.0. The MPS® system 203 assembly system from Festo Didactic. One of the ways to achieve the goals of Industry 4.0 to produce products

customized in one-piece batches is to have machines, equipment, and assembly cells designed so that the entire assembly system is flexible, which is also defined by the reference architecture. Production resources must therefore be modularized. The entire assembly system is created in a decentralized manner, where the individual modules are designed as a separate cyber-physical system, a mechatronic system with its own control system and connectivity.

RO.62.

Title EN	The influence of the air filter location on the intake system temperature in the case of engines for drift cars - <i>PhD Thesis</i>
Authors	Birtok Baneasa Corneliu, Budiul Berghian Adina, Stoica Diana Monica
Institution	Faculty of Engineering Hunedoara, Politehnica University of Timișoara
Patent	

This study presents the influence of the air filter location on the intake system temperature in the case of engines for drifting. The heat flow dispersion map at the engine compartment was determined for four different cases. The measurements were performed with a thermographic camera in the area of the air filter and intake manifold. The results obtained after the test contribute to the efficiency of the thermal management of the engine by reducing the temperature of the intake air.

Description EN Four Drift engines with an engine displacement between 3.2l and 4.4l were considered for this study: I BMW E36; II Nissan Skyline r32; III BMW E30; IV BMW E36.

The relatively high values of the temperature recorded on the intake path in the case of the 4 engines studied, mainly case 3 is due to the organization of the supercharging group, the air filter location and the lack of protection in the filter area.

A solution in order to reduce the temperature on the intake system consists in the implementation of an Air by Corneliu system composed of the super-aspiring air filter YXV, dynamic system of air transfer (STDA) and integrated thermal deflector. The researches has shown that temperatures have been reduced by up to 50%.

RO.63.

Title EN	Safe Hand Device SHD Dexter's laboratory - <i>Educational program</i>
Authors	Birtok Baneasa Corneliu, Budiul Berghian Adina
Institution	Faculty of Engineering Hunedoara, Politehnica University of Timișoara; CorneliuGroup Innovation Research Association In order to increase the ergonomics and the work protection factor, we have designed a device called Safe Hand Device SHD for the maintenance and repair operations of the independent front axle within the Road Vehicle Repair Laboratory - Faculty of Engineering Hunedoara, Politehnica University of Timișoara. Safe Hand Device is a multifunctional tool designed in such a way as to allow the successive mounting of various heads dedicated to specific work operations as follows:
Description EN	<ul style="list-style-type: none"> - Disassembly of the shock absorber assembly; - Disassembly of the planetary shaft hub of the wheel; - Disassembly / assembly of planetary shaft tripod; - Disassembly / assembly of Rzeppa planetary shaft coupling; - Pivot screw removal; - Remove the shock absorber screw. <p>The main advantage of using SHD is to increase work safety and improve the accuracy of laboratory operations performed by students.</p> <p><i>Project realized within the educational program DEXTER's Laboratory with the support of the CorneliuGroup Innovation Research Association.</i></p>

RO.64.

Title EN	Hydrogen in steel
Authors	Ana Socalici
Institution	Faculty of Engineering Hunedoara, Polytechnic University of Timisoara When making steel in electric arc furnaces there are different sources of hydrogen (moisture of the metal charge, the additions needed to form the slag and the atmosphere of the furnace) which under certain conditions of pressure and temperature make it possible to absorb hydrogen in the metal bath. The existence of hydrogen in steel is one of the causes of the appearance of blows in semi-finished castings /
Description EN	

castings and contributes to the appearance of the defect called "flakes" in steel. Industrial research has analyzed the possibilities of increasing the degree of hydrogen removal in steels developed in the EBT-LF duplex system. The analyzes followed: the study of the behavior of hydrogen in steel, the sources of origin in liquid steel of gases, defects caused by gases in finished products, methods of hydrogen removal from steel and the influence of steel gases on the mechanical properties of finished products.

RO.65.

Title EN	Pencil Graphite Electrodes Decorated with Platinum Nanoparticles as Efficient Electrocatalysts for Hydrogen Evolution Reaction
Authors	Lorena-Cristina Balint, Iosif Hulka, Andrea Kellenberger
Institution	Politehnica University Timisoara Pencil graphite (PG) leads have been decorated with Pt nanoparticles (NPs) deposited by an electrochemical method to obtain very efficient electrodes for hydrogen production. PG is an affordable carbon-based support, highly available and very cost-effective. The main challenge for developing Pt electrocatalysts is to achieve as low as possible catalyst loading, while still preserving the electrocatalytic properties. This can be realized by using suitable deposition methods, such as pulsed current electrodeposition, which enables the formation of NPs with a narrow size distribution, highly dispersed on the PG support. The Pt-PG electrodes can be applied for hydrogen production, with efficiencies similar to that of Pt. The advantages of Pt-PG electrodes refer to very short deposition time (120 s) and the use of very low Pt loadings (50 $\mu\text{g cm}^{-2}$).
Description EN	

RO.66.

Title EN	Device for Measuring Gas and Air Quality
Authors	Gabriel Nicolae Popa, Corina Maria Diniş
Institution	Faculty of Engineering Hunedoara, Politehnica University of Timișoara A device has been designed and built for measuring gases (LPG gas, carbon monoxide, methane, hydrogen, ammonia) concentration in the air, as well as measuring air temperature and humidity (Fig.1). The device uses four electrochemical gas sensors, an electrochemical sensor for measuring air quality, a sensor for measuring temperature and humidity that are connected to an Arduino development board that is
Description EN	

connected to a 2x16 LCD display with six buttons and one electromagnetic relay. Each electrochemical sensor has an analogue pin, in the form of a voltage, which has a voltage proportional to the value of the gas concentration detected by the sensor. The temperature and humidity sensor transmits the information in digital format through a single pin. A relay has been connected to a digital Arduino output, which will be triggered (to start a fan) when a maximum value measured by the gas sensors is exceeded. The program was made to display the information from sensors, at a certain moment, on the LCD display, with the possibility to display information by using the buttons in the menu.

RO.67.**Title EN****High quality cast iron used in rolling stock braking systems - *PhD Thesis*****Authors**

Flavius Bucur, Ana Socalici

Institution**Faculty of Engineering Hunedoara, Politehnica University of Timisoara****Description
EN**

The brake blocks of the rolling stock are obtained by casting from phosphorous cast iron P10 type. In the structure of phosphorous cast iron, a phosphorous ternary eutectic is formed, called steadite, consisting of perlite, cementite and iron phosphide, it is distributed at the limits of the grain in the form of isolated separations, discontinuous network or continuous network, depending on the phosphorus content. Phosphorous eutectic is characterized by a high hardness and high fragility, which is why it has a great influence on the properties of cast iron. The amount of phosphorous eutectic in cast iron is directly dependent on the phosphorus content, being also influenced by the factors that increase the tendency of phosphorus segregation. In the industrial experiments, the metallographic examination of the cast iron of the swordboard was carried out according to the SR EN ISO 945-1:2009 and UIC 832 sheet and consisted in the analysis of four samples: one sample to identify the shape of graphite separations respectively their character and the length of the lamellar graphite separations, one sample for the determination of the pelitic configuration and two samples for the base metal mass and phosphorous eutectic. The hardness of the brake blocks is influenced by the chemical composition and structural components of the cast iron.

RO.68.

Title EN **Management of ferrous waste small and powdery - *PhD Thesis***

Authors Ioana Fărcean, Gabriela Proștean, Ana Socalici

Institution **University Politehnica of Timisoara**

Waste management includes all the collection, transport, recovery and disposal activities, including the activity of surveillance of the aforementioned operations as well as the obligation to care for the storage areas once their closure is completed.

**Description
EN**

Ferrous waste (in the form of pieces or powders) is not only an environmental problem, but also an economic loss, as it holds an untapped value. The main purpose of the recovery of ferrous waste in the context of the circular economy is to equate the notion of industrial waste (waste with a high iron content) with that of an industrial by product as a secondary raw material. The development of the metallurgical industry depends on the resolution of the environmental problems arising as a result of the emissions and quantities of waste generated resulting from the industry - environment relationship. At international and national level, among the most representative processes of recovery of powdered waste are pelleting, briquetting and agglomeration. The wastes once processed in the form of pellets/briquettes/agglomerate are recovered in the process of developing ferrous alloys, and if they are also subjected to a reduction process, they can be used in the load of the elaboration aggregates.

An adequate management in terms of waste management and recovery will lead to the protection of natural resources and the recovery of those consumed, thus reducing the costs and the impact of waste disposed of on the environment.

RO.69.

Title EN **Unconventional method of cutting aluminum plates using fiber laser with oxygen assist gas - *PhD Thesis***

Authors Laurentiu Zgripcea, Richard Molnar, Teodor Heput

Institution **Faculty of Engineering Hunedoara, Politehnica University of Timisoara**

**Description
EN**

The process of cutting aluminum plates is widely used in automotive industry, especial in the last years for new electrical vehicles. Conventional method of cutting uses CO₂ and fiber lasers together with nitrogen used as assist gas. This paper presents new method of cutting aluminum sheets

using pulsed laser in combination with oxygen instead of nitrogen. Results obtained in workshop are presented, in terms of productivity, quality and increase of laser range thickness for aluminum plates.

Analyzing the experimental data results the following conclusions:

- Changing of the assist gas can increase the cutting range for aluminum plates by 50%.
- Using laser pulsed output is possible to narrow the cut line and decrease roughness of the cut walls.
- Pulse frequency is essential parameter for alumina removal. Best results are obtained at 3000Hz, when dross formation is minimal and cut line is without alumina insertions.
- Laser operation is more stable with oxygen versus nitrogen, and gas consumption decrease by 68%.
- Total cost of operation is decreased by 30% due to lower gas consumption and second, by oxygen price which is lower than nitrogen price.

RO.70.

Title EN

GUARDRAILS AND ROAD SAFETY – *Student Project*

Authors

Teodorescu Calin Rares, Predescu Alexandru Ioan, Bogdan Tudor Mihai; Coordinator: Birtok-Baneasa Corneliu

Institution

Faculty of Engineering Hunedoara, Politehnica University of Timisoara

Description EN

The study presents a comparative analysis on the use of various types of guardrails in order to increase traffic safety on public roads. In the technical literature, the parapet is considered as a wall or railing with variable height that ensures the delimitation of the sides of a road, the purpose being to prevent accidental exits of vehicles by protecting the routes and areas delimited by them. If properly designed, installed and maintained, barriers should reduce the severity of crashes involving 'out of control' vehicles. Although a crash may still occur, it is likely to have a safer consequence than colliding with the object that the barrier is protecting. The implementation of parapets leads to a significant increase in traffic safety:

- Increased safety on the roads. The road safety barriers are especially designed to increase safety level on the roads and highways by protecting the drivers and the vehicles in cases of accidents.

- Reduced traffic jams and congestion. By reducing the number of car accidents on the roads, the safety road barriers also have a positive impact on traffic jams – less car crash accidents equal less traffic jams.

RO.71.**Title EN****Linguistic analysis in Cardiology - *PhD Thesis*****Authors**

Găianu Oana

Institution**George Emil Palade University of Medicine, Pharmacy, Science, and Technology of Târgu Mureș****Description
EN**

The medical language can become a “foreign language” for anyone. General dictionaries, article and mass-media play an important in narrowing the gap between specialized language and common language. They offer easy and most of the times free access to every individual that comes into contact with the medical language. In every situation the patient and the doctor must come to a common ground in order for the message to be successfully understood. Throughout time the language in the Cardiology domain has developed new metaphors, synonyms and antonyms for its specialized terms.

RO.72.**Title EN****BODY PROTECTION AND CONSERVATION IN THE CASE OF SUZUKI GRAND VITARA – *Student Project*****Authors**Hențiu Lucian Nicolae, Măgduț Răzvan Dorian;
Coordinator: Birtok-Baneasa Corneliu**Institution****Faculty of Engineering Hunedoara, Politehnica University of Timisoara****Description
EN**

Japanese vehicles differ in diversified models, with high reliability of the powertrain, but the body has low resistance over time to environmental factors. The case study is the Suzuki Grand Vitara, with traces of corrosion on the body elements. For remediation, replacement works were performed on the affected elements, surface cleaning, application of a primer-type paint and soundproofing layer, and finally, a layer of wax for prolonged resistance to environmental factors. The advantage is the extension of the life of the car.

RO.73.

Title EN	Investigation of UV dye-sensitized solar cells based on water electrolyte: a new insight for wavelength-selective greenhouse - <i>Research project no. PN-III-P2-2.1-PED-2019-2091</i>
Authors	Daiana Albulescu^{1,2}, Daniel Ursu¹, Lucian Rusnac², Sabina Nitu², Marinela Miclau¹ and Melinda Vajda^{1,2,*} ¹ National Institute for Research and Development in Electrochemistry and Condensed Matter, 300569 Timisoara, Romania;
Institution	² Politehnica University Timisoara, 300006 Timisoara, Romania
Description EN	The optimization of the photoactive electrode based on TiO ₂ with a complex architecture for UV dyes along with water-based electrolyte has successfully allowed (i) to obtain a photovoltaic efficiency of the dye sensitized solar cell with 1.45 times higher than the best efficiency reported for synthetic dye and 3 times for curcumin dye so far; (ii) transparency on the entire Photosynthetic Active Radiation domain; (iii) preserving high efficiency for lighting 1 sun (summer) and shading, especially for 60 mW/cm ² which represents the maximum illumination in the rest of the seasons. Our water-based dye-sensitized solar cells loaded with synthetic and natural UV dyes have revealed that the implementation of a dye-sensitized solar cell in autonomous greenhouses is a viable and inexpensive concept.

RO.74.

Title EN	Creating an active and collaborative e-learning resources portfolio for courses in the field of mechanical engineering
Authors	ALIC Daniela Delia ¹⁾ ; RACKOV Milan ²⁾ ; MILTENOVIC Aleksandar ³⁾
Institution	¹⁾ Politehnica University of Timisoara, Faculty of Engineering Hunedoara, Romania; ²⁾ University of Novi Sad, Fac. of Technical Sciences, ³⁾ University of Niš, Fac. of Mechanical Engineering, Serbia
Description EN	The project is focused on the creation of an e-portfolio of learning resources for topics relevant to the field of mechanical engineering, dedicated to practical use in the interactive and collaborative learning activities, as well as in the current teaching activity in blended learning courses.

The main idea consists in providing the users an easy and operative access to relevant and valuable e-learning resources on the desired topic and/or subject. Therefore, as approach, the e-learning resources collections, including images, video files, PowerPoint presentations, notes and theoretical syntheses, multimedia resources and links to websites with relevant online resources and interactive activities, are organized as an e-learning library with free access on various topics in mechanical engineering. Incorporated in a database type file, the links lead to learning resources stored in local folders, as well as to external free learning resources and provide users with relevant materials accessible through the learning resources portfolio interface, as useful dedicated information on mechanical engineering topics.

Operational in the interdisciplinary virtual laboratory-classroom of our faculty, the idea was put in practice in the applied mechanical engineering course and it is currently active in the on-going curricula of the Mechanical engineering subject.

RO.75.

Title EN

**DRILLING – CUTTING DIE WITH STEP PUNCH -
*Research project***

Authors

PINCA-BRETOTTEAN ALEXANDRU-MIHAI

Institution

Politehnica University of Timisoara

The designed die allows the realization of thin sheet metal parts with a thickness of 1 mm by cold plastic deformation. The parts obtained are intended for the automotive industry.

**Description
EN**

The stamp ensures a high precision of the dimensions, a good quality of the surfaces, which allows the elimination of some subsequent mechanical processing.

The die also ensures low metal consumption and high productivity.

RO.76.

Title EN

Fabrication of a UV Photodetector Based on n-TiO₂ /p-CuMnO₂ Heterostructures - *PhD Thesis*

Authors

Mircea Nicolaescu^{1,2}, Viorel-Aurel Serban¹, Cornelia Badas², Corina Orha², Carmen Lazău², Simona Căprărescu³

Institution

¹University Politehnica of Timisoara

²**National Institute for Research and Development in Electrochemistry and Condensed Matter Timisoara**

³**University Politehnica of Bucharest**

The heterojunction based on n-TiO₂ nanolayer /p-CuMnO₂ thin film was achieved using an efficient two-step synthesis process for the fabrication of a UV photodetector. The first step consisted of obtaining the TiO₂ nanolayer, which was grown on titan foil by thermal oxidation (Ti-TiO₂). The second step consisted of CuMnO₂ thin film deposition onto the surface of Ti-TiO₂ using the Doctor Blade method. Techniques such as X-ray diffraction, UV-VIS analysis, SEM, and AFM morphologies were used for the investigation of the structural and morphological characteristics of the as-synthesized heterostructures. The Mott-Schottky analysis was performed in order to prove the n-TiO₂/p-CuMnO₂ junction. The I-V measurements of the n-TiO₂ nanolayer/p-CuMnO₂ thin film heterostructure confirm its diode characteristics under dark state, UV and visible illumination conditions. The obtained heterojunction, which is based on two types of semiconductors with different energy band structures, improves the separating results of charges, which is very important for high-performance UV photodetectors.

**Description
EN**

RO.77.

Title EN

Gaming experience with eye tracking technology – Student Project

Authors

MUTU Robert Marian; Coordinator POPA Mihaela

Institution

Faculty of Engineering Hunedoara, Politehnica University of Timisoara

Game experience is the most important thing for a player.

From graphics to gameplay, but one thing that many games lack is immersion.

The present research aims to find out what can be improved during the massive multiplayer role-playing game Elder Scrolls Online, developed by Bethesda, which has two different points of view.

**Description
EN**

One is the perspective in the first person, the other is the perspective in the third person. The purpose of the experiment is to choose the perspective that motivates and gives greater satisfaction to the player.

VPS 16 glasses from View Point System technology were

used to record the gameplay, and the post-processing was done with the Filmora Editing Program.

One of the main conclusions is that the games, as they are now, are improving to a small extent. The exact incorporation of eye tracking and virtual reality are under study. The gaming company decides whether to switch or stay on the screens.

Eye tracking plays an important role in the gaming experience that someone has. Sure, some games or companies have failed to incorporate perspective into their games, but with trial and error, they are making progress.

So the use of eye tracking in the gaming industry could attract more people to the gaming scene. Currently, the average age of a player is 34 years old, 70% of players are 18 years old or older and 70% of parents believe that video games have a positive influence on their children's lives.

RO.78.

Title EN	Revealing the electrocatalytic performance of perovskite oxides-based electrodes – <i>Research project no. 40N/2019, PN 19220201</i>
Authors	Paula Sfirloaga, Maria Poienar, Bogdan-Ovidiu Taranu, Paulina Vlazan, Adina Budiul-Berghian, Corneliu Birtok Baneasa
Institution	National Institute of Research and Development for Electrochemistry and Condensed Matter, Timisoara Politehnica University of Timisoara
Description EN	<p>In this research work, the electrocatalytic activity of electrodes modified with Ag or Pd doped perovskite compounds for the oxygen and hydrogen evolution reduction, and nitrite oxidation reaction was investigated. In the case of the oxygen evolution reaction, the preliminary results obtained on the electrodes modified by four different procedures indicate that the graphite electrode modified with 0.15% Ag doped LaMnO₃ has the highest electrocatalytic activity. Additional electrochemical investigations on this electrode showed that the oxygen overload potential at $i_{geom} = 20 \text{ mA / cm}^2$ is 0.893 V, the Tafel slope value is 0.33 V / dec and the electrode retains its electrocatalytic properties after the stability test.</p> <p>The Ag or Pd doped perovskite modified electrodes have been comparatively evaluated in terms of their</p>

electrocatalytic properties and the best results for these reactions are obtained for the electrodes modified with Ag doped compositions.

Furthermore, it has been found that electrodes modified with compositions containing Ag ion-doped perovskite have the best electrocatalytic properties for oxygen oxidation, hydrogen reduction, and nitrite oxidation reactions.

„Lucian Blaga” University of Sibiu

RO.79.

Title EN	TURNING PROCESS WITH INCLINED TANGENTIAL EDGE, TURNING TOOL AND REMOVABLE INSERT FOR IT
Authors	Gheorghe Romeo CIOARĂ, Mitruț Vasilică PURICIUC, Aurel Mihai ȚÎȚU, Constantin OPREAN, Cristian PISARCIUC
Institution	Transilvania University of Brasov, “Lucian Blaga University of Sibiu” Patent application No. A 2020 00738 - 2020
Description EN	The invention relates to a lathe tool with an inclined tangential edge, adjustable in value, intended for turning external cylindrical surfaces, to the corresponding process and to the specific removable insert. The tool consists of a parallelepiped body pierced by a conical bore, or only cylindrical, in which it is fixed (by friction) to the desired inclination of the support body of the removable insert. Its edge, straight and of long length, is contained in a plane tangent to the surface to be machined and inclined to the plane determined by the axis of the workpiece and the point of tangency between the active edge of the insert and the workpiece. <i>Advantages:</i> The angle between the insert edge and the horizontal plane containing the workpiece axis is adjustable between 0° and 90°, the extremes not being useful; The turning tool is excellent for experimental research, for determining the optimal inclination of the edge for different materials and working regimes; The process is not influenced by the vertical position of the insert edge; Inserts can also be used for ordinary lathe tools. <i>Applications:</i> The tool is intended exclusively for turning the outer cylindrical surfaces; An exceptional quality of the generated surfaces is obtained; Allows quality processing of materials that require low cutting speeds.

RO.80.

Title EN	Flexible modular system for fixing workpieces for the incremental forming process
Authors	Racz Sever-Gabriel, Breaz Radu-Eugen, Oleksik Valentin Ștefan, Pascu Adrian Marius, Popp Ilie Octavian, Gîrjob

Institution	<p>Claudia Emilia, Tera Melania, Chicea Anca Lucia, Biriş Cristina Maria, Crengăniş Mihai</p> <p>Lucian Blaga University of Sibiu, Faculty of Engineering</p> <p><i>Decision to grant patent no. 4.3 / 31, 28.01.2022</i></p> <p>Patent application A 2019 00712 - 07.11.2019</p>
Description EN	<p>The incremental forming process is a flexible alternative to conventional cold metal forming processes. One of the main disadvantages of the process is that it allows the processing of a single type of workpiece size, because the working area and implicitly the size of the workpiece sheet that can be processed is fixed. To eliminate this disadvantage, a flexible modular system for fixing the workpiece is proposed, which allows the user to adjust the size of the workspace and implicitly the size of the workpiece.</p>

RO.81.

Title EN	<p>REMEDIATION PROCEDURE FOR THE DISLOCATIONS OCCURRING IN THE ROAD PAVEMENT</p>
Authors	<p>Aurel Mihail ȚÎȚU, Constantin OPREAN, Ioan BONDREA, Ion MĂRGINEAN, Alexandru Marcel MOLDOVAN, Adrian BOGORIN-PREDESCU</p>
Institution	<p>“Lucian Blaga University of Sibiu”</p> <p>Patent No. 129463 - 30.05.2018</p>
Description EN	<p>The procedure consists of technologically modifying the shape and depth of the hole in the asphalt, so that an implant may be created through the local casting of asphalt mixture in the newly created cavity instead of the hole. The created implant fills the hole and extending downwards vertically to the level of the road foundation it is joined by pressing the inclined walls of the cavity, which crosses the layers of the pavement, providing a vert stable assembly. The contact area between the implant and the road structure, with the geometric shape of a truncated cone, is self-fixated and self-sealing by priming and pressing under its own weight and the vehicle traffic, so that the stability of the remedied site increases over time. The procedure may be applied in the operative correction of isolated damages that appear on the road, being able to use the material from the drilling of new holes with minor additions and improvements in the immediate creation of the implant that will occupy the previously damaged site. By using local bituminous material</p>

in small quantities, its local heating is economical, its remediation is done quickly and the traffic is resumed shortly after the intervention. The remedied road through the procedure of implant, according to the invention, is more stable and stronger after the remediation than before it was damaged due to the effect of local vertical reinforcement.

RO.82.**Title EN**

PROCEDURE OF OXIDATIVE STABILIZATION OF FISH OIL BY AN ADDITION OF CRUDE ANTHOCYANIN EXTRACT FROM BILBERRY

Authors

Rodica Simona OANCEA, Mihaela STOIA, Letiția OPREAN

Institution

“Lucian Blaga University of Sibiu”

Patent No. 129691 - 28.09.2018

**Description
EN**

The invention is applicable to the field of fish oil supplements, rich in polyunsaturated fatty acids, for which it ensures protection against oxidative degradation during storage, by an addition of low amounts of natural extract of bilberry, with antioxidant properties, without addition of any synthetic antioxidant. The invention refers to a procedure for improving the oxidative stability of fish oil supplements rich in highly oxidizing polyunsaturated fatty acids, by addition of a water-soluble natural extract based on bilberry anthocyanins. The composition consists of cod liver oil, soy lecithin and a crude bilberry extract added in low amounts (0.05-0.1%) such as not to affect the organoleptic and coloring properties. The composition shows efficient protection against oxidative degradation of cod fish oil under storage conditions (7-14 days at 30°C / 42 days at 15-17°C) compared to synthetic antioxidants = tocopherols added in higher concentrations (0.1-0.25%). The novelty of the invention is given by using a natural extract that substitutes the use of synthetic compounds for oxidative stabilization of healthy polyunsaturated oils.

RO.83.**Title EN**

AUTOSTATIC SPREADER WITH LIGHT PROJECTION AND SUCTION

Authors

Dan SABĂU, Alexandru Dan SABĂU, Anca Mariana DUMITRA, Aurel Mihail ȚÎȚU

Institution

“Lucian Blaga University of Sibiu”

Patent No. 129621 - 27.04.2018

Description
EN

The invention refers to a method and a device useful in minimally invasive or transorifice surgery of a relatively small depth that is able to create an adjustable autostatic spread, an in depth access of 70-150 mm (adjustable) with artificial lighting by projecting distal light (LED or optic cable) and continuous fluid suction protected against cupping and clogging the "air intake". The device designed for narrow places offers comfort, reduces the number of hands necessary, the number of vacuums, frees the operating field, providing adjustable spreading, central lighting, continuous suction, without a major risk of blockage, visibility and the lack of additional maneuvers to unclog the vacuum, fixation and resetting of the scialitic lamp or frontal lamp, the presence of a mobile vacuum that interrupts the activity in the operation theater, occupying a vital operating space.

Advantages: applied through mini-laparotomy (3-5 cm) up to 13-15 cm depth; cancels the necessity of the manual spread which requires numerous staff and instruments; ensures vacuity through in-depth suction; ensures permanent light, stabile focused, without obstruction.

Applications: Useful in the minimal-invasive or trans-orifice surgery. The minimal invasive surgery specifically aimed at, is constituted by the cholecystectomy, suture of the perforated ulcer, the open access of the prostate, the open access of the cervix or low or average rectal tumours.

RO.84.

Title EN

Mobile application for storing receipt, invoices and warranties

Authors

Antal Sebastian-Dionisie, Moca Sebastian, Dan Alexandru

Institution

Lucian Blaga University of Sibiu, Faculty of Engineering

Description
EN

This project aims to create a mobile application allowing us to store receipts, invoices and warranties received following any type of purchase. The application is based on the Near Field Communication (NFC) system, through which the mobile phone receives information from the cash registers, which stores it in the application according to the parameters entered in the source code.

This process takes place only by using the application and bringing the mobile phone closer to the cash register.

The data is stored in the phone's memory, which is used for

the application, eliminating the need for an external database, which increases security.

The interface of the application is user-friendly and has the options "Receipt", "Utility Invoice", "Warranty " and "Contact us".

In order to use the application, it is necessary to create an account.

Applications: All areas in which, following purchases, we receive receipts, invoices and warranties.

Advantages: It protects the environment by reducing the paper used for receipts, invoices and warranties.

It is a free, safe and easy-to-use application, which allows you to customize your interface and content.

It allows you to see the content, both during and after generation, eliminating the inconvenience caused by losing a warranty.

The application can be used on Android, iOS and Harmony OS.

RO.85.

Title EN

Authors

Institution

Ultrasonic Cleaner

Dragomir Ioan-Sebastian, Babii Mihai, Vira Andrei

Lucian Blaga University of Sibiu, Faculty of Engineering

This project proposes the design of a device that has the role of cleaning various small objects (watch, bracelet, spectacle frames, etc.) using vibrations (waves). The device is shaped like a parallelepiped with a pocket inside. A certain amount of water is introduced into this space. In the water, insert the object we want to clean. Using the same principle of creating vibrations as a mobile phone, using a small electric motor with a shaft that is provided at the end with a device with an unevenly distributed weight (such as a cylinder cut in half). When the shaft rotates, vibrations occur in one of the walls. This produces strong waves that move through the water and clean the deposits on the object. An electronic timer will be displayed on an exterior wall of the cleaner for the duration of the process. After the cleaning process is completed, the water is removed from the cleaner. By pressing a button on the outside, a small fan installed inside a wall will blow air through two vents that open when the button is pressed to dry the object. The cleaner is connected to a power source.

Description

EN

RO.86.

Title EN	DESIGNING A LABORATORY STAND FOR FIXATING FORCES OF WORKPIECES IN TIGHTENING MECHANISMS USING WEDGE AND PLUNGERS
Authors	Vergu Constantin-Alexandru
Institution	Lucian Blaga University of Sibiu, Faculty of Engineering The project proposes a device specifically designed to study the fastening forces of parts in clamping mechanisms using wedges and pistons. It consists of a motherboard (1); a force sensor (2); a supporting body (3); the stem (4); four pistons (5); four springs (6); four cylinders (7); four wedges (8); a conical cord (9); a threaded shaft (10); a handle (11); the part on which the study is being carried out (12) and some screws and fixing pins.
Description EN	The semi-finished product is fixed by operating the threaded shaft (10) using the handle (11) and the part (12) to be examined. It moves to the cone (9), which further engages the pistons (5), with the help of which the attachment is made. The clamping force is determined by the force sensor (2) and displayed on a computer monitor.

RO.87.

Title EN	Auto-cleaning and sterilization garbage can
Authors	Gaston Maria-Cristina, Horga Bogdan Dumitru, Hera Stefan Danut
Institution	Lucian Blaga University of Sibiu, Faculty of Engineering This project aims to make the medical system cleaner by providing a self-cleaning and sterilizing garbage can, using UV lights and special washing fluid to kill all the bacteria and viruses. The garbage comes with 2 UV lights on the interior of the cover near the fluid dispenser, which will rotate to fully clean all surfaces. The fluid is to be introduced from outside of the cover in the dispenser, after the washing stage the fluid will be eliminated in the lower part from where it should be thrown out. The cleaning process ends within 5 minutes, 1.5 minutes for washing and 3.5 minutes for the UV lights to sterilize. The advantages of this project are a cleaner medical system, a lower chance of spreading diseases and also an easier way of washing a garbage can which even with disposable garbage bags can get contaminated.
Description EN	

RO.88.

Title EN

DESIGNING A CASE FOR DESKTOP IN SHAPE OF A LAPTOP

Authors

Dragomir Ionut Razvan, Muntean George Valentin

Institution

Lucian Blaga University of Sibiu, Faculty of Engineering

**Description
EN**

The project propose a device specifically designed for desktop to be easy to carry in different places. It consists of a display, a keyboard, supporting body to increase the airflow and help the system to be cold.

Stefan cel Mare University of Suceava

RO.89.

Title EN	Extension device for the diagnosis of conductive charging systems
Authors	Ciprian BEJENAR, Marian BEJENAR, Mihai DIMIAN, Laurențiu-Dan MILICI, Mariana-Rodica MILICI, Ciprian AFANASOV, Constantin UNGUREANU, Mihaela PAVĂL
Institution	Ștefan cel Mare University of Suceava
Patent	Patent application No. A/003682021 / EP 21464002.1 The invention uses a simple solution from a constructive point of view and allows it to be attached for diagnostic purposes in the extension of any conductive charging system, being suitable as an accessory regardless of the testing equipment and/or system and it has the capability to incorporate an incorporable source of electrical energy and/or universal terminals, facilitating the extension action without the strict need for a human operator, because the device constitutes a monobloc testing probe for the acquisition of the related signals corresponding to the electrical parameters of interest in the process of diagnosis the conductive charging of an electric vehicle.
Description EN	
Class	2

RO.90.

Title EN	Method for selective switching
Authors	Ciprian BEJENAR, Laurențiu-Dan MILICI, Constantin FILOTE, Mihai RAȚĂ, Ciprian AFANASOV, Elena-Daniela LUPU, Valentin VLAD, Constantin UNGUREANU
Institution	Ștefan cel Mare University of Suceava
Patent	Patent Application No. A/00462/2021 The invention introduces the capability of selectively switch (connect / disconnect) voltage sources and/or converter modules that can be controlled and connected in parallel in the composition of power supply systems, on the basis of conditional events with attenuated transition modeled in a specific manner, which involves mathematical functions that composes a sigmoidal control logic approached differently, which provides it simplicity and performance along with malleability, without unpredictable, uncontrolled and unjustified compromises, improving the switching process
Description EN	

without additional implications, that it does not involve the control of electromechanical devices because it improves the compatibility, performance and redundancy in operation of the systems or parts thereof that implement it.

Class

2

RO.91.

Title EN

Motion control system

Authors

TOADER Eusebiu, MILICI Mariana Rodica, PAVĂL Mihaela, NIȚAN Ilie, BEJENAR Ciprian, UNGUREANU Constantin, LUPU Elena Daniela

Institution

Ștefan cel Mare University of Suceava

Patent

Patent application No. A00397/2021, EP 21464003.9

**Description
EN**

The motion control system according to the invention consists mainly of a mobile system consisting of two motors which are fed simultaneously or separately, the braking being carried out by means of two nitinol springs, which once fed act on the system braking.

RO.92.

Title EN

Electrical network fault signaling device

Authors

Ovidiu Magdin ȚANȚA, Mihaela PAVĂL, Laurențiu-Dan MILICI, Oana Vasilica GROSU, Eusebiu TOADER, Pavel ATĂNĂSOAE, Valentin POPA

Institution

Ștefan cel Mare University of Suceava

Patent

Patent Application No: A/00199/2021, EP 21464001.3

**Description
EN**

The automatic device for signaling the failure of the electrical network, according to the invention, consists mainly of a tube mounted on the electrical conductor which has inside a quantity of ferrofluid which will move inside the tube when a defect occurs.

The invention has the following advantages:

- The system does not require additional power;
- Constructive simplicity;
- Accurate signaling of the fault zone

RO.93.

Title EN

Gluten free and functional waffles and process for obtaining them

Authors

Adriana DABIJA, Ancuța CHETRARIU

Institution

Ștefan cel Mare University of Suceava

Patent

Patent application No. A/00084/2022

Description
EN The invention relates to an assortment of gluten free and functional waffles with an improved nutritional value, with a high protein and fiber content, intended for all categories of consumers. The gluten free and functional waffles, according to the invention, are obtained from the following ingredients: chickpea flour, wild garlic, spent grain flour from malt whisky, golden flax seeds, hemp seeds, and salt. The finished product has a low glycemic index and a high content of protein and dietary fiber. Fiber from spent grain flour has a major implication for digestion, by slowing gastric emptying, prolonging intestinal transit time and reducing the rate of nutrient absorption in the small intestine.

RO.94.

Title EN **Functional ice cream with low fat content and process for obtaining it**

Authors Adriana DABIJA, Georgiana Gabriela CODINĂ, Mircea Petruț ȘESTAC

Institution **Stefan cel Mare University of Suceava**

Patent Patent application No. A/00453/2020; EuroPatent application No. EP/3944768-A1/2022

Description
EN

The invention is about a food product of a frozen dairy dessert type with the role of a functional food, due to it multiple health benefits. Functional ice cream with low fat content, according to the invention, is obtained only from natural ingredients, without the addition of sugar or food additives, by a special freezing process. Finished product has a low fat and lactose content but an increased protein content of a valuable quality for the human body by using whey cheese. This product can be consumed by people suffering from diabetes, obesity, because sugar is not used to obtain this frozen dairy dessert, being replaced with the natural sugar. The active substances present in the green walnuts content have positive effects in neurological disorders, regulates blood cholesterol levels, blood pressure, reduce the risk of heart attack and strengthen the blood vessels

**„Grigore T. Popa” University of Medicine and Pharmacy
Iasi, Romania**

RO.95.	
Title EN	Importance of lactate measured in the replanted limb: applicability in establishing therapeutic behavior in pediatric trauma
Authors	Alina Belu, Laura Mihaela Trandafir, Elena Cojocaru, Anca Galaction, Viorel Scripcariu
Institution	„Saint Mary” Emergency Children's Hospital, „Gheorghe Asachi” Technical University, „Grigore T. Popa” University of Medicine and Pharmacy Iasi, Romania
Description EN	<p>Lactic acid is one of the metabolic parameters used to monitor the postoperative evolution of limb replantation. The serum lactate is a diagnostic marker of hypoxia in adults but is not validated for children because it is incompletely known how lactate production in children differs from adults after severe trauma. In replantation of limbs following traumatic amputation, monitoring the lactate levels in the replanted limb can be used as a more accurate measurement of progression than systemic lactate. The aim of the study is to highlight the utility of lactate values from the replanted limbs in the monitoring protocol over the systemic lactate values as an indicator of postoperative evolution. In our study, we compared the values of systemic lactate with the values of lactate levels obtained from the replanted limb, which is mainly a marker of tissue perfusion. Our results showed that the lactate detected in the replanted limbs showed significant changes in values at the time of the unfavorable evolution. In conclusions, monitoring lactate levels in the replanted limb proved to be a more reliable indicator than serum lactate measurement in determining the prognosis of late limb replantation following traumatic amputation in children. Key words: trauma, replanted limb, systemic lactate, lactate in replanted limb, children</p>
Class no.	4

RO.96.

Title EN **Innovative device for functional rehabilitation of the upper limb - active orthosis with electrical stimulation module**

Authors Silviu-Ștefan Boanță, Sînziana Anca Butnaru Moldoveanu, Florin Munteanu

Institution “Grigore T. Popa” University of Medicine and Pharmacy Iasi, Faculty of Medical Bioengineering

Patent no.

Description EN Stroke is a major health challenge, leading to important disabilities in the upper limb. Thus there is a need for efficient and low-cost rehabilitation devices. The developed solution proposed is a functional rehabilitation device that is composed of an active orthosis equipped with an electrical stimulation module. The device can be used for simultaneous mobilization and functional electrical stimulation for upper limb rehabilitation. The two functions can also be used individually, as needed. By combining repetitive exercise therapy and functional electrical stimulation, the device offers effective rehabilitation for patients with post-stroke hemiparesis. The active movement of the device is performed by a servo-motor connected to a cylindrical gear transmission mechanism. The entire casing of the device and the gears are 3D printed, thus making the product affordable and easy to repair by using low-cost manufacturing materials and technologies.

Class no. 4

RO.97.

Title EN **LUDOTHERAPY AND OCCUPATIONAL THERAPY IN CHILDREN WITH NEUROLOGICAL PROBLEMS**

Authors Iustina Condurache, Cătălin Ionițe, Andrei Gheorghiiță, Genoveva Filip, Mariana Rotariu

Institution “Grigore T. Popa” University of Medicine and Pharmacy of Iasi, Faculty of Medical Bioengineering

Patent no.

Description EN Ludotherapy is a method of treating mental illness through play. Today, play therapy is the basis of all child psychotherapy. It aims to bring the subject out of self-closure by reminding him of his inner conflicts.

NATIONAL

The techniques can be individual or collective. The main purpose of occupational therapy is to improve the quality of life of children with disabilities. Focus on their individual needs.

The purpose of this paper is to present activities in the form of games in the occupational therapy room using various devices designed by occupational therapists especially for children with disabilities. The activities and devices have been designed in such a way as to train functions such as balance and coordination, reaction speed but also muscle strength.

By working on these skills during occupational therapy sessions, a child will be able to develop the essential skills for an independent life, which helps him enormously both at a young age and as a future adult. Also, the ability of a child to take care of himself and to become independent of his parents is considered an important basis for the development of cognitive, social skills and for the formation of self-confidence. The more autonomous a child is, the more he will have the courage to explore the world around him, to try, thus facing various situations or barriers / problems for which he will have to find the appropriate strategies to solve them.

Class no.

4

RO.98.

Title EN

The novel Postpartum Uterine Ultrasonographic Scale (PUUS)

Authors

Roxana Covali, Ioana Pavaleanu, Mona Akad, Razvan Socolov

Institution

“Grigore T. Popa” University of Medicine and Pharmacy of Iasi

Patent no.

-

**Description
EN**

This is a novel scale, simple and fast, introduced by the authors, to evaluate the uterine involution after birth.

The use of PUUS is beneficial in all postpartum patients. It could precisely assess the uterine involution after difficult labors, in multiparas or to evaluate the benefit of specific

medicines. PUUS also allows precise evaluation, day after day, in difficult postpartum cases.

Class no.

4

RO.99.

Title EN **New approach of stress response and tolerance of yeast cell**

Authors Mădălina Poștaru¹, Alexandra Tucaliuc², Dan Cașcaval², Anca-Irina Galaction¹

Institution ¹“Grigore T. Popa” University of Medicine and Pharmacy Iasi, Faculty of Medical Bioengineering
²“Gheorghe Asachi” Technical University of Iasi, “Cristofor Simionescu” Faculty of Chemical Engineering and Environmental Protection

Patent no.

-

Description EN

As the main component in yeast fermentation, *Saccharomyces cerevisiae* cells affect the bio-product yield. State-of-the-art studies on the production of ethanol by fermentation processes have indicated numerous challenges in the yeasts growth rate and metabolism increase due to a number of factors related to the composition of the culture media, yeast cell structure, and product inhibition. To date, it is known that manual changes of the membrane lipid composition by chemical supplementation or genetic engineering experiments were able to confer yeast cells increased tolerance to heat, ethanol or oxidative stresses. Therefore, this study investigates the stress of the *Saccharomyces cerevisiae* cells during the fermentation process, by modifying the salts nature and concentration in the culture media, by subjecting the cells to hyperosmotic stress, and oxidative stress.

Class no.

4

RO.100.

Title EN **Prealert System for improving emergency vehicles movement**

Authors Irina Duducă, Irene Pampu, Mădălina Andriesei, Andrei Gheorghiiță, Marius Turnea, Dragoș Arotăreței,

Institution “Grigore T. Popa” University of Medicine and Pharmacy of Iasi, Faculty of Medical Bioengineering

Description EN A very common problem in emergency medicine is the relatively long travel time of priority vehicles, due to traffic

jams caused by limited road widening.

Our project aims to develop a system for alerting the drivers in case of an emergency. The main objective is to reduce response times, giving them the opportunity to clear the road section long before noticing the light and sound signals. The developed system aims to considerably reduce the response time in case of emergency medical interventions. This is possible by creating a system that announces the approach of special vehicles, with a distance of up to 1 km, making travel more efficient.

The system is based on an equipment which already exists in all vehicles produced after 1995 that includes the RDS (Radio Data System) - TMC (Traffic Message Channel) traffic service. Simplicity in use, but also low costs will make this system indispensable in emergency medical services.

Class no.

4

RO.101.

Title EN

INTELLIGENT CERVICAL COLLAR USED IN FIRST AID

Authors

Bianca Andreea FRUNZĂ, Maria PURCAR, Călin CORCIOVĂ, Robert FUIOR, Cătălina LUCA.

Institution

University of Medicine and Pharmacy GRIGORE T POPA Iasi, Faculty of Medical Bioengineering.

**Description
EN**

The cervical collar is a medical device used to immobilize the neck and spine, being indicated for patients who have suffered degenerative changes of the spine, surgery in the cervical region or severe trauma. In this paper we have designed and developed at the laboratory level, a cervical collar of the type of a smart device that could be used to monitor patients with severe trauma. The intelligent cervical collar will monitor vital parameters through sensors: pulse, resistive and temperature; connect and control with a microprocessor. The use of the smart collar provides important information about the patient's condition in a short time, so that those involved in providing first aid can take steps to stabilize the victim.

Class no.

RO.102.

Title EN **PORTABLE DEVICE USED IN NON-INVASIVE RESPIRATORY ASSISTANCE**

Authors Adelina-Elena EZARIU, Bianca-Georgiana POTOP, Călin CORCIOVĂ, Robert FUIOR, Cătălina LUCA.

Institution **University of Medicine and Pharmacy GRIGORE T POPA Iasi, Faculty of Medical Bioengineering.**

Description EN

Continuous positive airway therapy is the first-line treatment for patients with respiratory problems. Due to the COVID 19 pandemic, there is an acute demand for medical devices that provide respiratory support. This paper aims to create a miniaturized smart device that reduces the disadvantages of classic CPAP devices. The experimental device is the size of a mask and maintains therapeutic pressure by interconnecting essential components such as a motor, a microprocessor and a pressure sensor. To minimize pressure variations during spontaneous breathing and exhalation discomfort against positive pressure, determine the transition point between exhalation and inspiration. Thus, the device maintains a constant pressure to prevent the collapse of the airway. The designed device can be a comfortable and easy-to-use option both at home and in medical units, for positive airway therapy, improving the patient's quality of life.

Class no.

RO.103.

Title EN **INTELLIGENT ORTHOSIS USED IN REHABILITATION OF THE HUMP JOINT**

Authors Daniela GOLDAN, Călin CORCIOVĂ, Robert FUIOR, Cătălina LUCA.

Institution **University of Medicine and Pharmacy GRIGORE T POPA Iasi, Faculty of Medical Bioengineering.**

Description EN

The hip joint connects the pelvic cavity to the femoral head and is one of the main anatomical components responsible for the mobility of the whole body. The purpose of this paper is to design and create a medical device, which could be used in recovery clinics, in monitoring the hip joint in pathological situations. Our concept presents an orthosis-type device, very easy to use, which can be used during recovery programs, to assess the degree of patient mobility,

in flexion-extension, abduction-adduction and internal or external rotation activities. The information is captured using sensors and will be processed by a microcontroller from the Arduino Uno development platform. The set has a built-in warning system in case the activity of the hip joint does not fall within the standard limits, and the information will be displayed on a screen.

Class no. 4

RO.104.

Title EN

Plasma sources tailored for plasma agriculture: at the interface with liquids and solids

Authors

Andrei Vasile Nastuta¹, Ramona Huzum²

Institution

¹“Grigore T. Popa” University of Medicine and Pharmacy, Iasi, Faculty of Medical Bioengineering, ²„Alexandru Ioan Cuza” University of Iasi, Interdisciplinary Research Institute

Applications of plasma jet discharges at atmospheric pressure (appj) are widely spread from industry, medicine to agriculture; therefore, it's important to characterize plasma sources from electrical and optical point of view, in order to fulfill the applications requirements.

**Description
EN**

We use an appj for: a. treating liquid media - fresh must (grape juice) in order to improve the storage / quality of wine; b. treating solid / liquid media: seed & tap water and studied its effects upon plant evolution.

The appj was characterized via electro-optical methods and plasma-treated medium was investigated by means of UV-Vis, ATR-FTIR and pH. The results favor the usage of appj for activating the medium / preserving (wine) or stimulating processes (germination of seeds) in the studied medium.

Class no. 4

RO.105.

Title EN

Mobile robotic system for medical recovery of patients with cerebral palsy

Authors

Gabriela Gladiola Petroiu, Daniela Matei, Teofil Ursache, Cristian Rotariu

Institution

Grigore T. Popa University of Medicine and Pharmacy Iasi, Faculty of Medical Bioengineering

**Description
EN**

Cerebral palsy (CP) is a group of disorders that affect a person's ability to move and maintain balance and posture.

CP is the most common motor disability of childhood. About 1 in 345 children has been identified with CP according to estimates from CDC's Autism and Developmental Disabilities Monitoring (ADDM) Network. In this project, we build and programmed a robot that changes its speed while the patient with cerebral palsy change the force of a grip on a hand dynamometer. Using a hand dynamometer connected to a mobile robot, children can recover "by playing" by controlling the speed and direction of the robot. The challenge is to control the speed of a mobile robot with a hand dynamometer. By monitoring muscle activity, a personalized treatment plan can be developed taking into account the muscular force applied to move the robot and the muscular fatigue that appeared after each work session.

Class no.

4

RO.106.

Title EN

INTERACTIVE DEVICE FOR THE TREATMENT OF PEDIATRIC NEUROMOTOR DEFICIENCIES USING PERSONALIZED RECOVERY PROGRAMS

Authors

Corciovă Călin, Fuior Robert, Onu Ilie, Băeșu Andra Cristiana

Institution

“Grigore T. Popa” University of Medicine and Pharmacy Iasi, Faculty of Medical Bioengineering

**Description
EN**

Neuromotor deficiencies, often found in children, are noticed from an early age by parents. Although the child seems to develop harmoniously, there are more and more common conditions such as poor muscle tone, lack of attention and coordination, and stiffness in the joints. There are only a few life-threatening conditions, caused by a messy lifestyle, and daily stress that affects the physical, but especially mental health, sequelae after craniocerebral trauma, cerebral palsy (hemiparesis), and traumatic injuries of the fetus at a birth time not treated properly. It is well known that patients who have developed this pathology need recovery that can only be achieved with the help of medication recommended by a specialist combined with exercise in the presence of physiotherapists, speech therapists, and psychologists. Therefore, the starting point in making the device was the desire to recover the children as quickly as possible, through which their attention should be captured, permanently, throughout the therapy, combining playfulness with therapy. This system is built as a medium-sized device that monitors

pronation and supination movements, which is closely correlated with attached pressure sensors that capture the force with which the ball can be tightened, indicating the degree of pressure, the values being analyzed by the microcontroller and which returns a pressure map made in custom software. The graphical visualization of these data with the help of a pressure map is indicated to have an overview of the correctness of the movements performed, but also of the evolution of the subject, as it allows monitoring from one meeting to another. The system can be improved with a series of static and dynamic images, interactive games, virtual reality.

Class no.

4

RO.107.

Title EN

SILICONE TUBES USAGE IN PTOSIS EYELID SURGERY

Authors

Anisia-Iuliana ALEXA^{1,2*}, Calina-Anda SANDU^{1,2}, Ioana-Alexandra SANDU^{1,3}, Florentina SEVERIN^{1,2}, Alina Cantemir⁴ Madalina MOCANU^{1,2}, Madalina-Ioana BILHA¹, Ioan-Adrian CIUREANU¹, Oana OLARIU^{1,2}, Camelia Bogdanici^{1,2}

Institution

1. "Gr T Popa" University of Medicine and Pharmacy, Iasi, Romania.
2. "St Spiridon" Emergency Hospital, Iasi, Romania.
3. "Dr.C.I.Parhon" Clinical Hospital, Iasi, Romania
4. Oftaprof Clinic, Iasi, Romania.

**Description
EN**

Eyelid ptosis is a drooping of the upper eyelid due to the weakening of the levator palpebrae superioris muscle or the Muller's muscle. When the ptosis is severe with a poor function (less than 4 mm) of the levator palpebrae superioris muscle any intervention to strengthen the action of this muscles is doomed to failure. In these more serious cases it was necessary to find a surgical solution to sling the eyelid to the frontalis muscle. Cases of suspending the eyelid with fascia lata, polypropylene suture or various silicone tubes have been reported in the literature. The viability of this intervention varies depending on the properties of the material used. Our study included 28 patients with grade 3 ptosis for whom 23 G silicone lumen tubes were used. These tubes were originally created and produced for the intubation of the tear ducts, in this present study we adapt these silicone tubes to sling the upper eyelid. Out of the 34 eyelids operated on 28

patients in a 4-year follow-up interval, no intraoperative complications occurred, we report only one case of palpebral cilia ptosis at 2 weeks after surgery and 2 extrusions of the tube at the surface of the upper incision at the frontalis level, 3 of these cases required surgical reintervention with a favorable evolution. Silicone is a biocompatible material widely used intraoperative. In ophthalmic surgery it has also been used in scleral bucking for retinal detachment and in tear duct operation. Shifting the use of silicone lumen tubes for tear ducts in eyelid ptosis surgery is a pioneering study with successful preliminary results. These tubes are provided by the manufacturer in a sterile packaging, the costs are affordable, which could allow being extensively used in severe surgical cases of eyelid ptosis.

Class no.

4

RO.108.

Title EN

Latest developments in the treatment of rare genetic diseases – Pompe Disease

Authors

Luca Alina-Costina, Adumitrachioaiei Heidrun

Institution

GR.T Popa University of Medicine and Pharmacy

**Description
EN**

Pompe Disease is a rare autosomal recessive disorder caused by deficiency of the glycogen – degrading lysosomal enzyme acid-alfa-glucosidase. Late onset Pompe disease is a multi-system condition with heterogenous clinical presentation that mimics other neuro-muscular disorders. In this poster we want to present how we can establish the diagnosis and the latest therapies for this disease.

Class no.

4

RO.109.

Title EN

Difficulties in the diagnosis and treatment of Paroxysmal Supraventricular Tachycardia in Infants

Authors

Luca Alina-Costina, Horhota Emma, Pădureț Ioana
Alexandra

Institution

„Gr.T Popa” University of Medicine and Pharmacy

**Description
EN**

Paroxysmal Supraventricular Tachycardia (PSVT) is a type of abnormal heart rhythm with an abrupt onset and termination. It is usually a narrow-complex tachycardia that has a regular, rapid rhythm. In this poster we want to show the latest therapies for treating this arrhythmia.

Class no.

4

**“Carol Davila” University of Medicine and Pharmacy,
Bucharest, Romania**

RO.110.	
Title EN	Biocompatible oil in water microemulsions with hyaluronic acid and salicylic acid and method for obtaining thereof
Authors	Dinu-Pîrvu Cristina Elena, Popa Lăcrămioara, Ghica Mihaela Violeta, Anuța Valentina, Prisada Răzvan-Mihai, Velescu Bruno Ștefan, Talianu Marina-Theodora
Institution	“Carol Davila” University of Medicine and Pharmacy, Bucharest, 37 Dionisie Lupu Str., 020021, Bucharest, Romania,
Patent	A 00179 / 01.04.2020
Description EN	<p>The invention refers to a biocompatible oil in water (O/W) microemulsion, with hyaluronic acid and salicylic acid, designed for topical application in dermatologic therapy of acne and a method for obtaining thereof.</p> <p>The following advantages result from the invention:</p> <ul style="list-style-type: none"> - the topical use of a biocompatible O/W microemulsion which may incorporate (i) an antiacne active, namely salicylic acid 0.5%, due to a surface tension modulator system with solubilization capacity and diffusion promoting properties through stratum corneum; -minimizing the adverse reactions of salicylic acid like erythema or dryness by the integration of (ii) hyaluronic acid as a biopolymer with hydrating, protective and resurfacing properties; -the biocompatibility of surface tension mixture is also defined by (iii) the association of Tween 80 as a non-ionic surfactant with lecithin as a natural zwitterionic surfactant; the tensioactive mixture content is selected under the maximum required value of 70 %.
Class no.	4

RO.111.**Title EN**

Anti-rheumatic ointment with shark liver oil, copaiba balm and bee venom

Authors

Mișitelu Magdalena, Ioniță Ana Corina, Udeanu Denisa Ioana, Dinu-Pîrvu Cristina Elena, Moroșan Elena, Ghica Mihaela Violeta, Ioniță Elena Iuliana, Ghica Manuela

NATIONAL

Institution	“Carol Davila” University of Medicine and Pharmacy, Bucharest, 37 Dionisie Lupu Str., 020021, Bucharest, Romania,
Patent	A 100709 / 09.11.2020 The invention refers to an anti-rheumatic ointment with natural extracts (shark liver oil, castor oil, copaiba balm, eucalyptus volatile oil, bee venom) designed for the treatment of rheumatic and inflammatory diseases, and a method for obtaining thereof. The following advantages result from the invention: - an effective antimicrobial and antifungal action (shark liver oil, castor oil, copaiba balm, volatile eucalyptus oil, bee venom); - a significant anti-inflammatory and revulsive effect (shark liver oil, castor oil, copaiba balm, volatile eucalyptus oil, bee venom); - immunomodulatory effect by non-specific mechanisms (shark liver oil, copaiba balm); - a calming and anesthetic action (castor oil, copaiba balm, volatile eucalyptus oil, bee venom); - an improvement of peripheral circulation (castor oil, copaiba balm, volatile eucalyptus oil, bee venom); - an effective and profound anti-inflammatory effect generated mainly by the ability of castor oil to penetrate the skin, and also by the active compounds from copaiba balm and volatile eucalyptus oil.
Description EN	
Class no.	4

RO.112.	Development of the institutional capacity of UMFC D to support RDI activities in the direction of personalized therapies
Title EN	
Authors	Cristina Elena Dinu-Pîrvu
Institution	“Carol Davila” University of Medicine and Pharmacy, Bucharest, Romania
Description EN	The aim of the project is to strengthen at Institutional level the RDI activities dedicated to personalized therapies by optimizing the existing research infrastructure, the continuous improvement of the members of the interdisciplinary research teams of UMFC D and the increase of international visibility. The project goal can be achieved by improving the

performance of existing research infrastructure and the continuous development of human resources involved in RDI activities to increase the level of interdisciplinarity and complexity of the results obtained, UMFCDD international visibility and achieving the benchmark personalized therapies. In this sense, the objectives of the project are:

O1. Developing and optimizing the performance of UMFCDD's research infrastructure in the field of personalized therapies in order to coagulate new high-performing research cores by: (i) expanding the material base (maintenance of existing modules, new modules and equipment purchased through co-financing, laboratory space design) (ii) ensuring the sustainability of ongoing research projects through the purchase of consumables / reagents).

O2. Increasing the performance of interdisciplinary research teams in UMFCDD in the direction of personalized therapies, by (i) supporting the participation of human resources in scientific events / training courses, (ii) facilitating access and stimulating the involvement of students / masters / doctoral students in interdisciplinary RDI teams.

O3. Ensuring support for increasing the visibility and capitalization of research results by (i) supporting the publication of ISI-rated journals in the open access regime, (ii) institutional promoting.

Class no.

4

RO.113.

Title EN

Optimizing the institutional mechanisms for correlating the educational offer with the labor market demand

Authors

Bruno Ștefan Velescu

Institution

“Carol Davila” University of Medicine and Pharmacy, Bucharest, Romania

Description

EN

The aim of the project is to support UMFCDD Strategic Development Plan and strengthen the Institutional capacity to generate highly competent human resources by optimizing the institutional mechanisms to correlate the educational offer with the labour market.

In order to achieve the project's goal, in correlation with UMFCDD's mission of education and to generate and transfer knowledge to society in Health field, at Institutional level, the aim is to optimize and consolidate the process of correlating the educational offer with labour market demand

through the following objectives:

O1. Identify the main requirements of the labour market related to the skills of employees in Health domain. This objective involves consulting the actors in the field of Health: professional organizations, employers, and employees regarding the current needs of the market, in order to train specialists with extensive adapted skills. In the context of the European Digital Health Initiative, the digital sector will be addressed in consultations as a requirement identified at Institutional level.

O2. Initiation/consolidation of skills provided by UMFCF necessary for insertion in the labour market. This objective will correlate the academic training curriculum of UMFCF students and graduates of UMFCF or other specialized institutions with the needs identified in O1 for the development of complementary training programs to ensure the generation of the required competencies.

O3. Initiation/consolidation of partnerships with institutions with complementary expertise UMFCF. This objective involves optimizing the institutional flow regarding the involvement of the socio-economic environment in training programs for specialists with increased skills adapted to current needs.

Class no. 4

**University of Medicine and Pharmacy
„Iuliu Hatieganu” Cluj-Napoca**

RO.114.	
Title EN	A recombinat plasmid DNA based nanoparticle system for prevention of SARS-CoV-2 coronavirus infection
Authors	Sergiu Chira, Ioana Cornelia Stanca Neagoe, Andrei Cosmin Cismaru
Institution	University of Medicine and Pharmacy „Iuliu Hatieganu” Cluj-Napoca
Patent	Patent application No. A/00296/2020 The patent application proposes a experimental model of vaccine based on plasmid DNA vector that harbors a consensus sequence of SARS-CoV-2 spike protein. The genetic elements in the vector design give the possibility for manipulation and amplification in Escherichia coli, and to monitor the expression of the viral antigen in the human cells, and bio-distribution in upper respiratory system of experimental animal models, upon intranasal or pulmonary administration. For enhancing the efficiency and immunologic potential of the vaccine, three bio-compatible polymers are used to pack the plasmid DNA vector in nanoparticles. The proposed model of anti-COVID vaccine can set the clinical basis of immunization strategies against SARS-CoV-2 infection.
Description EN	
Class no.	4
RO.115.	
Title EN	Electrochemical Screen-Printed Sensor Integrated on an Intra-oral Device for Direct and Simultaneous Detection of Two Important Advanced Glycation End Product in Human Saliva
Authors	Tertiș Mihaela Claudia, Cristea Victoria Cecilia, Băbțan Anida-Maria, Feurdean Nicoleta Claudia, Uriciuc Willi Andrei, Boșca Adina Bianca, Ilea Aranka
Institution	University of Medicine and Pharmacy „Iuliu Hatieganu” Cluj-Napoca
Patent	Patent application No. A/00171/2020 The invention relates to an electrochemical sensor constructed for the purpose of simultaneous salivary detection of two compounds of the category of advanced glyating agents, namely N (6) -carboxymethyl lysine (2-
Description EN	

amino-6- (carboxymethylamino) hexanoic acid) - CML and methylglyoxal (pyruvic aldehyde or 2-oxopropanal) - MGL. The salivary electrochemical sensor presented in this invention relates to an electrochemical cell consisting of three electrodes, this cell being screen printed together with the corresponding contacts on a planar polyethylene support. The sensor is then reversibly attached to an intraoral device - for example, but not limited to a splint, braces, prosthetic work, etc.

Class no.

4

RO.116.

Title EN

Food supplement with antioxidant / antiproliferative properties

Authors

Lucaciu Roxana Liana, Hangan Adriana Corina, Vicaș Laura Grațîela, Sevastre Bogdan, Hanganu Daniela, Sevastre-Berghian Alexandra Cristina, Páll Emőke, Ionescu Corina Maria Lucia

Institution

University of Medicine and Pharmacy „Iuliu Hatieganu” Cluj-Napoca

Patent

Patent application No. A/00004/2020

**Description
EN**

The invention relates to a food supplement represented by a fluid extract containing a mixture of lyophilized extracts of *Artemisia annua*, *Verbascum phlomoides* and *Centaurea cyanus* in a ratio of 1:1:1, dissolved in a hydro-glycerinated mixture (90:10). The phytoproduct can be used for its antioxidant / antitumor activity. The antioxidant activity of the three extracts and of their mixture was evaluated *in vitro* (DPPH method) and *in vivo* (SOD mimetic activity). Their cytotoxicity was determined by cell culture studies and the therapeutic efficacy-risk ratio was evaluated *in vivo* on mice. The therapeutic efficacy and their lack of toxicity was proved.

The problem solved by the invention is to provide a good ratio between the elements of the composition, with the aim to obtain a synergistic effect, a biocompatible phytoproduct, useful in neutralizing free radicals involved in oxidative stress, with a role in slowing down aging and preventing / treating cardiovascular diseases, neurodegenerative diseases, neoplasms, as adjuvant therapy or monotherapy.

The need to obtain such a phytoproduct derives

from the desire to capitalize on the plants of Romania's spontaneous flora, to sell local products to the detriment of imported ones, as well as to use the product as an antioxidant / antitumor for preventive / curative purposes.

Class no.

4

RO.117.

Title EN

Process For Preparing A Product To Be Applied In The Optimized Photothermal Therapy Of Hepatic Tumours

Authors

Mocan Lucian-Constantin, Iancu Cornel, Matea Cristian-Tudor, Ilie Ioana-Rada, Mocan Teodora.

Institution

University of Medicine and Pharmacy „Iuliu Hatieganu” Cluj-Napoca

Patent

Patent No. 130737/2020

**Description
EN**

The invention relates to a process for preparing a product to be applied in the photothermal therapy of hepatic tumours. According to the invention, the process consists in that the gold nanoparticles - GNP - are prepared in an aqueous medium and stabilized with citrate, after which they are functionalized with beta-mercaptoethanol, at a neutral pH, at the room temperature, for 15 min. The thus functionalized gold nanoparticles are then subjected to successive stages of centrifugation and redispersion by ultrasonication in bidistilled water, for removing the secondary reaction products.

Applications

The invention was developed as a prototype. It is currently in the experimental testing phase.

Class no.

4

“Alexandru Ioan Cuza” University of Iasi**RO.118.****Title EN****Interdisciplinary Analysis of Pottery from The Middle Bronze Age Settlements in Bistrița Rivers's Basin****Authors****Ana Drob****Institution****“Alexandru Ioan Cuza” University of Iași**

The interdisciplinary study of prehistoric ceramics is an approach with profound implications in archaeology, but, unfortunately a larger study addressing this category of artefacts from a quantitative, qualitative and comparative perspective has not been a topic of interest.

This research was determined by the existence of this issue, the main motivation being the need for a comprehensive approach, combining archaeological and scientific methods of investigation (OM, SEM-EDX, FT-IR, TGA/DTA), thus contributing in establishing an interdisciplinary discourse as part of current archaeological research.

This thesis is a scientific approach that correlates the results of two research directions in order to identify and understand the behavior of Middle Bronze Age communities, by highlighting the active role that pottery has played in these human groups. The first one is focused on the macroscopic study, associated with the archaeologist, which emphasizes the importance of this stage in understanding prehistoric pottery. The interdisciplinary direction involves additional information regarding macroscopic observations and identifying new data through physico-chemical analysis, which are related to the raw material used in pottery manufacturing, pyrotechnological skills and the use and reuse of vessels.

**Description
EN**

This approach, built on several case studies, highlights that the connection of archaeological knowledge and physico-chemical methods provides results that contribute to understanding the active role of pottery, which involves the whole process of manufacturing and use.

Therefore, the contribution of this thesis is represented by the creation of a "bridge" between two types of discourses, apparently parallel, by combining the results obtained from the two research directions, highlighting the need for a change in the approach to ceramic studies.

RO.119.	
Title EN	Statistical methods of analysis on game phases in volleyball using the application (ProVBallStat 3.0)
Authors	Stirbu Ilie-Catalin, Rohnean Adrian Ionel, Stirbu Catalina Mihaela
Institution	University “Al. I. Cuza” Iasi, Technical University “Gh. Asachi” Iasi
Patent	-
Description EN	Version 3.0 aims to make its mark on the game phases that involve taking over from the service, respectively the pick-up area, the receiver's reception area, the shooter's attack area and the attacking area. All this is materialized by recording the actions in a single command line, which gives it a high speed of recording and displaying the report in real time, which can quickly change the game and defense system of a team.
Class no.	13
RO.120.	
Title EN	The evolution of teleworking in the European Union based on fuzzy logic. Empirical evidence during the COVID 19 pandemic
Authors	Roxana Dicu ¹ , George-Marian Aevoae ¹ , Ioan-Bogdan Robu ¹ , Viorel Herghiligiu ² , Adrian Vilcu ² , Christiana Brigitte Sandu ¹
Institution	¹ Alexandru Ioan Cuza University of Iasi ² Gheorhe Asachi Technical University of Iași
Description EN	Since the first publication in this regard, tele-working was known as a way of the future, due to its flexibility and ease of access, allowing productive employees to work from home or other place of convenience, disregarding their gender. Given the fact that the financial crisis which began in 2008 with the bankruptcy of Lehman Brothers represented a turning point for the economy worldwide, this paper aims to analyze the tele-working phenomenon after this trigger event, considering the 2008-2020 period of time, with focus on the Covid-19 pandemic, for the 27 member states of the EU. Until 2019, data suggests that the access to internet, employment rate, and the average wage significantly influenced this option of the employees, without recording any gender differences. But the pandemic year, 2020,

showed some differences in the tele-working field. The two lockdowns showed different patterns. Thus, for the major lockdown (April-May), the average wage was not a significant variable of interest, while the internet access and the employment rate were. This might suggest that employees were not as much interested in their income, rather than maintaining the certainty of a job through tele-working, given the possibilities offered by internet. For the second wave (June-July), only the access to internet made a significant difference, whilst the other variables did not influence the perception regarding tele-work. This might suggest that, given the infrastructure already created in the first wave, if not before that, the employees took advantage of it and continued, in a lower scale, to keep the social distance, although the measures taken in the second wave were not perceived to be as though as in the first one. We tested the influences for both males and females and identified, as the literature already suggested, that the females are keener to tele-work than men.

Class no.

4

RO.121.**Title EN**

Using fuzzy logic in energy sector M&AS, based on sustainability dimensions and audit opinion

Authors

Ioan-Bogdan Robu¹, Viorel Herghiligiu², Roxana Dicu¹, George-Marian Aevoae¹, Adrian Vilcu², Cătălin Bălan²

Institution

¹ **Alexandru Ioan Cuza University of Iasi**

² **Gheorhe Asachi Technical University of Iași**

**Description
EN**

Economic globalization is the process which shapes the global economy, using mechanisms specific to market economy. Two main paths lead to business growth - either companies grow internally by using its resources, equities and internal investments, or firms pursue external growth strategies, by acquiring or merging with other firms. There is a well-known fact that cross-border mergers and acquisitions (CBM&As) are the main part of the foreign direct investment and that they are motivated by a large range of expected outputs, like the need for specialized resources or market expansion of the multinational companies. CBM&As in the emerging markets have shown an increase in the past years, notably in BRIC countries, Eastern Europe and Africa, the countries from the first group being among of the most

attractive markets in the world for these business concentrations showed in their research that the focus on sustainable development in the energy industry has led to an increase in the M&A activities. For the current research, we analyse the factors which influence the choice for the target companies from the energy sector, compared to other sectors. In the first place, we consider the macroeconomic factors (human development index – HDI and CO2 emissions) for the BRICS countries. In the next step of the analysis, we take into account ratios and data which characterize the target companies in the energy sector, compared to other sectors.

After considering the environmental and social factors which characterize the target country, we consider a number of financial ratios (return on equity, return on capital employed, the growth rate for the market capitalization) and a transparency score for these companies, that have the potential of explaining the choice of the MNEs. On the other hand, we want to analyse if the audit opinion on the financial statements of the target company plays an important role in the growth strategy of an investor, or if it is not interested in investing in an audited company.

Class no.

4

University of Craiova

RO.122.	
Title EN	HAND-FOREARM SYSTEM USED FOR HUMAN UPPER LIMB PROSTHETICS
Authors	Tarniță Daniela, Berceanu Cosmin
Institution	University of Craiova
Patent	Patent No. RO 128911 A2/ 29.11.2017 The patent's subject refers to an artificial hand-arm assembly composed by an anthropomorphic five finger artificial hand and an artificial forearm, linked by a revolute joint. The system comprises 16 revolute joints at hand level plus another revolute joint between artificial hand and artificial forearm, which allows the flexion-extension movements of the hand with respect to the forearm. The system reproduces the aesthetics, mass, dimensions and functionality of the human upper limb, and, in particular, of the human hand
Description EN	
Class no.	4
RO.123.	
Title EN	ORTHOTIC DEVICE USED FOR HUMAN KNEE JOINT AFFECTED BY GONARTHROSIS
Authors	Tarniță Daniela, University of Craiova, Tarniță Dănuț Nicolae, University of Medicine&Pharmacy, Craiova Catana Ionel-Marius, INAS, Craiova
Institution	University of Craiova, Romania
Patent	Patent Number: RO 132075/ 30.09.2019 The invention relates to an orthotic device used in the human knee joint orthotics affected by osteoarthritis in the medial compartment. It has the possibility of adjusting the angles of the components. Orthotic device used in the human lower limb orthotics wherein presents new elements that lead and contribute to minimizing the internal space of the lower limb and orthotic device by change of position components. Through fixing and tightening there are stabilized lateral movements in flexion-extension movements. The orthotic device makes it possible to conduct the people affected in the human knee showing the various stages of the osteoarthritis
Description EN	Applications Rehabilitation, Medicine, Orthopedics
Class no.	4

RO.124.	
Title EN	BALL AND SOCKET TYPE JOINT FOR ELBOW PROSTHESIS
Authors	Tarniță Dănuț Nicolae, University of Medicine and Pharmacy, Craiova Tarniță Daniela, Universitatea din Craiova, Boborelu Cristian, Emergency Hospital, Craiova Popa Dragoș Laurențiu, University of Craiova
Institution	University of Craiova
Patent	Patent RO 129147-A0 / sept. 2018
Description EN	<p>The invention relates to a new model of elbow prosthesis which has the operating principle hinge model, with a spherical shape. The elbow prosthesis according to the invention has the following advantages:</p> <ul style="list-style-type: none"> • It has a simple construction, easy to perform; • It consists of two components that are implanted separately easily; • The destruction of bone for implantation is small; • Intracapsular implantation is performed, which provides greater stability elbow prosthesis after implantation; • The prosthesis allows motion in the frontal plane, which leads to lower stress in ulna and humerus bones; • The two components are coupled without the use of other devices, which, in other types of prostheses, produce fouling elements of movement, resulting in limitation of movement of the joint. <p><i>Applications Rehabilitation, Medicine, Orthopedics</i></p>
Class no.	4

RO.125.	
Title EN	Exoskeleton intended for human motion assistance and rehabilitation
Authors	Geonea Ionut Daniel, Nicolae Dumitru, Sorin Dumitru, Cristian Copilusi, Leonard Ciurezu-Gherghe
Institution	University of Craiova / Faculty of Mechanics
Patent	RO 134430 B1 / iunie 2021
Description EN	<p>In this patent, a locomotion assistance system for people with locomotor disabilities is designed. The proposed system for assisting human locomotion consists of two leg mechanisms and an upper frame that attaches to the human subject. The invention relates to a mechatronic system of the exoskeleton type, intended to assist the walking of locomotor disabled persons. According to the invention, the system consists of two mechanisms with articulated bars which</p>

materialize one leg of an exoskeleton, each mechanism having a structure consisting of seven mobile kinematic elements (1, 2, 3 ... 7), which are connected to each other by means of some bolts (15), where the first leading element (1) for the exoskeleton leg is a crank fixedly assembled to a drive shaft (13) and an electric gear motor (10) which transmits the movement by means of a chain transmission consisting of two chain wheels (11 and 12) to the motor shaft (13), which is rotary supported on an upper frame (9), the lengths of the last elements (6 and 7) being adjustable depending on the anthropomorphic dimensions of the subjects.

Class no. 4

Transilvania University of Brasov

RO.126.	
Title EN	Can City Branding Through Culture Lead to Economic Growth and Innvovation?
Authors	<i>Pătrașcu (Ciuculescu) Elena-Lavinia, Luca Florin-Alexandru</i>
Institution	Universitatea Transilvania din Brașov, Universitatea Tehnica “Gheorghe Asachi” din Iasi
Description EN	In a constant competition to attract professionals, students and tourists, cities all over the world are adopting complex branding strategies. This paper aims to research the correlation between cities branded through culture (or 'cultural cities'), economic growth and innovation.
Class no.	14

Babes-Bolyai University, Cluj-Napoca

RO.127.	
Title EN	Photopolymerizable giomer composition
Authors	Prejmerean Cristina, Moldovan Marioara, Prodan Doina, Buruiana Tinca, Silaghi-Dumitrescu Laura, Sarosi Liana Codruta, Vlassa Mihaela, Colceriu-Burtea Adela Loredana, Hodisan Ioana, Boboia Stanca, Dadarlat Dorin Nicolae, Sreza Mihaela, Agapescu Camelia
Institution	Babes Bolyai University, Cluj-Napoca Iuliu Hatieganu University of Medicine and Pharmacy, Cluj-Napoca
Patent	Patent no. RO 132534 / 30.09.2019
Description EN	<p>The invention relates to a composition of a photopolymerizable dental material of the giomer type, consisting of an organic matrix based on poly (methacrylic) monomers and a hybrid filler containing pre-reacted glasses and the process for obtaining it. Giomer, in addition to the specific properties of dental composite diacrylic resins, aesthetic appearance, adhesion to dental hard tissues, adequate mechanical properties, biocompatibility, has properties of controlled release, loading and re-release of fluoride ions. Due to its properties of continuous release, recharging and re-release of fluoride ions can prevent the formation of secondary caries and can be used as a restorative material or caries prophylaxis material in children by sealing pit and fissures.</p>
	<p>ADVANTAGES of using gomers in dental materials:</p> <ul style="list-style-type: none"> - development of "smart materials" that respond to oral microflora by releasing chemotherapeutic and antimicrobial fluorides removes the shortcomings of composite fillings; - obtaining a dental product with superior properties, characterized by physiognomic aspect, superior physico-chemical and mechanical properties, as well as continuous and controlled release of fluoride ions over time; - glass-ionomer might turn out to the more reliable restorative material in minimal invasive dentistry based on adhesive techniques.
Class no.	DISADVANTAGES: High initial solubility. 4

RO.128.	
Title EN	Teeth whitening gel composition based on natural agents
Authors	Moldovan Marioara, Prejmorean Cristina, Prodan Doina, Silaghi-Dumitrescu Laura, Saroși Codruța, Cuc Stanca, Dudea Diana
Institution	Babes Bolyai University, Cluj-Napoca
Patent	Iuliu Hatieganu University of Medicine and Pharmacy, Cluj-Napoca
Description EN	<p>Patent no. RO 131614/ 29.01.2021</p> <p>The present invention relates to a gels designed for natural whitening and teeth remineralization. The whitening gel contains lyophilized extracts from fruit and vegetable juices and /or nanofillers for remineralization. It has the following characteristics: good gel consistency, does not leak from the applied surface, increased biocompatibility due to whitening compounds from natural sources, water solubility, easy to remove by brushing to remove from the tooth surface, increased efficiency in whitening stained teeth, the possibility of remineralization of hard tissues and last but not least the lower cost price than in the case of traditional bleaching materials based on peroxide.</p> <p>ADVANTAGES OF USE: the comfort of applying and using natural whitening gel, without attending dental offices; gel consistency and very good craftsmanship; increased biocompatibility due to bleaching compounds from NATURAL sources; increased efficiency in whitening stained teeth; the possibility of remineralization.</p> <p>PRECAUTIONS: Do not use whitening gel to people who are allergic to the components of the product. Avoid contact of the gel with the skin or oral mucosa.</p>
Class no.	4

RO.129.	
Title EN	Porous bioactive glass doped with gold nanoparticles
Authors	Klara Magyari, Timea Nagy-Simon, Adriana Vulpoi, Lucian Baia
Institution	Babes-Bolyai University
Patent	RO 13234 (2020)
Description EN	<p>The invention relates both to the process for obtaining glasses and to the successful testing of their functionality. The obtaining process of glasses with gold nanoparticles consists in synthesizing the glass by sol-gel method and</p>

introducing into the sol the gold nanoparticles embedded in block copolymer. The evaluation of the *in vitro* bioactivity of the obtained glasses was performed in simulated biological fluid and the bioactivity of these materials was proved. *In vitro* biocompatibility has been demonstrated by adsorption of serum albumin, as well as cell viability assays. The gold nanoparticles retain their properties after embedding in the glass matrix.

Applicability of the material:

- Soft tissue regeneration

Hard tissue regeneration

Class no.

4

University "Valahia" from Târgoviște

RO.130.	
Title EN	Nanomaterial used to consolidate the decorative elements of historical heritage buildings and their preparation process and applications
Authors	Rodica Mariana Ion, Cristiana Radulescu, Lorena Iancu, Laura Monica Gorghiu, Ramona Marina Grigorescu, Madalina Elena David, Nelu Ion, Sofia Slamnoi-Teodorescu
Institution	University 'Valahia' from Târgoviște, Romania
Patent	ICECHIM, Bucharest, Romania Patent application No. A 00531/07.09.2021
Description EN	The present invention refers to the preparation of a nanomaterial based on SiO ₂ and CaO and its application for the consolidation of architectural decorative elements - stuccoes and façade ornaments from historical buildings, and the reconditioning of the damaged ornamental elements of the historical buildings, at the procedure of its preparation and application. The process of application and use of nanomaterial solution is characterized, according to the invention, by drying and grinding the reconditioned parts, then applying two or three layers of nanomaterial solution, achieving a layer of 0.2 mm thick, followed by drying in the open air for 12 h, obtaining a strengthening layer, uniformly covering the cracks, crevasses and voids in the surface structure stable in time, thermally stable, on the entire surface applied, there being no change in the appearance, color, or clarity of dispersion.
Class no.	7

Dunarea de Jos University of Galati

RO.131.	
Title EN	IMPROVEMENT OF ASPHALT MIXTURES WITH GRIT WASTE AND MICROPLASTICS
Authors	Daniela Laura BURUIANĂ, Puiu Lucian GEORGESCU, Gabriel Bogdan CARP, Viorica GHISMAN, Cristian Cătălin STANCIC
Institution Patent	Dunarea de Jos University of Galati Pending
Description EN	The invention relates to the technological eco-innovation of introducing polypropylene microplastics in the recipe of the asphalt mixture and of partially replacing the natural resources with the waste grit from the blasting process of the ship's hulls. The invention relates to an improved asphalt mixture with waste grit from the process of sanding ship hulls and with polypropylene microplastics, the so-obtained asphalt mixture having improved mechanical resistance and resistance to wear, to the action of water or other exogenous agents, as compared to the standard asphalt mixture.
RO.131BIS	
Title EN	New Insights in vitiligo treatment using bioactive compounds from Piper Nigrum
Authors	Alin Laurențiu tatu, Olimpia Dumitriu Buzia, Kamel Earar, Rodica Mihaela DINICA
Institution Patent	Dunarea de Jos University of Galati Pending
Description EN	This study shows that Piper nigrum (PN) extract and its major alkaloid, piperine, promote melanocyte proliferation in vivo, consistent with previous studies. A PN fruit extract and pure piperine were integrated into two different ointments and tested on human subjects affected by vitiligo. The test was performed on 3 human subjects, all females, between 40 and 70 years of age, comprising 18 vitiligo wounds, located mainly on the limbs and throat. We tested the ointments alone and in combination with a travoprost solution of 40 µg / ml, because periorcular pigmentation was observed in recent studies in patients treated with prostaglandin analogues for glaucoma. The pigmentation was done in all the treated areas. The extract produced faster and more remarkable results than pure piperine. The combination of the travoprost solution accelerates the process and changes the pigmentation pattern, especially when it is associated with the PN extract. Our early studies suggest that PN extract may, in the future, be a new treatment option for vitiligo, especially given the mild side effects of the tested products and the short time required for repigmentation

**”Ion Ionescu de la Brad” Iasi
University of Life Sciences, Romania**

RO.132.**Title EN**

Evaluation of sustainability of eco-friendly processes used in wastewater treatment based on an integrated environmental and economic assessment approach

Authors

Raluca Maria Hlihor, Isabela Maria Simion, Cătălina Filote, Mihaela Roșca, Petronela Cozma, Maria Apostol, Maria Gavrilăscu

Institution

”Ion Ionescu de la Brad” Iasi University of Life Sciences, Faculty of Horticulture, Department of Horticultural Technologies

**Description
EN**

The project “Evaluation of sustainability of eco-friendly processes used in wastewater treatment based on an integrated environmental and economic assessment approach (SusTrEE)” aims at providing optimal solution(s) in terms of non-conventional and eco-friendly wastewater treatment processes sustainability by aligning environmental, human health, economic and social interests based on the development of an experimental demonstration model which works as a validated framework. The overall objective of the SusTrEE project focuses on eco-friendly and non-conventional technologies such as biosorption and bioaccumulation used for the removal of persistent pollutants by considering life cycle assessment (LCA) and life cycle costing (LCC) methodologies, which will allow their integration in large-scale systems. Thus, for the sustainable application of biosorption and bioaccumulation processes in large-scale system facilities, considering LCA and LCC frameworks, several specific tasks have been established: (1) detailed analysis of eco-friendly and low-cost non-conventional processes (e.g. biosorption and bioaccumulation) used for the removal of persistent pollutants from wastewaters relative to the operating conditions, energy consumption and/or residuals; (2) evaluation of environmental and human health impacts generated during processes application based on LCA framework; (3) evaluation of overall costs of wastewater treatment strategies and moving forward to determine how different alternatives impact the final consumer considering LCC framework; and (4) assessing spatial and temporal

distribution for toxic emissions in LCA in terms of ecotoxicity and human toxicity impact categories. Considering all these specific objectives, SuSTrEE project strategy will allow the identification of processes application advantages and disadvantages based on human, environmental and economic impacts.

This work was supported by a grant of the Ministry of Research, Innovation and Digitization, CNCS/CCCDI – UEFISCDI, project number PN-III-P2-2.1-PED-2019-2430, contract no. 439PED/2020, within PNC DI III.

RO.133.	
Title EN	Tailor-made human health risk assessment framework for evaluating the toxicity caused by heavy metals contamination of herbal based products used in phytotherapy and cosmetics
Authors	Raluca Maria Hlihor, Maria Apostol, Laura Hagiuz Zaleschi, Isabela Maria Simion, Dana Asiminicesei, Gabriel-Ciprian Teliban, Stavarache Mihai, Adrian-Ilie Nazare, Maria Gavrilescu
Institution	”Ion Ionescu de la Brad” Iasi University of Life Sciences, Faculty of Horticulture, Department of Horticultural Technologies
Description EN	The project “Tailor-made human health risk assessment framework for evaluating the toxicity caused by heavy metals contamination of herbal based products used in phytotherapy and cosmetics (RiskToxPlants)” has as fundamental objective the development of a human health risk assessment framework aiming to improve the quality of life by providing appropriate recommendations for safety levels of metals contained in medicinal plants used for phytotherapy and cosmetology. To meet the complexity of the overall objective, we have established several specific objectives: (1) to provide a systematic and detailed analysis of human health risks generated by the exposure to herbal plants contaminated with heavy metals used in phytotherapy and cosmetology according to the state of the art, (2) to investigate the growth and development of three plant species (lavender - <i>Lavandula angustifolia</i> L., basil - <i>Ocimum basilicum</i> L. and oregano - <i>Origanum vulgare</i> L.) - which will act as model plants - used as medicinal plants and

in plant-based products for cosmetic preparations under heavy metals stress (lead, cadmium and nickel) - which will act as model pollutants - and their detoxification/antioxidative pathways (mechanisms), and (3) to quantify the potential risks to human health based on the intake of heavy metals considering 2 routes of exposure, i.e. ingestion and dermal contact. The limitations of current approaches within the toxicity to human health caused by herbal based products containing heavy metals, provide us the opportunity to further investigate this complex field, underlining the international competitiveness of the RiskToxPlants project.

This work was supported by the Romanian Ministry of Education and Research, CNCS - UEFISCDI, project number PN-III-P1-1.1-TE-2019-1200, contract no. TE120/2020.

University of Agronomic Sciences and Veterinary Medicine of Bucharest

RO.134.
Title EN

Topical product for the protection of the skin from the action of artificial light

Authors

Cristina Monica Papa, Emanuel Vamanu

Institution

University of Agronomic Sciences and Veterinary Medicine of Bucharest

Patent

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**Description
EN**

Pigmentation of human skin is a complex biological process, and sun exposure is considered the main factor responsible for it. Most of the effects of sun exposure on the skin, related to UV radiation, cause oxidative stress. The functional product aims to combat/remedy the problems caused by the appearance of oxidative stress through blue light through a combination of natural extracts. Testing the extracts from the composition of the product (cream) includes the following steps: the effect of blue light by *in vitro* and *in vivo* study - yeasts; the effects caused on some cell lines - keratinocytes; characterization of plant and mushroom extracts and their combination in an original formula that protects against the effects of exposure to blue light; making a cream with an effect of reducing oxidative stress caused by the action of blue light. Thus, the proposed product contains a cream base of natural ingredients and extracts of red currant (*Ribes rubru*), blueberry (*Centaurea cyanus*), hot lettuce (*Lactarius piperatus*). It is initially tested, being a stable formula, with *in vitro* protection against the action of oxidative stress induced by UV radiation.

RO.135.	
Title EN	Ecological extracts from burdock waste - obtaining process and potential therapeutic use
Authors	Alina Ortan, Simona Spinu, Radu Fierascu, Anda Baroi, Irina Fierascu, Toma Fistos
Institution	University of Agronomic Sciences and Veterinary Medicine of Bucharest
Patent	<p>Patent application No. A00187/12.04.2022</p> <p>The present invention relates to a plant extract obtained from a species of the genus <i>Arctium</i>, with concomitant antioxidant and antimicrobial properties. The process according to the invention involves the use of the microwave-assisted extraction method, followed by concentration on a rotary evaporator and freeze-drying.</p> <p>The plant extracts are obtained through a process with good extraction efficiency of the active principles, the product obtained is ecological and natural, it presents simultaneously</p>
Description EN	<p>two types of therapeutic action: antioxidant and antimicrobial, it has potential applications in natural treatments for topical use, which does not involve the use synthesis substances against which high resistance has developed over time.</p> <p>This work was supported by a grant of the Romanian Ministry of Education and Research, CCCDI-UEFISCDI, project number PN-III-P3-3.5-EUK-2019-0226, contract 220/2020 within PNCIDI III.</p>

1 Banat's University of Agricultural Sciences and Veterinary Medicine "King Mihai I of Romania" from Timisoara

RO.136.	
Title EN	NOCI DOLCI
Authors	Moldovan Camelia, Botău Dorica, Bordean Despina Maria, Borozan Aurica-Breica, Dogaru Diana Veronica, Drugă Mărioara, Dumbravă Delia-Gabriela, Hădărugă Nicoleta Gabriela, Mișcă Corina Dana, Moigrădean Diana, Poiana Mariana-Atena, Popa Viorica Mirela, Raba Diana-Nicoleta, Rădoi Bogdan Petru, Ștef Ducu Sandu
Institution	Banat University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania"
Patent	M2022/001355
Description EN	<p>NOCI DOLCI is a sweet mix of peanuts, walnuts, hazelnuts and chestnuts without sugar; it is a product range which has an innovative character given by recipe and nutritional value through addition of ingredients appreciated by consumers; it is a perfect alternative, as a spreadable cream or a desert ready-to-eat.</p> <p>This product addresses to general consumption, being very suitable for people with diabetes or those on a ketogenic diet. The main advantages of NOCI DOLCI consist of substantially lower caloric value and lower carbohydrate content than similar products on the market.</p>
RO.137.	
Title EN	GEM-JAM Functional Food
Authors	Despina – Maria Bordean, Adrian Rivis, Ducu-Sandu Ștef, Camelia Moldovan, Delia Dumbrava, Liana Maria Alda, Diana Nicoleta Raba, Mirela Popa, Mariana-Atena Poiana, Aurica Breica Borozan, Laura Radulescu, Simion Alda
Institution	Banat's University of Agricultural Sciences and Veterinary Medicine" King Mihai I of Romania" from Timisoara, Romania
Patent	M2022/001357
Description EN	<p>GEM-JAM refers to a functional, dietary product made from pumpkin (<i>Cucurbita maxima</i>), ginger root (<i>Zingiber officinale</i>), lemon (<i>Citrus limon</i>), basil seeds (<i>Ocimum basilicum</i>) and polyfloral honey. The product is obtained at temperatures where the active ingredients are protected and</p>

is intended for people who want to eat healthy functional food. The product is packed with high content of minerals, fiber, polyphenols and antioxidant capacity, due to the presence of ginger, and basil seeds. The mucilaginous seeds enrich visual and functional properties of the product. The sweet taste is offered by the beautiful orange pumpkin mass and polyfloral honey. Aroma, taste and aspect make this product to be appreciated as “*the gem*” of jams. The product can be used as it is, or in variety of foods such as confectionery, bakery and fillings of cakes.

RO.138.	
Title EN	Magnifique Biscuit
Authors	<i>Mișcă Corina Dana, Botău Dorica, Bordean Despina Maria, Boroșan Aurica-Breica, David Ioan, Dogaru Diana Veronica, Drugă Mărioara, Dumbravă Delia-Gabriela, Hădărugă Nicoleta-Gabriela, Moldovan Camelia, Poiana Mariana-Atena, Popa Viorica Mirela, Raba Diana-Nicoleta, Rădoi Bogdan Petru, Rinovetz Alexandru Erne, Ștef Ducu Sandu</i>
Institution	Banat University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania"
Patent	M2022/001390
Description EN	Magnifique Biscuit is a range of biscuits obtained by superior use of dried bean sheaths, in various manufacturing variants. These biscuits are characterized by a high dietary fiber content, high satiety and are gluten-free. Magnifique Biscuit range is addressed to any consumer, even those with special nutritional needs (diabetics, overweight people, people with celiac disease).
RO.139.	
Title EN	VEGAN GOODIES – CHEESE LIKE
Authors	Authors: Dumbravă Delia-Gabriela, Botău Dorica, Bordean Despina Maria, Boroșan Aurica Breica, Dogaru Diana-Veronica, Drugă Mărioara, Hădărugă Nicoleta Gabriela, Mișcă Corina Dana, Moldovan Camelia, Poiană Mariana Atena, Popa Viorica-Mirela, Raba Diana-Nicoleta, Rădoi Bogdan Petru, Ștef Ducu Sandu
Institution	Banat's University of Agricultural Sciences and Veterinary Medicine „King Michael I of Romania” from Timișoara
Patent	REGISTERED TRADEMARK M2022/001351

Description EN	<p>In recent years we are witnessing a growing demand from consumers for vegan cheese products.</p> <p>The VEGAN GOODIES - CHEESE LIKE product range includes a variety of vegan cheese assortments, obtained from natural raw materials, with high quality protein, good fats, antioxidants, being both healthy and very tasty products, similar to dairy cheeses, from organoleptic point of view, but being cholesterol free, lactose free and safe for a wider category of consumers (including those with lactose intolerance, cholesterol restrictions or vegans).</p> <p>The raw materials used for mozzarella, gorgonzola or other cheese products are chickpeas, coconut milk, soy milk, almonds, cashews. Agar-agar, tapioca starch and white miso paste (obtained from fermented soybeans) were used for coagulation of products, for texture and for fermentation, respectively</p>
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RO.140.	
Title EN	Grape Skins Fortified Pasta by AKADEMIKAFood
Authors	Mariana-Atena Poiana, Cristina-Georgiana Torjoc, Ersilia-Calina Alexa, Diana-Nicoleta Raba, Adrian Rivis, Diana Moigradean, Camelia Moldovan, Luminita Pirvulescu, Viorica-Mirela Popa, Delia-Gabriela Dumbrava, Isidora Radulov, Ileana Cocan, Despina-Maria Bordean, Corina-Dana Misca
Institution	Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" from Timisoara
Patent	TRADEMARK REGISTRATION CERTIFICATE AT OSIM - ROMANIA No. 177211/2021 (M2021/002692)
Description EN	<p>The TRADEMARK Grape Skins Fortified Pasta by AKADEMIKAFood refers to pasta formulas obtained by addition of grape pomace skins (GPS) separated from grape pomace which results as the main by-product of Pinot Noir and Italian Riesling grapes vinification. The idea behind this application focused on the fact that, so far, there are limited studies on the use of winemaking by-products, as a source of polyphenolic compounds, to develop pasta formulas with improved antioxidant and sensory properties. Prior to use, grape pomace was conditioned by drying at a moderate temperature to avoid degradation of the bioactive compounds. The grape pomace skins separated from the</p>

conditioned grape pomace, have been used in powder form in the traditional pasta recipe by substituting wheat flour in percentages of 3, 6 and 9% (w/w) as a functional ingredient to develop innovative value-added pasta formulas. The incorporation of GPS in the pasta recipe has led to significant increases of the total polyphenol content and antioxidant activity depending on the percentage of GPS used, as well as the grape variety which the skins were derived. It was noticed that the incorporation of GPS is recommended up to a percentage of 6% to develop pasta formulas with improved organoleptic attributes and functional properties. A higher level a 9% led to difficulties in the dough processing, in response to the decrease in gluten content and, consequently, the decrease in dough elasticity.

RO.141.	
Title EN	Natural products used in the treatment of bacterial origin mastitis
Authors	Tulcan Camelia, Hutu Ioan, Mircu Calin, Radulov Isidora, Iancu Tiberiu, Obistioiu Diana, Cocan Ileana, Boldura Oana, Gaspar Cristina, Torda Iuliu
Institution	Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I" from Timișoara, Romania
Patent	A 100567 / 22.09.2021
Description EN	The present invention consisted in a natural product with therapeutic effects for the treatment of mastitis with bacterial etiology, having a specific field of application: veterinary medicine. In fact, the invention's purpose was to ensure the anti-inflammatory, antibacterial and regenerative effect on the mammary gland tissue. In this context, three types of ointments were prepared, depending on the predominant mastitis phase: I with a predominantly regenerative role, II with a predominantly antimicrobial role and III with an anti-inflammatory role. The first lanoline-based cream contains an active complex represented by <i>Ocimum basilicum</i> , <i>Calendula officinalis</i> and Propolis extracts, as well as thyme, carrot, and wheat germs essential oils. The second cream's complex contains <i>Salvia officinalis</i> , <i>Chelidonium majus</i> , <i>Allium ursinum</i> and <i>Cynara scolymus</i> extracts, clove, carrot and wheat germs essential oils, with a lanoline cream base.

The third lanoline-ointment's active complex is represented by the *Calendula officinalis*, *Allium ursinum*, *Cynara scolymus*, *Betonica officinalis* and *Tagetes patula* and *Dioscorea communis* extracts, as well as the carrot and wheat germs essential oils.

RO.142.**Title EN**

Organization and optimization of agricultural farms through geomatic technologies: UAS and GIS

Authors

Luminița Cojocariu¹, Loredana Copăcean¹, Mihai Simon², Cosmin Popescu¹

Institution

¹Banat's University of Agricultural Sciences and Veterinary Medicine "King Mihai I of Romania" from Timisoara
²RTK ATLAS SURVEY S.R.L.

Patent

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**Description
EN**

Geomatic technologies, involved in more and more fields of activity, are also useful in the agricultural field, in different segments. One of these can be considered the "computerization" and "spatialization" of agricultural farms. For this, a geomatic model was created in which data purchased with WingtraOne UAS equipment were used, subsequently processed with GIS applications. The model of organization and optimization of an agricultural farm responds to several practical requirements: the spatial location of all components of the farm (spaces for feed storage, spaces for animals, administrative buildings, exploited agricultural land, etc.); hierarchy and creation of parcel registers that contain both the graphic representation of the lands in exploitation, as well as different attributes related to them (surface, mode of exploitation, existing culture, fertilization, taxation, etc.); data integration in geo-intelligent applications that provide different models and analyzes of economic efficiency. The result of the application of this model is the "geo-intelligent farm", which can be connected to "smart" operating systems and for which all factors of an agricultural, environmental or management nature can be analyzed and marked on maps or graphs, in order to operate at high performance standards.

RO.143.	
Title EN	Geomatic models for determining the physical and functional changes in the agro-forestry-pastoral systems
Authors	Loredana Copăcean ¹ , Luminița Cojocariu ¹ , Mihai Simon ²
Institution	¹ Banat's University of Agricultural Sciences and Veterinary Medicine "King Mihai I of Romania" from Timisoara ² RTK ATLAS SURVEY S.R.L.
Patent	-
Description EN	<p>Agriculture and animal husbandry can no longer be seen only as a human-animal relationship, but as a complex integration in specialized ecosystems, respectively agro-forestry-pastoral systems. Depending on local practices and specific traditions, the land surfaces have undergone changes, both in terms of extension and spatial location, the dynamics of this space being analyzed by remote sensing and GIS methods, based on aerial and / or satellite imagery. The proposed working model involves geospatial data from different time periods and automated comparison of results to capture quantitative and qualitative changes in time and space. Land Change Modeler (LCM) was used, implemented in GIS software, one of the most useful tools in the analysis of changes in land use, but also for making predictions, important in land planning and management. This tool allowed the detailed investigation of the land use in the reference years, but also the "transitions" from one category of land use to another. Graphic materials and thematic maps derived from satellite images are useful tools in agronomic and ecological management of agro-forestry-pastoral systems, as they highlight: the evolution of land cover in the area of interest, individual analysis of components of the whole system, optimal solutions for sustainable management or aspects related to the availability of possible resources to be exploited.</p>
RO.144.	
Title EN	Techniques for exploiting three-dimensional models for extracting data used in patology
Authors	Margareta Măgureanu ¹ , Loredana Copăcean ¹ , Mihai Simon ² , Luminița Cojocariu ¹
Institution	¹ Banat's University of Agricultural Sciences and Veterinary Medicine "King Mihai I of Romania" from Timisoara ² RTK ATLAS SURVEY S.R.L.

Patent

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The variability of the environmental conditions requires the detailed analysis of the grasslands by holistic methods, which should “combine” all the factors of the physical environment, at any point on the investigated surface. The purpose of the proposed analysis model was to extract relevant information in pratological studies, by processing three-dimensional models generated from altimetric models and topo-cadastral data. The input data were: Digital Elevation Model, aerial and satellite images, with different spatial resolutions and topo-cadastral data. Essential data were considered: altimetric values, both punctual and in the form of continuous images (raster), slope of the terrain (length and inclination), slope orientation, morphometry and morphology of the relief (with direct implications on water runoff and accumulation); all these elements have a direct and indirect influence on the vegetation of the grasslands. The following were also extracted: longitudinal and transverse profiles, data related to the topography of the area and neighborhoods, limiting factors and risk processes. The advantages of this working model are: the punctual approach but also on the entire investigated surface; the diversity of the extracted data; applicability in any area of interest; the possibility of integration with other geospatial data; exclusion of "field visits"; the accuracy and precision of the resulting information.

**Description
EN****RO.145.****Title EN**

Technical solutions for the generation and exploitation of the "virtual tour" as a data source in agricultural practice

Authors

Mihai Simon², Loredana Copăcean¹, Cosmin Popescu¹, Luminița Cojocariu¹

Institution

¹Banat's University of Agricultural Sciences and Veterinary Medicine "King Mihai I of Romania" from Timisoara
²RTK ATLAS SURVEY S.R.L.

Patent

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**Description
EN**

Documentation and presentation of the virtual space have become possible and popular with the introduction of new technologies, equipment and software. The aim of the proposed working model was to provide solutions for the generation and operation of an "enhanced virtual tour",

which would allow the transformation of the image of a physical space into virtual reality, through mobile LiDAR scanning equipment and geomatic technology. The result is a virtual tour similar to Google Street View, but more complex due to the fact that LiDAR data was purchased, in addition to images during the scan, so there is the possibility to perform various measurements within the virtual tour. The inclusion of data in the virtual tour offers, in addition to the measurable elements, the possibility of summative analysis of all components of the pastoral space, from "strengths" to "opportunities" and "risks". Applicable to any space, indoor or outdoor, the way of presenting through spherical images, positions us inside a "virtual globe" that allows us to fully and integrately explore space. The model meets some practical requirements: evaluation of the agricultural potential of the area, evaluation of the tourist potential, reconstruction of the space, territorial planning, etc., but also with theoretical implications in the scientific research in the field. By scanning with LiDAR equipment can be extracted both top-cadastral information and physical-geographical data very useful in assessing the natural potential of the area. Indirectly, by interpreting the images, some socio-economic aspects can be deduced to outline the anthropic framework.

RO.146.**Title EN****MODELS FOR DESCRIBING FLOWER SIZE AND FLOWERING TIME IN CHRYSANTHEMUMS****Authors**

Maria BALA, Florin SALA

Institution

Banat University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" from Timisoara

Patent

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**Description
EN**

Regression analysis was used to obtain models that described the variation of flower diameter (FD) and flowering time (FT) for some chrysanthemums cultivars in greenhouse conditions: 'Yellow Snowdon', 'Tom Pearce', 'Palisade' si 'Avignon'.

It was found that a number of shoots (SN-T1, 2.223; SN-T2, 2.765), provided large flowers. The height of the shoots of 27.191 cm (SH-T1) and 91.816 cm (SH-T2) showed optimal values in relation to the flowering time (FT).

RO.147.	
Title EN	AGRICULTURAL LANDS SPATIAL VARIABILITY EVALUATION BASED ON AGROCHEMICAL INDICES FOR DIFFERENTIATED FERTILIZATION MANAGEMENT
Authors	Radu BERTICI, Daniel DICU, Mihai HERBEI, Florin SALA
Institution	Banat University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" from Timisoara
Patent	-
Description EN	The study evaluated soil fertility based on specific agrochemical indices, in order to characterize the spatial variability of the agricultural land studied, and for differentiated fertilizers management. The agricultural land under study is located in the area of Tormac, Timis County, Romania. The soil is of the stagno-gleyic preluvosol type, medium loam-clay. Soil reaction (pH), humus content (H%), phosphorus content (P, ppm), and potassium content (K, ppm) were analyzed. The values of the degree of saturation in bases (V%) and the nitrogen index (NI) were determined. There were low values of the coefficient of variation in the case of soil reaction ($CV_{pH} = 7.4868$) and high values in the case of phosphorus content ($CV_P = 44.186$). The other agrochemical indices studied had intermediate values in terms of coefficient of variation ($CV_V = 16.8066$; $CV_{NI} = 22.0252$; $CV_K = 27.3909$).
RO.148.	
Title EN	THE SELECTION OF PLANT EXTRACTS FROM <i>ARISTOLOCHIA CLEMATITIS</i> L WITH ANTIMICROBIAL APPLICATIONS IN THE MEDICAL AND COSMETIC FIELDS
Authors	Borozan Aurica Breica, Popescu Sorina, Moldovan Camelia, Dumbrava Delia, Misca Corina, Popa Mirela, Botau Dorica, Bordean Despina, Raba Diana, Posta Gheorghe
Institution	Banat University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" from Timisoara
Patent	-
Description EN	Although <i>Aristolochia clematitis</i> L is considered a toxic plant, its richness in chemical compounds, the beneficial effects mentioned in various bibliographic sources and insufficient pharmacological, microbiological and

oncological studies have led us to include it in our research. Wide range of compounds such as aristolochic acid, magnoflorin, trimethylamine, volatile oil, flavonoids, dioxiphenalamine, mineral salts, phytosterols, sitosterols, hydroxycinnamic acid derivatives, allantoin, resins, flavonic compounds, recommend this plant, are used in pharmacological and cosmetic applications. The analgesic, diuretic, anti-inflammatory, detoxifying, skin-relieving effects are reminiscent of the pharmacological properties of this plant.

The aim of this study is the antimicrobial screening of *Aristolochia clematitis* L extracts from the garden and health food stores. The evaluation of the efficacy of the extract with high antimicrobial potential was also performed by molecular tests. The extracts were obtained from dried leaves, although some research claims that the dried and fresh root has higher oil content.

The effect of the extracts varies depending on the bacterial strain. Of the two extracts, the extract of *Aristolochia clematitis* L (harvested from the garden) on the bacteria *S. epidermidis* and *E. coli* had the greatest inhibitory effect. Molecular analyzes showed that after treatment with wolf apple, for a short period of time, *Pseudomonas aeruginosa* cells did not acquire resistance to the compounds in wolf apple extracts.

RO.149.	EVALUATION OF THE ANTIMICROBIAL ACTIVITY OF AN ORIGINAL STRAIN OF <i>NOSTOC</i>, WITH PHARMACOLOGICAL AND COSMETIC POTENTIAL
Title EN	
Authors	Borozan Aurica Breica, Trofim Alina, Popescu Sorina, Moldovan Camelia, Dumbrava Delia, Misca Corina, Popa Mirela, Botau Dorica, Bordean Despina, Raba Diana
Institution	Banat University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" from Timisoara
Patent	-
Description EN	Extracts of cyanobacteria, obtained from an original strain of <i>Nostoc halofilum</i> , isolated from a soil in the Republic of Moldova, were used for microbial tests. <i>Nostoc halofilum</i> was characterized morphologically and biochemically in the

laboratory of "Phycobiotechnology", by Dr. Trofim Alina. This species is mentioned in the literature as being present in the ecosystems of the Republic of Moldova, Romania and the Czech Republic, but in the absence of its identification for a long time, it can be said that this taxonomic classification is an important step for the conservation of this strain. Following the present research, the morphological and biochemical characteristics were completed with the antimicrobial profile of the strain. The pigments contained in cyanobacteria (chlorophyll, carotenoids, phycocyanin, phycoerythrin, mixo-xanthophyll) have an antioxidant, antiviral, antiseptic and anti-aging effect. Compared to other species of cyanobacteria of the genus *Nostoc*, this strain is characterized by a high content of polysaccharides, proteins and phycoerythrin, which has a high antioxidant capacity. The results were dependent on the concentration of the extracts. Also, the variation of the response was determined by the nature of the microbial strain. The extract showed high antimicrobial potential at the highest concentration. Among the microbial strains, *Pseudomonas aeruginosa* ATCC 27853 was strongly inhibited at this concentration, while *Aspergillus niger* showed resistance.

RO.150.**Title EN**

**CHARACTERIZATION OF A PASTURE AREA
BASED ON SOIL AGROCHEMICAL INDICES AND
IMPROVEMENT MEASURES**

Authors

Daniel DICU, Radu BERTICI, Mihai HERBEI, Florin SALA

Institution

Banat University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" from Timisoara

Patent

-

**Description
EN**

The research project evaluated the quality of the soil within an agricultural area, the category of pasture use, in terms of agrochemical indices. A surface of 485.94 ha was studied, from the area of Brebu Nou, Caras-Severin County, Romania. The agricultural land under study falls into the category of pasture use. Soil samples were taken, and the agrochemical indices determined for the evaluation of the studied agricultural land were represented by the soil pH, humus content (H,%), phosphorus content (P, ppm), potassium content (K, ppm).), the nitrogen index (NI,%),

and the degree of supply of basic cationic (V,%). The data obtained for the 119 studied plots were grouped in 10 groups, depending on the pH value, with a variation of 0.1 pH units per group. Based on the determined agrochemical indices, a high variability was found regarding the soil supply with phosphorus ($CV_P = 56.1509$) and the soil supply with potassium ($CV_K = 42.5579$). Low values of CV were recorded for pH ($CV_{pH} = 4.7231$) and for humus ($CV_H = 5.2127$), and intermediate values for NI ($CV_{NI} = 25.2418$) and for V ($CV_V = 24.8559$). From the analysis of the average values, on the 10 groups obtained, it was found that 79% of the studied area (385.15 ha) has a strongly acidic pH (groups G1 - G7), and 21% of the surface (100.79 ha) has a moderate acidic pH (groups G8 - G10). According to the PCA, PC1 explained 44.051% of the variance and PC2 explained 32.812% of the variance. Regression analysis facilitated the obtaining of models in the form of equations ($p < 0.001$, $R^2 = 0.764$ to $R^2 = 0.827$), and 3D and isoquant graphical models, which described the variation of phosphorus and potassium in relation to soil acidity and soil humus.

RO.151.**Title EN**

THE MANAGEMENT OF LAND USE CHANGES IN PERI-URBAN AREA OF TIMISOARA CITY USING GIS AND REMOTE SENSING TECHNOLOGIES

Authors

Mihai Valentin HERBEI¹, Radu BERTICI¹, Codruta BADALUTA – MINDA², George POPESCU¹, Florin SALA¹

Institution

¹ Banat University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" from Timisoara,
² Polytechnic University of Timisoara, Department of Hydro technical

Patent

-

Description EN

Land cover and Land use monitoring is a very complex process for a better understanding of the dynamics of the landscape over a long period of time. Such monitoring cannot be performed without using geospatial methods in the field of remote sensing and Geographic Information Systems (GIS). In this paper was analysed the use of land in the Periurban area of Timisoara in the period 1990-2018 based on data provided by the Copernicus program of the European Union. From the analysis of the data from 1990 to 2018,

based on the GIS spatial analyses, it can be concluded that approximately 5700 hectares have changed their destination. The most significant changes were those in the category Pesterers in Non irrigated arable land (21.8% - 1256ha) and the change in the category Non irrigated arable land in Discontinuous urban fabric (18.9% - 1087 ha), leading to the conclusion both of the urbanization of this periurban area of Timisoara Municipality, but also of the development of the agricultural field. Also, in this studio were analysed 3 remote sensing indices determined based on Landsat 8 images, data that can be the basis for a monitoring of urban expansion in western Romania.

University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca

RO.152.	
Title EN	Nanosystems for essential oils encapsulation
Authors	Socaci Sonia, Fărcaș Anca, Coman Cristina, Leopold
	Loredana, Diaconeasa Zorița, Dan Vodnar
Institution	University of Agricultural Sciences and Veterinary
	Medicine Cluj-Napoca, Romania
	Essential oils (EOs) are aromatic volatile oily liquids extracted from different parts of plants, known to possess various bioactivities, including antioxidant, antimicrobial and antiproliferative activities. Despite their numerous proved health benefits, EOs are very sensitive to environmental factors (light, heat, moisture, oxygen) when used as such, having a high volatility, strong odor and poor water solubility. These drawbacks limit their application as active compounds in food, pharmaceuticals or cosmetics. To overcome these shortcomings, the nano-sized delivery systems are considered as one of the most promising technologies. Thus, the present research focused on the development of three type of nanoformulations: (i) EOs nanoemulsions, (ii) EOs loaded in polymer nanocapsules and (iii) EOs-metallic nanoparticles colloidal dispersions. The results suggested that the nanoformulations can be used for entrapment of EOs and to provide the protection of the EOs bioactive compounds, enhance their stability, bioavailability, and hence their effectiveness as antioxidants, antimicrobials or antiproliferative agents.
Description	
EN	Acknowledgement: This work was supported by a grant of Ministry of Research and Innovation, CNCS - UEFISCDI, project number PN-III-P4-ID-PCE-2020-1847, within PNCDI III.

RO.153.	
Title EN	Reintegration of beer industry by-products in the food chain: nutritional, functional and sensorial aspects
Authors	Farcas Anca, Socaci Sonia, Fogarasi Melinda, Tofana Maria
Institution	University of Agricultural Sciences and Veterinary
	Medicine Cluj-Napoca, Romania
	Nowadays, the multinational and craft beer and distilled beverage producers represent one of the biggest agro-industrial waste generators, with a high impact on the environment and economy. Furthermore, the pandemic situation has encouraged the concept of circular bio-
Description	
EN	

economy and the idea of sustainable foods, leading to change the consumption trends towards a healthier diet. In these contexts, the aim of the present research is to evaluate the chemical variability of different grains by-products and their impact on the functional properties and sensorial profile of some new developed food products. The cereal by-products were collected from local breweries, tested regarding proximate composition, bioactive compounds and volatile aroma profile, and then integrated in the composition of different food products (cookies). The results highlighted significant differences between the spent grain samples, mainly due to the raw materials used in the brewing process, but in general, the partial substitution (20%) of flour with these unconventional ingredients enhanced the nutritional values of the final baked goods and improved their sensorial attributes. Acknowledgement: This work was supported by a grant of Ministry of Research and Innovation, CNCS - UEFISCDI, project number PN-III-P2-2.1-PED-2019-3622, within PNCDI III.

RO.154.**Title EN**

Novel cosmetic formulation containing pure anthocyanins isolated from *Aronia melanocarpa*

Authors

Diaconeasa Zorita

Institution

The University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca

**Description
EN**

Anthocyanins are water-soluble vacuolar pigments that occur ubiquitously in the plant kingdom, and they are widely distributed in fruits and vegetables as glycosides, having different sugars, such as glucose, rhamnose, xylose or arabinose, attached to an aglycon nucleus.

Anthocyanins are also known to be natural sun protectants as well as having antioxidant and anti-inflammatory properties. There have been a variety of studies that suggest anthocyanins have the potential to protect the skin from UV damage. In this context, our novel cosmetic formulation brings a new and useful application of anthocyanins in cosmetic industry. The novelty of the product consists in high amount of pure anthocyanins with demonstrated antioxidant activity. The formulation also contains 60% water and pure oils. This cosmetic formulation can be used daily as photoprotector and anti-inflammatory agent. Moreover, can be used a chemoprevention due to the high amount of anthocyanins.

Ovidius University of Constanta, Romania

RO.155.	
Title EN	Pharmaceutical Bioadhesive Gels-Type Preparations Based On Chlorhexidine Metal Complexes And Process For Obtaining The Same
Authors	Negreanu-Pîrjol Ticuța, Negreanu-Pîrjol Bogdan-Ștefan, Guran Cornelia, Călinescu Mirela, Oancea Anca, Gorun Elena, Roncea Florentina, Dumitru Florina, Meghea Aurelia, Badea Nicoleta, Țarălungă Gheorghe, Sîrbu Rodica, Moldovan Lucia
Institution	OVIDIUS University of Constanta, RO, University POLITEHNICA of Bucharest, RO, University of Bucharest, RO, National Research and Development Institute for Biological Sciences, Bucharest, RO, Prodiagnostic S.R.L. Constanta, RO
Patent	RO 127726 (B1) /29.11.2013
Description EN	<p>The invention relates to pharmaceutical preparations of bioadhesive gels type, having antimicrobial, antifungal, anti-inflammatory and wound healing effects and to a process for obtaining the same. According to the invention, the preparation consists of chlorhexidine metal complexes with ions of Cu(II), Zn(II), Ag(I), 90...100%, gel of hydroxypropylmethylcellulose 2% or 4% (90...100%), sorbitol (1...5%), mint essential oil, EDTANa₂ (0,05 – 1%) and an esters mixture. It looks as a translucent homogeneous mass, having a surface pH in the range of 4.5...6.25. The invention also relates to a process for bioadhesive gels obtaining, which consists in weighing the starting materials, preparing the hydroxypropylmethylcellulose hydrogel, add the preservative solution in which the disodium salt of ethylenediaminetetraacetic acid and the sorbitol solution has been dissolved and is allowed to max. 4 ° C for 24 hours. It results a translucent mass, in which chlorhexidine metal complexes are added, by stirring and the peppermint oil is finally incorporated into the droplets. Pharmaceutical preparations are subjected to qualitative control regarding organoleptic properties, pH, homogeneity, penetration level, are packaged in aminoplast boxes and stored in a darkness cool place.</p> <p><i>Applications:</i> Topical pharmaceutical products for human health and / or veterinary, with antimicrobial and antioxidant activity, tissue biocompatible, used for the treatment of mucosal, also for oral hygiene, have increased efficacy and minimal side effects, low or negligible toxicity and are not environmental pollutants.</p>

RO.156.	
Title EN	Ecological Fertilizer Biocomposite And Process For Obtaining It
Authors	Negreanu-Pîrjol Bogdan-Ştefan, Negreanu-Pîrjol Ticuța, Meghea Aurelia, Năstac Maria, Paraschiv Gabriela Mihaela, Bratu Mihaela Mirela, Sîrbu Rodica, Roncea Florentina Nicoleta, Bucur Laura Adriana, Badea Nicoleta, Meghea Irina, Baltă Andreea Gabriela, Gheorghiu Alina Karina, Zuliang Liao, Are Pedersen
Institution	OVIDIUS University of Constanta, RO, Association for the Protection of Human and Environment for Sustainable Development in the World-ECOM Constanta, RO, University POLITEHNICA of Bucharest, RO, NIVA-Norwegian Institute for Water Research, Oslo, NO
Patent	RO 126038 (B1)/ 30.05.2013
Description EN	<p>The present invention relates to an ecological fertilizer biocomposite based on natural wastes from a mixture of marine biomasses vegetal (macroalgae) and animal origin and sewage sludge. The biocomposite fertilizer comprises 0.1...90% residual marine algae biomass, 0.1-80% marine zoobentos biomass, 0.1-90% sewage sludge from wastewater treatment plants and 0.1...20% natural deodorizing absorbent substances. The invention also relates to a process for obtaining this biocomposite fertilizer which consists in that the residual marine algae and zoobentos biomass is conditioned by washing and dehydrated for 72 h at ambient temperature, the sewage sludge conditioned at ambient temperature, dried at 20-50 °C up for 72 h and sanitized in ovens with UV-C lamps for 2 h, the components being then ground, batched and mixed together in a mixer, moisturized with 10% distilled water related to the amount of solid material, macerated up to 72 h at the ambient temperature, odorized with a natural odorizer, granulated in granulating machine and dried at 20-50 °C. The obtained ecofertilizer is a gray-brown biocomposite, granular, homogeneous, with a slightly basic pH.</p> <p><i>Applications:</i> For superior valorization of residual biomasses in circular bioeconomy, for the improvement of quality and fertilization of soils in agriculture, horticulture, forestry, gardening, also restoration the quality of degraded soils. The innovative ecofertilizer was applied in granular form, in arable, sandy soil on an agricultural surface on Dobrogea area, Romania, where wheat type cereals, were cultivated and obtained an increased production on the experimental group, compared to the control group, treated with usual chemical fertilizers.</p>

National Research and Development Institute for Laser, Plasma and Radiation Physics Magurele

RO.157.

Title	Doped boro-lead-phosphate glass and nanocarbon composites and method for obtaining them
Authors	Sava Bogdan Alexandru, Boroica Lucica, Filip Ana Violeta, Vasiliu Ileana Cristina, Elisa Mihail, Iordache Ana Maria
Institution	National Institute for Laser, Plasma and Radiation Physics Magurele; National Institute for Research&Developing for Optoelectronics INOE2000 Magurele
Patent no.	Patent application No. A/00379/30.06.2021
Description	<p>The invention relates to the production of doped boro-lead-phosphate glass-nanocarbon composites, which have increased chemical homogeneity, while maintaining the other nanocarbon-induced properties, namely electrical and mechanical properties, and dopants add new optical and magnetic properties, amplified by phosphorus oxide in the vitreous matrix.</p> <p>The composites according to the invention are obtained by a method for obtaining which consists in the wet preparation of the mixture of raw materials, with the addition of nano-carbon, ultrasonication, drying, heat treatment, pre-melting, melting at low temperatures, homogenization of the melt, casting, annealing and shaping of the homogeneous composite obtained.</p> <p>The technical problem solved by the invention is the production of doped boron-lead-phosphate glass - nanocarbon composites, which have increased chemical homogeneity, while maintaining the other nanocarbon-induced properties, namely electrical and mechanical properties, and dopants add new optical and magnetic properties, amplified by phosphorus oxide in the glass matrix. Potential applications of the patent: opto-electronic devices, photonics, lasers. It is possible to create a new field of activity related to the patented product, both industrially and in research, with the involvement of at least 20-30 workers at a manufacturing line as well as 2-5 researchers to expand the field.</p>
Class	5

RO.158.

Title	Phosphate-telluritic glass materials with magnetic and magneto-optical properties, for Faraday rotators and the method for obtaining them
Authors	Elisa Mihail, Iordache Stefan Marian, Sava Bogdan Alexandru, Boroica Lucica, Kuncser Victor, Galca Aurelian Catalin
Institution	National Institute for Laser, Plasma and Radiation Physics Magurele; National Institute for Research&Developing for Optoelectronics INOE2000 Magurele; National Institute of Material Physics Magurele, Romania
Patent no.	Patent application No. A/00752/19.11.2020
Description	<p>The invention relates to phosphate-tellurite glasses containing lithium oxide and titanium dioxide and, respectively, zinc oxide and to the process for obtaining them. The preparation process of phosphate-tellurite glasses ensures a high chemical and optical homogeneity of the materials. The method for obtaining comprises unconventional wet method of reactants processing followed by melting (1100°C-1225°C), mechanical homogenization, refining (melt clarification), shaping by pouring the melt into pure spectral graphite mold, preheated, annealing (removal of residual stresses, 390°C-420°C) and optical processing.</p> <p>Technical importance: the mixture of reactants is introduced into the H₃PO₄ solution, achieving a continuous mechanical homogenization which is also applied in the melting stage of the mixture of chemical compounds. In the final product, chemical compounds of the metaphosphate type are formed, ie polymeric structures composed of phosphate (PO₄) 3-tetrahedral chains, joined by bridges of oxygen atoms.</p> <p>Potential applications of the patent: magneto-optical, opto-electronic, photonic devices. It is possible to create a new field of activity related to the patented product, industrial and research, with the involvement of at least 10 workers at the manufacturing line as well as 2 researchers to expand the field.</p>
Class	5

RO.159.

Title Boron-silicate glasses doped with gadolinium oxide and / or dysprosium oxide for neutron guides and process for obtaining them

Authors Dinca Marius Catalin, Sava Bogdan Alexandru, Boroica Lucica, Bita Bogdan Ionut, Galca Aurelian Catalin

Institution National Institute for Laser, Plasma and Radiation Physics Magurele; National Institute of Material Physics Magurele, Romania

Patent no. Patent application No. A/00797/21.12.2021

Description The invention relates to a novel product, boron-silicate glasses doped with gadolinium oxide and / or dysprosium oxide for neutron guides and a process for obtaining them. The process for obtaining this new type of glass includes the operations of preparing the raw materials, melting, pouring, annealing and shaping the obtained glass, followed by its treatment in a flow of thermal neutrons (0.025 eV) of $102 \text{ nm}^{-2} \text{ s}^{-1}$ for 7 days. The operations within the process of preparing the mixture of raw materials, are the following: gravimetric and volumetric dosing of the raw materials; introduction of raw materials in the ceramic crucible; cold homogenization of raw materials; drying the mixture with the removal of moisture, in an oven, up to temperatures of 240°C . Next, the production process consisted of a pre-melting stage which is performed between 240°C and $750\ldots 900^\circ\text{C}$, with slow temperature controlled increase; melting stage at temperatures of $1200\ldots 1400^\circ\text{C}$ and includes melting of the mixture of raw materials; melt refining; melting homogenization; melt conditioning; lowering the temperature to the pouring temperature; annealing takes place at a temperature of $465\ldots 500^\circ\text{C}$, for 4 hours. The advantages of these glasses refer to their use as thermal and cold neutron guides, with superior performance to existing ones, in terms of resistance to the effect of prolonged exposure to radiation. The applications of these glasses are their use for the manufacture of high-performance thermal and cold neutron guides in terms of resistance to neutron radiation.

Class

9

RO.160.

Title	Electrochemical sensors based on micro and nano-structured Ceria layers obtained by laser methods for the detection of NADH and biosensors
Authors	Valentina Dinca, Mihaela Filipescu, Anca Bonciu, Alina Vasilescu
Institution	National Institute for Lasers, Plasma and Radiation Physics
Patent no.	Patent application No A100717/2021
Description	The invention relates to obtaining new electrochemical sensors based on carbon electrodes modified with micro and nanostructured active layers of Ceria used for the detection of the enzymatic cofactor nicotinamide adenine reduced dinucleotide (NADH), with direct applications in N + + based biosensors -dependent. The new sensors are obtained by depositing pyramidal structures of Ceria obtained at a temperature $T_s = 500^\circ\text{C}$ on carbon electrodes, by the method of pulsed laser deposition (excimer ArF laser $\lambda = 193\text{ nm}$, pulses 108,000). Films obtained on carbon electrodes are active as such or after modification with syringaldazine mediator, for the electrochemical determination of NADH and various compounds.
Class	1

RO.161.

Title	New zwitterionic polymeric films obtained by laser evaporation for microorganism inhibition, for antimicrobial surfaces applications
Authors	Anca Bonciu, Nicoleta Dumitrescu, Simona Nistorescu, Valentina Marascu, Laurentiu Rusen, Gratiela Gradisteanu, Valentina Dinca.
Institution	National Institute for Lasers, Plasma and Radiation Physics
Patent no.	Patent application No A1007447/2021
Description	The invention relates to the procedure for obtaining new hydrophilic bioactive layers based on zwitterionic polymers used to inhibit the growth of microorganisms, with direct applications in antimicrobial surfaces for implants. The proposed new active layers consist of 2-methacryloyloxyethyl phosphorylcholine (MPC) thin films obtained at room temperature on glass substrates, by the

method of laser evaporation deposition (MAPLE), using an Nd: YAG laser. The obtained films were tested using the following microbial strains: Staphylococcus aureus ATCC 25923, Escherichia coli ATCC 25922, determining the colony forming units per milliliter (CFU / mL) and evaluating them microscopically in terms of adhesion on films.

Class 4

RO.162.

Title **Fabrication of WO₃ thin films with enhanced photoelectrochemical efficiencies in alkaline solution**

Authors Nicu Doinel Scarisoreanu, Florin Andrei, Andreea Andrei, Nicoleta Enea, Valentin Ion

Institution **National Institute for Laser, Plasma and Radiation Physics**

Patent no. A/00583/27.09.2021

Description The invention is related to an original procedure for obtaining WO₃ thin films with excellent photoelectrochemical efficiencies and stability for water-splitting reaction ($J_{\text{photo}} = 14 \text{ mA/cm}^2$). Polycrystalline WO₃ thin films were grown on polycrystalline PtSi substrates via pulsed laser deposition technique (PLD). The photoelectrochemical activity of thin films was tested in a three-electrode system coupled to a quartz cell. A concentrated NaOH solution (pH=13.7) was used as an electrolyte. All samples were irradiated using a laser diode emitting at 405 nm. The results confirm the great photoelectrochemical activity and stability of WO₃ thin films in strong alkaline experimental conditions.

Class 2

RO.163.

Title **Method for obtaining sensors with pyroelectric activity from ecological materials based on doped barium titanate**

Authors Andreea Carmen Andrei, Nicu Doinel Scarisoreanu, Valentin Ion, Maria Dinescu, Nicoleta Luminita Dumitrescu

Institution **National Institute for Laser, Plasma and Radiation Physics**

Patent no. A/00468/26.06.2018

Description The invention consists in a method of obtaining sensors with pyroelectric activity from ecological piezoelectric materials

based on $\text{Na}_{0.5}\text{Bi}_{0.5}\text{TiO}_3$ doped with BaTiO_3 . The procedure consists in depositing on a SrTiO_3 substrate some layers of NBT-6% BT using pulsed laser deposition method. The experimental conditions for the production of the ecological pyroelectric material layer were determined. The value of the measured pyroelectric constant was $1.71 \cdot 10^{-8} \text{ C} / \text{cm}^2$ at a temperature of 40°C and at 80°C - $2.85 \cdot 10^{-8} \text{ C} / \text{cm}^2$.

Class

1

RO.164.

Title Obtaining procedure of SnO_2 photoelectrodes using picosecond laser with dye sensitized solar cells applications

Authors Cornelia Enache, Cristian Viespe

Institution National Institute for Laser, Plasma and Radiation Physics

Patent no. A1 00226/06.05.2021

The invention refers to one procedure of obtaining in situ of SnO_2 photoelectrodes (nanoporous films) using a picosecond laser by laser ablation method with DSSC (dye sensitized solar cells) applications.

Description This type of photoelectrodes (SnO_2) have the advantage of high electrons mobility, high absorption in red-IR domain, larger band gap.

Nanoporous SnO_2 films obtained in situ meet the requirements of a photoelectrode from morphological point of view, in terms of adhesion and composition, for obtaining DSSC.

Class

2.

RO.165.

Title RAPID HEATING/ COOLING PROCESS APPLIED TO DOPED TRANSPARENT CONTACTS USED IN CHALCOGENIDE SOLAR CELLS

Authors PETRONELA GAROI, CRISTIAN VIESPE, DOINA CRACIUN, FLORIN GAROI, VALENTIN CRACIUN

Institution National Institute for Laser, Plasma and Radiation Physics

Patent no. A/ 00235 / 11. 04. 2019

Description The invention refers to a rapid heating/ cooling procedure that takes place in oxygen flow and it is applied to doped transparent and conductive materials. Following this process, doped thin films of transparent polycrystalline contacts are obtained. These thin films have an increased crystallite size

and improved electrical conductivity, making them, essentially, active elements **for chalcogenide solar cells**. In this procedure, the thin films are subjected to rapid heating in oxygen atmosphere, maintained on a temperature floor, followed by cooling/ heating and then the process continues with cooling at the end. Thin films as doped transparent contacts, resulting from rapid heating/ cooling, have improved structural and optoelectronic properties.

Class

2

RO.166.**Title**

Process for obtaining TiO₂ nanoparticles doped with vanadium for photocatalytic applications

Authors

Goncearenco Evghenii, Dutu Elena, Fleaca Claudiu, Morjan P. Iuliana, Gavrilă-Florescu Lavinia, Scarisoreanu Monica, Morjan Ion

Institution

National Institute for Lasers, Plasma and Radiation Physics

Patent no.

A/00824/29.11.2019

Description

The state of the art on obtaining vanadium-doped TiO₂ photocatalysts describes processes that are performed in several stages, requiring time, quantitative limitations and the possibility of contamination of samples. By the present invention, the process for obtaining vanadium-doped TiO₂ nanoparticles is claimed, characterized in that: it ensures the obtaining of high purity nanoparticles, ensures the obtaining of TiO₂ nanoparticles doped with V, ensures the doping of nanoparticles directly in the synthesis (single stage) by laser pyrolysis; ensures the obtaining of these photocatalysts without quantitative limitations. The effect of the introduction of vanadium was achieved both in comparison with a standard sample of pure TiO₂ obtained by pyrolysis and with the commercial sample Degussa P25. The manufacturing process of TiO₂ nanoparticles by laser pyrolysis improves the photomineralization activity of CH₃OH, adding a small amount of vanadium to the TiO₂ matrix has been shown to have a positive impact on photocatalytic activity. Thus, the invention describes a one-step continuous process for obtaining nanomaterials with photocatalytic properties for depollution applications.

Class

1

RO.167.

Title	Hernia repair meshes coated with novel nanocomposite materials based on polyethylene oxide and carbon nanotubes and their deposition procedure as thin films
Authors	Alexandra Palla-Papavlu, Maria Dinescu, Cristian Dan Alin, Florin-Andrei Grama, Raluca Papagheorghe, Simona Brajnicov
Institution	National Institute for Lasers, Plasma and Radiation Physics
Patent no.	Patent application No A01018/2018
Description	The invention refers to a hernia repair mesh coated with a thin film of polyethylene oxide and carbon nanotube nanocomposite and its fabrication procedure. The hernia repair mesh consists of a commercially available monofilament, microporous polypropylene or polyester mesh coated with a uniformly distributed and homogeneous nanocomposite film of polyethylene oxide polymer and carbon nanotubes. The coating is applied by matrix assisted pulsed laser evaporation in a vacuum chamber using a pulsed UV laser working at 193 nm and a laser fluence of 750 mJ/cm ² . This novel hernia repair mesh will facilitate optimal local integration of implants and prevent the risk of infection.
Class	1

RO.168.

Title	Synthesis process for N-doped carbon nanoparticles, with controlled doping, through laser pyrolysis
Authors	L. Gavrilă-Florescu, E. Dutu; C. Fleacă; I.P.Morjan; F. Dumitrache; M. Scarisoreanu; I. Morjan
Institution	National Institute for Lasers, Plasma and Radiation Physics
Patent no.	A00196/23.04.2021
Description	The novelty element for this patent consists of the use of a CO ₂ laser, with tunable frequency, on the 10.73 μm line, which corresponds to the absorption maximum of nitrogen, with controlled doping, in continuous flow. The process of obtaining carbon nanopowders doped with N established in this patent can control N doping in the range of 1-6% based on the synthesis parameters: temperature in the reaction zone, which can be monitored through the power

of the incident laser beam, ammonia flow, as well as the pressure in the reaction chamber.

Class 2

RO.169.

Title **Process for obtaining iron oxide nanoparticles through laser pyrolysis and their decoration with platinum nanometric crystallites**

Authors Goncarencu Evghenii, Morjan Ion, Lavinia Gavrilă-Florescu, Fleacă Clăudiu, Scarisoreanu Monica, Dumitrache Florian, Dutu Elena

Institution **National Institute for Lasers, Plasma and Radiation Physics**

Patent no. A/00602/08.11.2021

Description This invention presents the process for obtaining iron oxide nanoparticles, using the laser pyrolysis method, followed by decorating with platinum atoms, gathered as crystallites on the surface. The catalytic properties of the platinum crystallites on the surface of the powder comes with the advantage that the final price of the product will be low and it could be used in the decomposition of materials that are harmful for the environment, either water, air or soil.

Class 2

RO.170.

Title **Process for obtaining iron oxide nanoparticles and biocompatible suspensions stabilized with sodium carboxymethyl cellulose (CMCNa)**

Authors Lungu Iulia Ioana, Fleacă Clăudiu-Teodor, Lavinia Gavrilă-Florescu, Balas Mihaela, Nistorescu Ioana-Simona, Ion Morjan, Banici Ana-Maria, Dumitrache Florian

Institution **National Institute for Lasers, Plasma and Radiation Physics**

Patent no. A/00573/2021

Description The present invention is referring to the process of obtaining iron oxide nanoparticles through laser pyrolysis and biocompatible suspensions stabilized with CMCNa for their use in, but not limited to, biomedical applications, such as oncological applications.

Class 4

RO.171.

Title	Laser based particle aceleration system alignment using parasitic electromagnetic pulses
Authors	Aurelian Marcu, Ravan Ungureanu, M.Serbanescu, G.L. Giubega, C.Diplasu, E.Stancu, G.Cojocaru, M.Zamfirescu, A.Alexandru, M.C.Lupu, M.Trupina, N.Tudor, M.Stoicu, G. Marin
Institution	National Institute for Laser Plasma and Radiation Physics
Patent no.	A00429/22-07-2020
Description	<p>The invention relates to high power laser systems based particle accelerators and consists of an innovative method of aligning the target laser system and optimizing the laser parameters and energy transfer to the target, using the electromagnetic pulses generated by the interaction of ultra-intense laser pulses with matter. Electromagnetic radiation is mainly produced by the oscillations of the plasma charges created by the laser-matter interaction and its energy depends on the extracted charge and implicitly on the laser energy transferred to the plasma. Thus, the laser energy transfer can be correlated with the level of the electromagnetic signal. While in the laser low power mode, a preliminary alignment of the system can be made by classical opto-mechanical techniques, in the laser high power mode, these techniques bacame inefficient due to the high power optical densities, and the presence of the parasitic electromagnetic pulses (EMP). Presented method proposes the alignment and final optimization of the system in high power mode based on the level of electromagnetic pulses generated by the laser-target interaction processes.</p>
Class	5

National Institute of Materials Physics

RO.172.

Title	Phosphate tellurite absorber for 10.6 μm CO₂ laser radiation
Authors	Silviu POLOSAN, Constantin Claudiu CIOBOTARU
Institution	NATIONAL INSTITUTE OF MATERIALS PHYSICS
Patent no.	Prototype
Description	<p>Phosphate tellurite glasses with nominal composition 20%TeO₂+40%ZnO+40%P₂O₅ obtained through melt-quenching technique exhibit superior properties to silicate glasses, widely used as laser light absorbers. These glasses are obtained at lower melting temperatures, around 1200 C, where TeO₂ and P₂O₅ are used as glass formers, while ZnO is used as a disperser. Their higher absorption coefficient in the far-infrared region and thermal properties like thermal conductivity, specific heat, and thermal diffusivity make them useful for absorbers in the calorimetric techniques for far-infrared CW lasers. The melt quenching procedure preserves the nominal composition of the glass samples compared with the initial mixture of oxides. The presence of the same ZnO concentration between the initial mixture and final glass confirms the role of ZnO as a disperser, which does not contribute to the glass forming procedure.</p> <p>These glasses exhibit higher density and absorbance at 10.6 μm and superior thermal properties compared with silicate glasses, widely used nowadays as CO₂ radiation absorbers.</p>

Class

2

RO.173.

Title	Procedure for functionalization of natural membranes extracted from eggshells with nanostructured inorganic materials by RF magnetron sputtering
Authors	Nicoleta Preda, Andreea Costas, Mihaela Beregoi, Ionut Enculescu
Institution	NATIONAL INSTITUTE OF MATERIALS PHYSICS
Patent no.	A/00391/08.07.2020
Description	<p>The invention describes a functionalization process of natural membranes extracted from eggshells with nanostructured inorganic materials by RF magnetron sputtering. In the deposition process were used commercial</p>

targets based on Ag, ZnO or CuO resulting in nanostructured inorganic materials as films based on metals (Ag) or metal oxides (ZnO, CuO) and films decorated with particles based on metal oxide-metal (ZnO-Ag, CuO-Ag) or metal oxide-metal oxide (ZnO-CuO, CuO-ZnO). The described functionalization process allows the synergistic combination of the properties of the two constituent components.

Aplicability in the field of nanomaterials, photocatalysis, biosensors, biomedicine.

Class

4

RO.174.

Title

Procedure for obtaining core-shell nanowires arrays based on copper oxide and titanium dioxide

Authors

Costas Liliana-Andreea, Preda Nicoleta-Roxana, Florica Camelia-Florina, Zgura Irina-Ionela, Enculescu Maria-Monica, Enculescu Ionut-Marius

Institution

NATIONAL INSTITUTE OF MATERIALS PHYSICS

Patent no.

A/00627/07.10.2020

Description

The invention describes a process for obtaining core-shell nanowire arrays based on CuO and TiO₂ on the surface of copper foils, the process consisting in combining two simple methods, thermal oxidation in air and RF magnetron sputtering. These techniques can be easily implemented in an industrial scale production. Due to the type II band alignment between the two semiconductors, these CuO-TiO₂ core-shell nanowires can be used in optoelectronic devices. Moreover, the superhydrophobic character and the Gecko effect evidenced on the core-shell nanowires, recommend them for "mechanical hand" applications in the transport of fluids in microanalysis.

Aplicability in the fields of nanomaterials, optoelectronic devices, photocatalysis, fluid transport in microanalysis.

Class

2

RO.175.

Title

Structure based on GeSi nanocrystals embedded in TiO₂ for VIS-NIR photodetectors and fabrication method

Authors

Magdalena Lidia Ciurea, Adrian Slav, Catalin Palade, Sorina Lazanu, Ana-Maria Lepadatu, Toma Stoica

Institution

NATIONAL INSTITUTE OF MATERIALS PHYSICS

Patent no.

RO133299-A0 published on Apr 30, 2019

Al/active photosensitive film formed of GeSi nanocrystals embedded in TiO₂ matrix/SiO₂/Si substrate structure for visible - near infrared (VIS-NIR) photodetectors is proposed (OSIM patent application no. RO133299-A0 published on Apr 30, 2019). The structure is obtained by rapid thermal oxidation of Si for growth of buffer SiO₂ layer, co-deposition by magnetron sputtering of Ge, Si and TiO₂ on the SiO₂ layer, and thermal annealing for formation of GeSi nanocrystals, followed by vacuum evaporation of Al coplanar contacts on top of annealed structures. The structure has photodetector properties with sensitivity in the 600–1220 nm range for 1 V bias. Proposed structure lends itself to the effort to develop ecological and cost-effective materials with comparable optoelectronic properties for Si photonics advance. So, it represents a promising alternative to be used instead of toxic materials such as InGaAs, HgCdTe, PbS and PbSe that are key components of the expensive market photosensor devices. The group IV-based structures have also the advantage of Si CMOS technology.

Class

1

RO.176.

Title

Hybrid system and method for thin film coatings by combining magnetron sputtering and pulsed laser deposition
Iosif-Daniel Șimăndan¹, Dan Nicolae Becherescu Barbu², Aurelian-Cătălin Gâlcăa, Claudia Mihail, Mircea Virgil Udrea², Lucian Pintilie¹, Alin Velea¹,

Authors

Institution

NATIONAL INSTITUTE OF MATERIALS PHYSICS

Patent no.

-

Description

The hybrid system solves or substantially reduces the critical problems of each individual method. It allows high deposition rates with precise control of film morphology, stoichiometry and uniformity over large areas. The hybrid thin film coating system by magnetron sputtering and pulse laser deposition has five operation modes, namely (i) magnetron sputtering in radio frequency (rf) and direct current (dc), simple and reactive, (ii) pulsed laser deposition, simple and reactive, (iii) co-deposition or sequential deposition by magnetron sputtering using two or more magnetrons, (iv) co-deposition or sequential deposition by magnetron sputtering and pulsed laser deposition from two different sputtering targets and (v) simultaneous magnetron

sputtering and pulsed laser deposition from a single sputtering target. In the last operation mode, the laser pulses are beneficial in initiating and maintaining the plasma of the magnetron at low pressures, leading to an increase in the deposition rate. The system was successfully used for the deposition of a wide range of metallic, semiconductor and insulating materials from single element sputtering targets such as Ge, Si, Cu, Te, Sn, etc., binary targets such as GeTe, TiN, ZnS, SiO₂, Cu₂S, SnS₂, etc. or ternary targets such as Ge₂Sb₂Te₅. The coatings can be applied to different solid or flexible substrates or objects of different shapes and sizes.

Class

10

RO.177.

Title

Micrometer Sized Hexagonal Chromium Selenide Flakes for Cryogenic Temperature Sensors

Authors

Angel-Theodor Buruiană, Florinel Sava, Nicușor Iacob, Elena Matei, Amelia Elena Bocîrneș, Melania Onea, Aurelian-Cătălin Gâlcă, Claudia Mihai, Alin Velea*, Victor Kuncser

Institution

NATIONAL INSTITUTE OF MATERIALS PHYSICS

Patent no.

A 00729 / 03.12.2021

Description

High-sensitivity nanometer-scale thermometers are needed both in the industry for liquefaction and gas distillation but also in research in the fields that study quantum and classical effects at cryogenic temperatures. The developed cryogenic sensor consists of a hexagonal micrometric flake of chromium selenide which has a lateral size between 5 μm and 20 μm and a thickness between 80 nm and 200 nm, transferred between two metal contacts. The electrical resistance of the sensor increases exponentially with decreasing temperature, with a variation of two to three orders of magnitude, between 20 k Ω and 10 M Ω when the temperature drops from 50 K to 1.8 K. The absolute sensitivity of the sensor is greater than the sensitivity of commercial cryogenic sensors, having a value between 6.7 and 2.5 in the temperature range from 1 K to 10 K. The method for obtaining chromium selenide cryogenic sensors is simple, consisting of two steps, namely obtaining micrometric hexagonal flakes of chromium selenide on substrates, which may be of Si/SiO₂, quartz or sapphire, by physical vapor transport at atmospheric pressure and their transfer between two metal contacts using a dry method involving the use of an adhesive material, which may be

PDMS or GelPak. Chromium selenide flakes are obtained at a temperature between 600 and 800 °C from high purity CrCl₂ and Se powders. During the synthesis, which lasts between 10 and 30 minutes, the gas flow, which can be N₂, Ar or a mixture of H₂ and Ar, transports the vapors to the substrate where they condensate in the form of hexagonal plates

Aplicability: Cryogeny, Liquefaction and gas distillation, Science (study of quantum and classical effects).

The cryogenic temperature sensors were tested in laboratory conditions.

Class

5

RO.178.

Title

Hydrophobic surfaces coated with Sn metallic nanoparticles obtained by a simple and clean method

Authors

Angel-Theodor Buruiană, Florinel Sava, Elena Matei, Irina Zgură, Mihai Burdușel, Claudia Mihai, Alin Velea

Institution

NATIONAL INSTITUTE OF MATERIALS PHYSICS

Patent no.

A 00631 / 02.12.2020

Description

Sn nanoparticles are usually obtained by difficult chemical routes in several steps followed by thermal treatments. We developed a simple and clean method, to obtain Sn nanoparticles directly on different rigid or flexible substrates based on a vapor transport technique. The method is versatile, thus can be easily adjusted to obtain Sn nanoparticles of different size, areal density and morphology, by controlling the deposition conditions. The hydrophobicity of the coated surfaces can be determined by water contact angle measurements. The surface hydrophobicity varies depending on the size, areal density and shape of the nanoparticles. Sn nanoparticles with sizes between 180 and 240 nm increase the surface hydrophobicity by up to 20%. The developed method of obtaining nanoparticles from a low-cost, earth-abundant, and environmentally friendly material directly on the substrate does not require chemical reactions or complex heat treatments and can be used to modulate the wettability of surfaces.

Aplicability: Water repellent surface coatings, self-cleaning fabrics, anti-corrosive industrials components, lubrication systems, anti-icing coatings

Class

9

National Institute for Research & Development in Chemistry and Petrochemistry – ICECHIM Bucharest

RO.179.

Title	Procedure for Manufacturing of an Immunoanalysis Platform Based on Electrochemical Detection Combined with Surface Plasmon Resonance for Selective Determination of Mycotoxins
Authors	Mihaela Doni, Ana-Maria Gurban, Petru Epure
Institution	National Institute for Research & Development in Chemistry and Petrochemistry – ICECHIM/ S.C. EPI SISTEM S.R.L.
Patent no.	Patent application No. A-01031/2018 The invention describes the process for obtaining of an innovative combined surface-plasmon resonance – electrochemical (SPR-ELEC) immunosensitive platform integrated into an on-line flow immunoassay configuration for sensitive and selective detection of various mycotoxins in complex samples. The immunosensitive layer consists in a copolymer film entrapping the specific antibody to mycotoxin, electrodeposited onto the active surface of the gold-based sensors having glass as support. The properties of this immunosensitive film can be easily controlled through the electrodeposition parameters, while the immunorecognition process can be monitored simultaneously by the two detection techniques, SPR-ELEC.
Description	The analytical method according to the invention consists in extraction of the mycotoxin in a liquid sample and then placing the liquid test sample containing the target mycotoxin and possibly interfering molecular species on the immunoassay platform formed by the gold film on which the immunosensitive material is deposited. Further the quantification of the mycotoxin is carried on by combined SPR-ELEC techniques. The immunoassay platform is versatile and the analytical method described by the invention can be adapted to determine any mycotoxin for which appropriate antibodies and bioconjugates are available. This immunosensitive platform has simple operational characteristics, being specially designed for use by non-specialist personnel. The present invention is a result of ERANET-MANUNET TOX-HAZ-ASSESS 33/2017 project – <i>Manufacturing of new online analytical system for toxin hazard assessment in dairy industry.</i>
Class	

RO.180.

Title	Process and Adsorbent Material for Absorption of Organic Pollutants from Aqueous Solutions
Authors	Roxana Ioana Brazdis, Radu Claudiu Fierascu, Anda Maria Baroi, Irina Fierascu, Toma Fistos
Institution	National Institute for Research & Development in Chemistry and Petrochemistry – ICECHIM
Patent no.	Patent application No. A-00123/2022 The present invention relates to an adsorbent material and to a process for obtaining it, used to reduce the level of organic pollutants in aqueous solutions, at ambient temperature and atmospheric pressure. The adsorbent obtained according to the invention eliminates the disadvantages of current approaches, in that it is presented in the form of a powder, having a specific surface area between 35-55 m ² /g, with the crystallites size below 25 nm and the method of obtaining it is easily scalable to industrial scale. The adsorbent demonstrates adsorption capacity, evaluated in a batch system, against organic micro-pollutants of industrial origin (demonstrated by phenol adsorption) and against organic micro-pollutants from pharmaceuticals and personal care products category (demonstrated by ibuprofen adsorption).
Description	The process for obtaining the adsorbent based on apatitic material is performed in two stages, in inert atmosphere, at pH and controlled temperature, in the first stage obtaining the primary apatitic material, and in the second stage is achieved its calcination, in order to obtain the active phase. Acknowledgements. This work was supported by the INCDCP ICECHIM Bucharest 2019-2022 Core Program PN. 19.23–Chem-Ergent, Project No.19.23.03.01. It is also acknowledged the support of Ministry of Research, Innovation and Digitization through Program 1 - Development of the national research-development system, Subprogram 1.2-Institutional performance- Projects to finance excellence in RDI, Contract no. 15PFE/2021.
Class	1

RO.181.

Title	Process and Material Obtained by Green Chemistry Methods for Catalytic Oxidation of Emerging Micropollutants
Authors	Radu Claudiu Fierascu, Roxana Ioana Brazdiș, Irina Fierascu, Anda Maria Baroi, Sorin Marius Avramescu, Corina Bradu, Elena-Alina Olaru, Angel-Vasile Nica, Sorin-Claudiu Ulinici
Institution	National Institute for Research & Development in Chemistry and Petrochemistry – ICECHIM/ University of Bucharest/ S.C. ICPE Bistrita SA
Patent no.	Patent application No. A-00163/2022
Description	<p>The present invention relates to a material with catalytic properties and to a process for obtaining it by the methods of green chemistry, used for the catalytic oxidation of emerging micro-pollutants (in the category of pharmaceuticals) from aqueous solutions, at ambient temperature and atmospheric pressure in a semicontinuous system.</p> <p>In order to comply with the concept of developing and using environmentally friendly materials with depollution capacity, in conditions similar to those in the real environment, inexpensive and easy to synthesize, the object of this invention is to obtain materials with high efficiency in catalytic oxidation of emerging micropollutants (from the category of pharmaceutical compounds), through a process based on the methods of green chemistry, using plant resources easily found.</p> <p>The technical problem solved by the invention consists in the development of a process and material for the catalytic oxidation of some emerging micropollutants, based on metal oxides synthesized by green chemistry methods (developed using natural extracts).</p> <p>The proposed material shows a significant increase in the oxidation efficiency of ibuprofen in a semi-continuous system, at ambient temperature and neutral pH values, compared to the non-catalytic system.</p> <p>Acknowledgements. This work was supported by a grant of the Romanian National Authority for Scientific Research and Innovation, CNCS/CCCDI-UEFISCDI, project number PN-III-P2-2.1-PED-2019-3166, contract 299 PED/2020, within PNCDI III. It is also acknowledged the support of Ministry of Research, Innovation and Digitization through Program 1 - Development of the national research-development system, Subprogram 1.2- Institutional performance- Projects to finance excellence in RDI, Contract no. 15PFE/2021.</p>

RO.182.

Title	Process and Material Obtained by Ecological Methods for Catalytic Oxidation of Some Organic Pollutants
Authors	Sorin Marius Avramescu, Corina Bradu, Elena-Alina Olaru, Angel-Vasile Nica, Irina Fierascu, Roxana Ioana Brazdiș, Radu Claudiu Fierascu, Toma Fistoș, Sorin-Claudiu Ulinici
Institution	National Institute for Research & Development in Chemistry and Petrochemistry – ICECHIM/ University of Bucharest/ S.C. ICPE Bistrita SA
Patent no.	Patent application No. A-00162/2022
Description	<p>The present invention relates to a material with catalytic properties and to a process for obtaining it by ecological methods, used for the catalytic oxidation of organic pollutants from aqueous solutions, at ambient temperature and atmospheric pressure in a semicontinuous system.</p> <p>In order to respect the concept of developing and using environmentally friendly materials with depollution capacity in conditions similar to those in the real environment, the object of this invention is to obtain materials with high efficiency in catalytic oxidation of organic pollutants, through a process based on the methods of green (ecological) chemistry, using common plant resources.</p> <p>The technical problem solved by the invention consists in the development of a process and material for the catalytic oxidation of some pollutants of organic nature, based on phytosynthesized metal oxides (obtained using natural extracts). The proposed material shows a significant increase in the catalytic oxidation efficiency of phenol in a semi-continuous system, at ambient temperature and neutral pH values, compared to the non-catalytic system.</p> <p>Acknowledgements. This work was supported by a grant of the Romanian National Authority for Scientific Research and Innovation, CNCS/CCCDI-UEFISCDI, project number PN-III-P2-2.1-PED-2019-3166, contract 299 PED/2020, within PNCDI III. It is also acknowledged the support of Ministry of Research, Innovation and Digitization through Program 1 - Development of the national research-development system, Subprogram 1.2-Institutional performance- Projects to finance excellence in RDI, Contract no. 15PFE/2021.</p>
Class	1

RO.183.

Title	Solutions Based on Ecological Surfactants Used for the Neutralization of Chemical Warfare Agents
Authors	Irina Elena Chican, Dana Simona Vărășteanu, Irina Fierăscu, Radu Claudiu Fierăscu, Tanța Verona Iordache
Institution	National Institute for Research & Development in Chemistry and Petrochemistry – ICECHIM
Patent no.	Patent application No. A-00484/2021
Description	The invention relates to the development of decontamination solutions based on a ternary surfactant system, including an amino acid surfactant and hydrogen peroxide, with added wetting agents and corrosion inhibitors. The solutions systems are used for the neutralization of neurotoxic chemical warfare agents and are characterized by a decontamination effect between 96% - 99.99% and a high degree of protection against surface corrosion.
Class	12

RO.184.

Title	Geotextile Composite for Environment Protection and Process for Preparing the Same
Authors	Tanța Verona Iordache, Anita Laura Chiriac, Anamaria Zaharia, Andrei Sârbu, Carmen Eugenia Sîrbu, Ana Mihaela Gavrilă, Teodor Sandu, Elena Bianca Stoica, Crina Thea Cojocaru, Răzvan Edward Botez, Andreea Miron, Steluța Apostol
Institution	National Institute for Research & Development in Chemistry and Petrochemistry – ICECHIM
Patent no.	Patent application No. RO201900846A/2019
Description	The invention describes the process for preparing a geotextile composite that can be used in agriculture. The composite is composed of a woven polypropylene fabric (bottom), such as raphia sack cloth, a hydrogel filler (i.e., interpenetrating networks of poly acrylic acid and bacterial cellulose), and a cotton-type fabric (top). The claimed composite has the capacity of retaining-returning water, agrochemicals and humic acids and also of draining the purified water towards the groundwater.
Class	1

RO.185.

Title	Process for Obtaining of the Foliar Biofertilizers Together with Microcapsules with Essential Oils Components and Compositions of Foliar Biofertilizers
Authors	Emil Stepan, Cristina-Emanuela Enascuta, Sanda Velea, Elena Radu, Elena Emilia Oprescu, Adrian Radu, Carmen Gaidău, Doru Gabriel Epure
Institution	National Institute for Research & Development in Chemistry and Petrochemistry – ICECHIM
Patent no.	Patent application No. A00167/2018
Description	<p>The invention relates to a process for obtaining foliar biofertilizers together with microcapsules with essential oils components and compositions of foliar biofertilizers, containing these microcapsules together with components mostly of natural origin.</p> <p><i>Advantages of the invention</i></p> <ul style="list-style-type: none"> • The efficiency of the microencapsulation of essential oils is improved and the dimensions of the microparticles are reduced, by conducting the process in the ultrasound field. • The use of foliar biofertilizers contributes to increasing the production and quality of plant fruits and / or seeds, due to the microcapsules with essential oils and nutrients with organic nitrogen and organic sulfur, which in addition to plant nutrition also ensure their protection against pathogenic microorganisms. of fungi or insects • The presence of adhesion agents on the leaves of the biofertilizers, ensures an increased efficiency of their assimilation by plants • Microcapsules with essential oils from the biofertilizer component provide increased protection during storage, against the degradation of some components (eg hydrolyzed proteins and hydrolyzed keratins) and inhibit unpleasant odors due to them • Microcapsules with controlled release of essential oils ensure the increase of the duration of protection conferred by them • Environmental protection is ensured by using components mostly of natural origin <p><i>Applications</i></p> <p>Foliar biofertilizer used for the treatment of cereal crops</p>
Class	3

RO.186.

Title **Process for Adapting the Yeast *Kluyveromyces marxianus* for Obtaining Biomass at Increased Yield**

Authors Camelia Rovinaru, Diana Georgiana Pasarin

Institution **National Institute for Research & Development in Chemistry and Petrochemistry – ICECHIM**

Patent no. RO132585 (B1) / 30.12.2021

The invention relates to a process for recovering a biomass from the whey resulting from cheese preparation. According to the invention, the process consists in adapting the strain of *Kluyveromyces marxianus* NRRLY1195 yeast by successive cultivation in aerobiosis conditions, on culture media, such as acid whey permeate enriched with two nitrogen sources and one potassium source, yeast extract 0.2...0.5%, in 20 serial passages, representing the inoculum for the next culture medium, acid whey permeate enriched with two nitrogen sources and one potassium source in double concentrations, yeast extract 0.4...0.10% in 30 serial passages, representing the inoculum for the next culture medium, acid whey hydrolysate enriched with a potassium source, in 30 serial passages for the multiplication of the yeast with accumulation of biomass which is further harvested after the fermentation period and dried by lyophilization.

Description**Applications**

The whey, a by-product from the manufacture of cheese is valorised by bioconversion into value-added products.

The recovered yeast biomass is a valuable source of protein, which can replace plant and animal protein, and can be used as a feed additive with immunomodulatory effect due to the presence of beta glucans in cell walls.

Class

1, 3

RO.187.

Title **Wool-Based Plant Biostimulant Composition and Process for Obtaining it**

Authors Florin Oancea, Mariana Calin (Constantin), Diana Aruxandei Constantinescu, Iuliana Raut, Mihaela Doni, Melania Liliana Arsene, Maria Luiza Jecu

Institution **National Institute for Research & Development in Chemistry and Petrochemistry – ICECHIM**

Patent no. **RO Patent 133240 B1/2021**

Description This invention is related to the development and use of plant biostimulant based on keratin waste, an abundant and valuable resource, which creates serious problems for the environment due to its recalcitrant nature. Keratin can be hydrolyzed in mild conditions by keratinolytic microorganisms. Fungal isolates from Microbial Collection of ICECHIM produce protein hydrolysates (PHs), a class of biostimulants, by cultivation on medium with keratin wastes as carbon and energy sources. The biodegradation process is efficient, with low costs and ensures the valorization of keratin waste in higher added-value applications, plant biostimulants for agriculture. The fungal isolates showed significant characteristics as plants biostimulants, namely antagonism *versus* pathogens, secretion of hydrolytic enzymes, and capacity to promote plants growth. Encouraging results were obtained treating tomato seedlings with PHs from fungal strains cultured on medium supplemented with 1% (w/w) keratin waste (chicken feathers or wool). The growth parameters (biomass, plant height and diameter, number of branches and leaves per plant) were significantly higher compared to those treated with water. The application of fungal PHs can serve as a promising approach for sustainable agriculture. The valorization of keratin waste is an example for applying the principles of circular economy, agro-industry wastes are valorized and returned in agriculture contributing to renewable natural resources. *Acknowledgments. The authors thank to Ministry of Research, Innovation and Digitalization of Romania, project PN 19.23.01.01/2019.*

Class

3

RO.188.

Title

Sol-Gel Nanohybrid Bicomponent Photocatalytic Compositions and Process for Obtaining These Materials

Authors

Violeta Purcar, Valentin Rădițoiu, Alina Rădițoiu, Florentina Monica Raduly, Raluca Manea, Georgiana Cornelia Ispas, Luminița Eugenia Wagner

Institution

National Institute for Research & Development in Chemistry and Petrochemistry – ICECHIM

Patent no.

Patent application No. A2020-00645/2020

Description

The invention relates to the sol-gel nanohybrid bicomponent photocatalytic compositions used for coating of optical glass, solar cell protection panels and architectural panel surfaces.

The thin films obtained with such compositions allow distinct mechanical, physico-chemical and aesthetic functionalities of the surface, including a superior finished surface and improved

photocatalytic performance. The technical problem solved by the invention is the use of low concentrations of non-volatile organic additives, as well as the optimal establishment of working conditions so as to ensure the obtaining of sol-gel nanohybrid bicomponent photocatalytic compositions by a simple, economical, efficient and qualitatively reproducible process to realizing coatings with high transparency, but also with improved photocatalytic activity. The invention has advantages: a) the sol-gel photocatalytic coating materials have very good physico-chemical resistance, present high transparency and are thermodynamically stable; b) the sol-gel nanohybrid filmogen photocatalytic compositions presented a high stability to pathogenic microorganisms, falling into the category of reduced ecotoxicological risk; c) the sol-gel photocatalytic materials had an increased photocatalytic effect on the surfaces where they are applied; d) the obtaining process of sol-gel nanohybrid filmogen photocatalytic materials does not require the existence of stabilizing agents that reduce the storage period, is easy to implement and provides films with uniform composition and thickness.

Acknowledgements. The work on this paper was supported by the INCDP ICECHIM Bucharest 2019-2022 Core Program PN. 19.23–Chem-Ergent, Project No.19.23.03.04. It is also acknowledged the support of Ministry of Research, Innovation and Digitization through Program 1 - Development of the national research-development system, Subprogram 1.2-Institutional performance- Projects to finance excellence in RDI, Contract no. 15PFE/2021.

Class

7

RO.189.

Title Antimicrobial Films Based Multi-Walled Carbon Nanotubes Decorated with Titanium Dioxide Nanoparticles for Dermatological Protection and Regeneration

Authors Madalina Elena David, Rodica Mariana Ion, Laura Monica Gorghiu, Lorena Iancu, Ramona Marina Grigorescu, Nelu Ion

Institution National Institute for Research & Development in Chemistry and Petrochemistry – ICECHIM/ Valahia University of Targoviste, Romania

Patent no. Patent application No. 00705/23.11.2021

Description The present invention relates to a composition made of multi-walled carbon nanotubes decorated with titanium dioxide

NATIONAL

nanoparticles incorporated in a solution of collagen and cellulose acetate with antimicrobial properties, resulting in biocompatible and non-toxic films, which once applied on the surface of the wound are able to promote healing by improving the ability of cell proliferation, minimize cytotoxicity and provide protection and dermatological regeneration with applicability in medicine and pharmaceutical industry. The present invention is directed to a film based on an antimicrobial, biocompatible and non-toxic composition for dermatological protection and regeneration.

Class

4

RO.190.

Title

New materials based on polylactic acid with controlled flexibility (FLEX4PLA), no. TE 67/2020, PN-III-P1-1.1-TE-2019-1333

Authors

Adriana Nicoleta Frone

Institution

National Institute for Research & Development in Chemistry and Petrochemistry – ICECHIM

Description

FLEX4PLA project aims to develop materials for children's goods by exploiting a niche market segment for biopolymers. Conventional plastics derived from non-renewable petrochemicals, containing dangerous chemical additives to ensure flexibility, natural feel and easy coloring, are generally used to produce toys and goods for children. Considering that children are more susceptible to the toxic effects of chemicals as they like to put things in their mouths, thus increasing their exposure, the design of new biomaterials based on polymers and additives *derived from renewable resources and "safe"* represents a real need and is highly demand by the market. Therefore, new biomaterials based on polylactic acid (PLA) and additives obtained from renewable resources are designed in the frame of FLEX4PLA. The *novelty* consists in the synthesis of new bioelastomers from low-cost biobased resources, which are compatible with PLA, and the development of a new technological route to improve PLA/bioelastomers interface and nanodispersion. The new nanomaterials will exhibit the good elasticity of bioelastomer and the excellent processability of PLA while the strength will be maintained by the addition of nanocellulose. This project has a significant social and economic impact as it targets the reduction of petroleum based materials by the design of bionanocomposites free of hazardous substances, suitable for safer and accessible children's toys whose price is expected to be lower due to cheap raw materials

and simplicity of the synthesis. Toughening and flexibilization of PLA using bioelastomers without compromising biocompatibility, renewability, and thermal properties of PLA have a great scientific impact.

RO.191.

Title	Biotechnological strategies for innovative construction materials incorporating bacterial bioproduct (BioConstrMater) (Project PN-III-P2-2.1-PED-2019-0991/392/2020)
Authors	Iuliana Raut, Ionela Petre, Mariana Constantin, Gelu Vasilescu, Nicoleta Radu, Ana Maria Gurban, Mihaela Doni, Adriana Moanta, Jenica Paceagiu, Cristina Firinca, Luiza Jecu
Institution	National Institute for Research & Development in Chemistry and Petrochemistry – ICECHIM/ CEPROCIM SA
Description	<p>The project objective is to obtain an innovative bioproduct, used to deliver bacteria to concrete matrix, in order to produce sustainable building materials with enhanced durability. Concrete is the most widely used construction material due to its durability, high compressive strength and long-term performance. The degradation produced by natural environments have led to innovations of cement composition through the use of technological bioengineering. Microbially-induced calcium carbonate precipitation (MICP) is a natural process, based on activity of specific microorganisms to induce the precipitation of calcium carbonate. The main factors that can impact MICP are bacterial genotype and cell concentration, amounts of Ca^{2+} (supplemented externally) and urea, nutritional composition of medium for bacteria cultivation, and pH conditions for urease activity. Species of <i>Bacillus</i> present strong adaptability to the environment, high specific surface area of cells, and they can use urea as energy and nitrogen source in metabolism. <i>Bacillus subtilis</i> from Microbial Collection of ICECHIM was evidenced in precipitating CaCO_3 under proper culture medium supplemented with urea and calcium ions. <i>B. subtilis</i> added into mortars has shown a great potential for application in cementitious materials, increasing compressive and tensile strength, due to consolidation of the pores inside the cementitious materials with biomineralisation products coming from MICP. <i>Acknowledgments.</i> The authors thank to the Ministry of Research, Innovation and Digitization, project PED 392/2020. Corresponding author: jecu.luiza@icechim.ro, www.icechim.ro; https://icechim.ro/project/bioconstrmater/</p>

**National Research and Development Institute for Soil
Science, Agrochemistry and Environment
ICPA Bucharest**

RO.192.**Title**

***Candida parapsilosis* strain biosurfactants-producing, growth and stimulation medium and bioaugmentation procedure of expanded perlite for bioremediation of soils contaminated with hydrocarbons**

Authors

MATEI Sorin, MATEI Gabi-Mirela, DRĂGHICI Elena Maria, SOMĂCESCU Vasile Claudiu

Institution

National Research and Development Institute for Soil Science, Agrochemistry and Environment - ICPA Bucharest

Patent no.

RO133486 B1/2020

Description

The invention relates to a procedure for immobilizing cells of *Candida parapsilosis* strain YCP124 selected for the biodegradation and biosurfactant synthesis capabilities in the expanded perlite granules and to a growth and stimulation medium that saturates the pore space of the expanded perlite granules for *in situ* or *ex situ* bioremediation of soils contaminated with petroleum hydrocarbons. The bioaugmentation procedure of expanded perlite granules with microbial cells ensures, by immobilizing on the natural inorganic porous support, physical and chemical uniformity, water retention capacity, non-toxic, environmental friendly character, buffering capacity, optimized/intensified metabolism and the use of hydrocarbons as carbon source.

Applications:

Environment protection Production of biosurfactants
Fermentation industry

Class

1. Environment – Pollution Control

RO.193.**Title**

Method for applying a fertilizer based on marine algae of the species *Ascophillum nodosum*

Authors

Carmen Sîrbu, Traian Cioroianu, Mihail Dumitru

Institution

National Research and Development Institute for Soil Science, Agrochemistry and Environment - ICPA Bucharest

Patent no.

132344/2020

Description

The invention relates to a fertilizer and to a method for applying the same. According to the invention, the fertilizer consists of 0.26...15.59% total nitrogen, 0.39...5.48% phosphorus as phosphorus pentoxide, 0.81...19.28% potassium as potassium

oxide, 2.62...42.72% organic substances, namely 1.93...39.03% organic substances from algae, 0.78...15.67% alginic acid, up to 1% iron, zinc, copper, boron, magnesium, manganese, molybdenum and cobalt, respectively, 0.36...5.14% sulphur as sulphur trioxide, as well as carbohydrates, organic acids and vitamins. The method, as claimed by the invention, consists in that the fertilizer is administered by spraying as aqueous solution in a concentration of 0.3...0.5% onto plants or of 0.01...0.02% onto seeds.

Applications: agriculture

Class

3. Agriculture and Food Industry

RO.194.

Title

Preparation process and fertilizer to be used in reclaiming degraded soil

Authors

Mihail Dumitru, Traian Cioroianu, Carmen Sîrbu, Vrînceanu George Andrei

Institution

National Research and Development Institute for Soil Science, Agrochemistry and Environment - ICPA Bucharest

Patent no.

132658/2020

Description

The invention relates to a fertilizer, to a process for preparing the same and to a method of application thereof for reclaiming degraded soils. According to the invention, the product has a humidity content of 35...45% and comprises 60...75% organic matter in relation to the dry matter, at least 1.5% total nitrogen, a C:N ratio of 12...20:1, at least 0.35% total phosphorus, 1.2% potassium, 0.6% magnesium, 0.4% calcium, 0.1% iron, respectively, and maximum 100 mg/kg copper, 500 mg/kg zinc, 1500 mg/kg manganese, respectively, at least 10% humic substances, at a pH of 6...8 and an apparent density of less than 750 kg/m³. The process, as claimed by the invention, consists in aerobically composting a mixture of manure, carbonaceous mass, a microbiological biopreparation and nitrogen addition in amide, nitric and ammonia form, potassium alkali and salts of iron, copper, zinc, manganese and magnesium, at a temperature of 40...65°C, a humidity of 35...55%, an oxygen content of more than 8%, pH of 6...8.5, a C:N ratio of 20...40:1, at a composting time of 3...6 months. The method, as claimed, consists in applying the product by incorporating it into the soil in an amount of 20...100 t/ha.

Applications: agriculture

Class

3. Agriculture and Food Industry

National Institute for Research and Development in Electrical Engineering ICPE CA Bucharest

RO.195.

Title	Electric machine with permanent magnets and conical air gap
Authors	Popescu Mihail [†] , Dumitru Constantin, Tănase Nicolae, Chihaiia Rareș-Andrei, El-Leathey Lucia-Andreea, Oprina (Cîrciumaru) Gabriela
Institution	National Institute for Research and Development in Electrical Engineering ICPE-CA Bucharest
Patent no.	Patent application No. a2017 00887/30.10.2017
Description	<p>The invention relates to an electric machine with permanent magnets and a conical air gap consisting of a housing and two shields in which a wound stator subassembly consisting of a number of columns is introduced, provided at the ends with two conical surfaces, made from lamination sheet with oriented crystals, used in the manufacture of electric transformers, evenly distributed and fixed in cross-section through the spacers provided with housings for improving the transient process, being fixed on a pair of disks, which constitute the rotor subassemblies.</p> <p>Applications: electric machine manufacturing industry, the invention contributing to the simplification of technological processes in the manufacture of electric machines (notch removal, simple magnetic circuit, simple machining operations, reduced labor and manufacturing costs).</p>
Class	6. Mechanical Engineering – Metallurgy

RO.196.

Title	Biosynthesized silver nanoparticles and the process of obtaining them
Authors	Ion Ioana, Lungu Magdalena Valentina, Nicula Nicoleta-Oana, Marinescu Virgil Emanuel, Mitu Ciprian Mihai
Institution	National Institute for Research and Development in Electrical Engineering ICPE-CA Bucharest
Patent no.	Patent application No. RO134209 (A2)—2020-06-30
Description	In the present patent application, silver nanoparticles have been biosynthesized in situ using a solution of fresh green

alga *Chlorella Sorokiniana*. The synthesized silver nanoparticles are smaller than 80 nm in diameters, are aggregated in a 3D cluster with cauliflower morphology with size between 100-500 nm. *Chlorella Sorokiniana*, in general, is used as a food supplement in human and animal nutrition. By functionalizing *Chlorella Sorokiniana* with silver nanoparticles, we expand the field of application by adding antifungal and antibacterial properties suitable in treating humans, animals, and plants.

The novelty of this biosynthesis consist in realization of a 3D cluster with fractal structure with cauliflower morphology formed by aggregation of silver nanoparticles.

The biosynthesis process of silver nanoparticles using *Chlorella Sorokiniana* as bio-reducer is (1) environmentally friendly, does not use any chemical or toxic agents for human or animal health and does not affect the environment; (2) simple bio-technologic synthesis process; (3) economically efficient (inexpensive) does not include additional stages of preparation /purification of raw materials and reaction products (separation, extraction/ filtration, centrifugation, drying, sterilization, etc.); (4) biosynthesis process can be implemented as an extension of algae growth technology, to increase the profit of the algae growth unit; and (5) can be extended to industrial scale to produces food supplements with antifungal and antibacterial activity suitable for human and veterinary application.

3. Agriculture and Food Industry

Class

4. Medicine – Health Care – Cosmetics

RO.197.

Title	System for securing / releasing the position with piezoelectric actuators and parallelogram mechanism
Authors	Ovezea Dragoș, Tănase Nicolae, Chiriță Ionel, Ilie Cristinel
Institution	Ioan, Popa Marius, Lipcinski Daniel, Nedelcu Adrian
Patent no.	National Institute for Research and Development in Electrical Engineering ICPE-CA Bucharest
Description	Patent application no. A/01065/2017 The invention relates to a system for securing / releasing the position with piezoelectric actuators and a parallelogram mechanism. The system according to the invention consists of a linear guidance rail (1) on which is guided a linear slide

(2) which has a single degree of freedom, and on which are fixed piezoelectric actuators (3, 3') which act on levers made with parallelogram mechanisms (4 and 4') which ensure a good linearity of the brake movement on its displacement range and do not introduce angular deviations of its position; the locking springs (5 and 5') keep the linear slide (2) locked on the linear guidance rail (1) when the piezoelectric actuators (3 and 3') are not supplied and when the piezoelectric actuators are supplied with voltage (3 and 3') their deformation is amplified and the linear slide (2) is unlocked.

Applications: Piezo actuated braking systems; Positioning systems

Class

6. Mechanical Engineering - Metallurgy

RO.198.

Title

Electromechanical system for automatic taking over and handling of electrodes

Authors

Ovezia Dragoș, Hristea Gabriela, Tănase Nicolae, Guțu Mihai, Mihai Romulus Marian

Institution

National Institute for Research and Development in Electrical Engineering ICPE-CA Bucharest

Patent no.

Patent application no. A/00293/27.05.2020

Description

The invention relates to an electromechanical system for automatic taking over and handling of electrodes. The system according to the invention consists of an enclosure (4) consisting of a thermo-stabilized box and a lid (5), having two linear positioning axes with some linear guides (9, 10) and a common frame (11), which connecting the shafts, and having a component (12) which, by means of a clamping system (13), can take up printed multiple electrode connectors (2) stored in a shed (3) in the enclosure (4), on which they place in containers (1) filled with liquid samples, in order to perform several measurements simultaneously and thus to minimize the sources of error and to reduce the measurement uncertainty.

Applications

Automation of electrochemical measurements

Class

5. Industrial and laboratory equipments

RO.199.

Title	Polymeric material stabilized with microalgal biomass and the manufacturing process
Authors	Zaharescu Traian, Mateescu Carmen, Dima Andreea-Daniela
Institution	National Institute for Research and Development in Electrical Engineering ICPE-CA Bucharest
Patent no.	A 2020 00463
Description	<p>The invention relates to an innovative polymeric material, based on polyolefin type ethylene-propylene-diene terpolymer and the process for obtaining it, the material gaining improved stability to oxidation, by additivating it with a microalgal powder of <i>Chlorella vulgaris</i> or <i>Spirulina platensis</i>. The additivated material can be produced either in the form of films or plates, by passing the terpolymer in chloroform solution, the microalgae powder being added to the solubilized polymer solution. The polymeric material obtained by evaporating the solution has acquired improved physical and mechanical properties demonstrated by chemiluminescence and infrared spectroscopy. The material was tested before and after exposure to gamma radiation. This innovative polymeric material stabilized with microalgal biomass can be used to manufacture products that require high physical and mechanical strength, as it can provide increased durability under severe conditions of use and storage, such as accidental or prolonged exposure to solar radiation.</p> <p>Applications: Particularly in the food packaging industry, since in addition to its improved physical and mechanical properties, this polymeric material shows high biocompatibility between the microalgal additive and the food item during packaging, transportation and storage.</p>
Class	9. Chemical and Textile Industry

RO.200.

Title	Superconducting coils system for magnetic field energy storage
Authors	Dobrin Ion, Dumitru George, Pinte Radu [†] , Enache Dan, Popovici Iuliu Romeo [†] , Dobrin Andrei, Zamfir Șefania
Institution	National Institute for Research and Development in Electrical Engineering ICPE-CA Bucharest
Patent no.	Patent application no. A/00783/2018
Description	The invention relates to a magnetic field energy storage

generated by a system of superconducting coils, with applications in the field of atomic and nuclear physics.

The technical problem solved by the invention consists in the realization of an energy storage in magnetic field generated by a system of superconducting coils which through the special construction, allows to obtain intense magnetic fields 0 - 5T by using an adequate number of HTS superconducting coils, with stored energies of MJ order and with the possibility of unloading energy extremely fast (\sim tens μ s - ms).

The magnetic field energy storage system generated by a superconducting coil system, eliminates the disadvantages of other systems by using a closed cycle cryocooler, which cools the HTS coil assembly to temperatures of 10 K level by thermal conduction, which allows the thermal regime to be maintained with minimal costs.

Magnetic field superconducting energy storage device generated by a system of superconducting coils, consists of a vacuumed cryostat (1) inside of which is placed a set of several HTS superconducting coils (3) mechanically fixed to the cover the cryostat (1) by means of the support bracket (8) and the cooling system (4) which is thermally coupled to the closed cycle cryocooler (2) by means of the thermal connector (6). The HTS superconducting coil assembly (3) is surrounded by a thermal shield (5) coupled to the cooling stage 1 of the cryocooler (2) and is powered / discharged electrically via the terminals (7).

Class 2. Energy and sustainable development

RO.201.

Title	Integrated device for remote interactive monitoring of current / voltage characteristic of photovoltaic panels
Authors	Teișanu Aristofan Alexandru, Marin Marcel Dorian, Iordoc Mihai Nicolae
Institution	National Institute for Research and Development in Electrical Engineering ICPE-CA Bucharest
Patent no.	A/00495/02.07.2018
Description	The integrated device for remote interactive monitoring of the current/voltage characteristic of photovoltaic panels, intended for monitoring the output voltage on normal load with a number of programmable readings by the user as well as determining the current voltage characteristic on optimal load.

The technical problem solved by the invention consists in determining the current/voltage parameters of each photovoltaic panel, without disconnecting them from the string, as follows: both the service load and the optimal load, which determines real and isolated characteristics compared to the other panels are connected to the photovoltaic panel through some electronic circuit breakers with very low direct resistance. In range of $3\text{m}\Omega$; the circuit breakers are controlled by a completely galvanically isolated system from the power source (the corresponding photovoltaic panel); the circuit breaker control system as well as the interactive remote communication system are powered by a lithium-ion battery. which is charged by the energy supplied by the photovoltaic panel through a power management system, the total power of all these systems being less than 1 W

Class 2. Energy and sustainable development

RO.202.

Title

Laser assisted magnetron sputtering method for gradient metallic deposition

Authors

Teişanu Aristofan Alexandru, Iordoc Mihai Nicolae, Tsakiris Violeta, Culcea Andreea Lucica

Institution

National Institute for Research and Development in Electrical Engineering ICPE-CA Bucharest

Patent no.

A/00368/2020

Description

Laser assisted magnetron sputtering method for gradient metallic deposition, according to the patent, eliminate the mentioned disadvantages, in that consists in achieving of gradient thin film metallic coatings on metal support, starting from common niobium zirconium and niobium zirconium tantalum alloys magnetron targets going trough a technological path as follow: reparation of the support surface, selecting the magnetron target, establishing the magnetron sputtering parameters, establishing the plasma deposition duration, establishing the annealing process parameters, starting the plasma deposition, starting the annealing process, starting the oxidation/nitriding process, final annealing. This method allows achieving of gradient metal deposition on metal support heaving thickness in range of $1\text{-}5\mu\text{m}$ measured from the initial support surface, with a gradient diffusion thickness in range of tens of microns, heaving excellent adherence on metal support an very good wearing and corrosion resistance.

Class

5. Industrial and laboratory equipments

RO.203.

Title	Resistive sensor for NO₂ detection based on RGO / ZnO nanocomposite
Authors	Ion Ioana, Telipan Gabriela, Pîslaru-Dănescu Lucian
Institution	National Institute for Research and Development in Electrical Engineering ICPE-CA Bucharest
Patent no.	A/00497/2018
Description	<p>In the present patent application (PA) is presented the synthesis and characterization of nanocomposite materials (NCMs) based on zinc oxide (ZnO) and reduced graphene oxide (RGO) used as sensing material (SM) with application in NO₂ detection at room temperature. The solutions of commercial ZnO nanoparticles with 1 and 10% (wt.%) of RGO were deposited onto the interdigitated array electrode forming IDE type sensors. The sensors were tested in 1, 3, 5 and 10 ppm NO₂ atmosphere, at room temperature and atmospheric pressure. The results prove that the obtained NCMs are suitable for sensing application.</p> <p>The novelty of this PA consist of:</p> <p>(A) synthetization of RGO/ZnO NCMs suitable as sensing materials for fabrication of resistive sensors working at room temperature for detection of NO₂ with the following advantages: (1) Good sensing properties for 1-10 ppm concentration of NO₂ gas: fast response time and high sensitivity; (2) simple construction and low price; (3) ecological and friendly environmental technology.</p> <p>(B) a lab-fabrication process/lab-prototype of a sensor device with gas – sensing properties for a resistive sensors IDE type, working at room temperature and having good response for NO₂ gas detection.</p>
Class	1. Environment – Pollution Control

RO.204.

Title	Polymeric bioimpedance sensor and procedure of synthesis of composite Ag/polypyrrole sensitive material
Authors	Lucian PÎSLARU-DĂNESCU, Gabriela TELIPAN, Ioana ION
Institution	National Institute for Research and Development in Electrical Engineering ICPE-CA Bucharest
Patent no.	Patent application no. A/00526/2020
Description	The invention relates to the realization of polarized bioimpedance sensors, with dry use, i.e. without application

of gel on the patient's skin, which has a good biocompatibility with human tissue, for ECG type monitoring applications, as well as the material synthesis process sensitive Ag/polypyrrole composite, as a sensitive material used in the realization of polarized bioimpedance sensors. Bioimpedance polymeric sensors for ECG monitoring based on polypyrrole conductive polymeric material and two composites with 10% and 20% Ag nanoparticles introduced in the polymer matrix, have besides biocompatibility, good physico-chemical properties, being chemically inert materials and showing resistance to corrosion in contact with environmental factors. These properties give them a long service life. Depolarization and repolarization of the surface of human skin is manifested by a difference in electrical potential and is measured non-invasively by bioimpedance sensors located on the chest or upper or lower limbs. Polymeric impedance sensors detect tiny electrical variations in the electrical potential difference between different points set on the skin, variations due to the activity of the heart muscle during the heartbeat.

Class 4. Medicine – Health Care – Cosmetics

RO.205.

Title **Electrical insulating fluid and obtaining procedure**

Authors Lingvay Iosif, Oprina (Cîrciumaru) Gabriela, Voina Andreea, Pica Alexandra, Șerban Florentina Fănica, Stănoi Valerica, Ungureanu Livia-Carmen

Institution National Institute for Research and Development in Electrical Engineering ICPE-CA Bucharest

Patent no. Patent application no. 132988 (A/00378/2017)

Description The invention relates to an environmental friendly electrical insulating fluid and to the process for making it. The electrical insulating fluid is obtained from raw materials from renewable resources and has functional dielectric characteristics and high thermal stability.

Applications: Mixed solid / liquid insulation (electrical insulating fluid / paper) from electrical equipment (transformers, inductance for neutral treatment etc.).

Class 2. Energy and sustainable development

RO.206.

Title	Electrical contact materials based on tungsten-copper-graphene oxide and process for preparing the same
Authors	Lungu Magdalena, Ion Ioana, Tâlpeanu Dorinel, Pătroi Delia, Marin Mihai, Marinescu Virgil, Sbârcea Beatrice Gabriela, Lucaci Mariana, Godeanu Petrișor, Barbu Alexandra Cătălina
Institution	National Institute for Research and Development in Electrical Engineering ICPE-CA Bucharest
Patent no.	Patent application no. A 2020 00276
Description	<p>The invention relates to novel electrical contact materials based on tungsten-copper-graphene oxide (W-Cu-GO) with high performance physical and mechanical properties and a process for preparing electrical arcing contacts (protection rings and contact tips) designed to equip a wide range of medium and high voltage switchgear apparatuses operating in low volume of electro-insulating mineral oil or sulfur hexafluoride (SF₆). According to the invention, the electrical contact materials consist of fine composite powders of W-Cu-GO with a weight content of 75-80% W and 20-25% Cu, and an additive (0.5% GO), which are manufactured by a modern powder metallurgy process based on spark plasma sintering under vacuum, at a sintering temperature of 1040-1060°C for a dwell time of 5-10 minutes, and a pressing pressure of 50-65 MPa. The sintered materials realized in a cylindrical shape (Ø20-60 mm x 3-10 mm) were mirror polished on both plane surfaces to remove possible impurities from the graphite foils used in the SPS process. The developed W-Cu-GO contact materials were highly densified since the relative density was 97-99% of the theoretical density, and yielded high Vickers hardness HV0.03/10 of 297-378 and a modulus of elasticity 238-289 GPa due to the GO addition into W-Cu materials. Very good electrical properties were also achieved for the electrical conductivity of 14-23 MS/m and electrical resistivity of 4.35-7.14 µΩ.cm. These properties contributed to the obtaining of reliable electrical arcing contacts by mechanical processing of the semi-finished products to the desired shape and dimensions.</p>
Class	6. Mechanical Engineering - Metallurgy

National Research and Development Institute for Cryogenic and Isotopic Technologies - ICSI Rm. Valcea

RO.207.

Title	Compacted Mixed Catalytic Packing
Authors	Gheorghe Ionita, Constantin Ciortea and Gheorghe Titescu
Institution	National Research and Development Institute for Cryogenic and Isotopic Technologies - ICSI Rm. Valcea
Patent no.	RO 134746 B1; BOPI 1/2022
Description	<p>Mixed catalytic packing consists of hydrophilic component, made of corrugated metallic net in ordered geometry and a catalyst with high hydrophobicity inserted in optimum ratio, inside of hydrophilic packing. The catalyst is based on platinum on carbon and polytetrafluorethylene (Pt/C/ PTFE) with high hydrophobicity and specific physico-textural properties to be able to promote the isotopic exchange between hydrogen and water even at direct contact with liquid water, according to the follow reactions:</p> $\text{H}_2 (\text{gas}) + \text{HTO} (\text{vapor}) \rightleftharpoons \text{HT} (\text{gas}) + \text{H}_2\text{O} (\text{vap}) \quad (1)$ $\text{H}_2\text{O} (\text{vap}) + \text{HTO} (\text{liq}) \rightleftharpoons \text{HTO} (\text{vap}) + \text{H}_2\text{O} (\text{liq}) \quad (2)$ $\text{H}_2 (\text{gas}) + \text{HTO} (\text{liq}) \rightleftharpoons \text{HT} (\text{gas}) + \text{H}_2\text{O} (\text{liq}) \quad (3)$ <p>Due to its specific arrangement (two in one) in comparison to conventional alternated packing, this compacted packing shows:</p> <ul style="list-style-type: none"> - an optimal structure with the lowest volume for the same separation efficiency of isotopic exchange; - a lower pressure drop; - the most compacted geometry which allows various arrangements for the both components; <p>The most advantage consists of twice decreasing of the sizes for isotopic exchange columns for the same efficiency.</p> <p>Mainly, the compacted mixed catalytic packing is devoted to promote the tritium removal from heavy water used as moderator in CANDU reactor and for water and air detritiation system from future fusion reactor (ITER). A type of compacted packing (COMPACT C-P 002) has been already selected to be applied at the future Cernavoda Tritium Removal Facility (CTRF) for heavy water detritiation. Secondary any chemical process in which liquid water and water vapor are reactant or reaction product could be promoted with high efficiency by using such compacted packing.</p>
Class	2

RO.208.

Title	Covalent graphene functionalized with azulene and process for obtaining them
Authors	Adriana MARINOIU¹, Simona ION²

Institution	¹ National Research and Development Institute for Cryogenic and Isotopic Technologies - ICSI Rm. Valcea ² "Costin D. Nenitescu" Institute of Organic Chemistry, Bucharest
Patent no.	135059 A0 - C01B 32/184; BOPI 6/2021
Description	<p>The present invention relates to a process for the preparation of graphene materials covalently functionalized with azulene under mild reaction conditions. The process of synthesis according to the present invention is carried out in a single step, one-pot type, by a 1,3-dipolar cycloaddition reaction of a azulene-methine to the reduced graphene oxide. By this process an advanced functionalization of the graphene material is obtained, the reaction taking place at the functional groups C = C both marginal and at those inside the graphene layer. This is possible due to the acceleration of the reaction due to the energy produced in the microwave field.</p> <p>According to the invention, the technical problem which it solves consists in the fact that a simple process for the synthesis of graphene materials functionalized with azulene in a short time, with low costs is proposed, a process which does not involve technological difficulties or drastic operating conditions.</p>
Class	2

RO.209.

Title	SOLAR DRYER WITH HUMIDITY EXTRACTOR
Authors	Ionete Roxana Elena, Ionete Eusebiu Ilarian, Spiridon Stefan Ionut, Constantinescu Marius
Institution	National Research and Development Institute for Cryogenics and Isotopic Technologies - ICSI Rm. Valcea
Patent no.	RO 132880; BOPI 8/2021
Description	<p>The invention relates to a solar dryer with humidity extractor usable for organic materials, like sewage sludge, vegetables, fruits, wood chips etc., by exposing them to the influence of sunlight, followed by the continuous extraction of the resulting moisture produced in the solar chamber following the drying process and its free or forced condensation.</p> <p>The advantages of the invention are related to the arrangement of transparent solar concentrators at the top of the installation and some auxiliary elements so that the solar heat concentrates in the lower element accommodating the substance to be dried / dehydrated, and the resulting moisture to be extracted continuously, freely or forcibly.</p>
Class	2

National Institute for Research and Development in Microtechnologies - IMT Bucharest

RO.210.

Title Matrix nanocomposite for resistive oxygen sensor

Authors Bogdan-Cătălin Șerban, Octavian Buiu, Cornel Cobianu, Viorel Avramescu, Maria Roxana Marinescu

Institution National Institute for Research and Development in Microtechnologies - IMT Bucharest

Patent no. Patent application No. A/00471, RO- BPOI, 28- 01-2022

Oxygen concentration monitoring is a process of paramount importance in various fields of industrial and domestic activity such as indoor air quality control (air conditioning and ventilation systems), combustion optimizing in industrial boilers, pollution control through automobile engine management, food processing plants.

This invention includes the design and manufacturing processes for a new resistive, room temperature oxygen sensor, employing organic - inorganic halide perovskites ($\text{CH}_3\text{NH}_3\text{PbI}_3$), /oxidized carbon nanohorns (CNHox) nanocomposite as sensing layer. The oxygen sensor includes a Kapton substrate, interdigitated electrodes and a sensing layer obtained via spin coating method. The oxygen monitoring capability of the sensing layers was investigated by applying a current between the two electrodes and measuring the voltage at different values of the oxygen concentration at which the sensing layer was exposed. The resistance of the sensitive layer varies with the oxygen concentration. The new synthesized sensing layer used in the manufacturing of resistive oxygen sensor have several significant advantages:

- the presence of CNHs-ox ensures a high specific surface area / volume ratio as well as a substantial affinity for oxygen molecules.
- detection at room temperature.
- rapid response of the sensor to variations in the value of oxygen concentration.

Class

1

RO.211.

Title	Matrix nanocomposite for resistive oxygen sensor
Authors	Bogdan - Cătălin Șerban, Octavian Buiu, Cornel Cobianu, Maria Roxana Marinescu
Institution	National Institute for Research and Development in Microtechnologies - IMT Bucharest
Patent no.	Patent application No. A/00472, RO- BPOI, 28- 01-2022
Description	<p>The invention includes the design and manufacturing processes for a new resistive hydrogen sulphide sensor, employing carbon nanotubes functionalized with mercapto groups (-SH) and carbonothioyl (-C=S) groups. The sensing layers described in this invention are based on carbon nanotubes subjected to H₂S / He plasma. The optimal degree of derivatization of carbon nanotubes, to obtain high sensitivities, can be tuned by changing the plasma power as well as the exposure time. The H₂S monitoring capability of the sensitive layers was investigated by applying a current between the two electrodes and measuring the voltage at different values of the H₂S concentration at which the mercapto carbon nanotubes based sensing layer was exposed. The resistance of the sensitive layer varies with the H₂S concentration.</p> <p>The process steps for the fabrication of the solid-state sensing films based on CNH-SH are listed below:</p> <ul style="list-style-type: none"> - Carbon nanotubes, are functionalized in H₂S / He plasma (60-40 v/v). - The synthesized CNO-SH is washed with ethanol, acetone and deionized water. - A dispersion of CNH-SH in dimethylformamide was subjected to ultrasonication at room temperature for 24 hours. - The obtained dispersion is deposited by the spin coating method on the Kapton substrate. - The obtained film is heated to 100°C for 30 minutes. - The obtained film is subjected to a final heat treatment, at 150°C, for 10 minutes.

Class

1

RO.212.

Title	Carbon dioxide sensor
Authors	Bogdan - Cătălin Șerban, Octavian Buiu, Cornel Cobianu, Maria Roxana Marinescu
Institution	National Institute for Research and Development in Microtechnologies - IMT Bucharest
Patent no.	Patent application No. A/00473, RO- BPOI, 28- 01-2022
Description	Carbon dioxide detection is important in various sectors of domestic and industrial activity, such as indoor air quality control, healthcare, agriculture, food technology, alcoholic beverage industry. The invention includes the design and manufacturing processes for a surface acoustic wave (SAW) CO ₂ sensor, employing carbon nanohorns and carbon nanonions functionalized with groups such as -CO-NH-CH ₂ -CH ₂ -NH- CH ₂ -CH ₂ -NH ₂ , (abbreviated as CNHs-R-NH-R-NH ₂ and CNOs-R-NH-R-NH ₂) as sensing layer, a quartz piezoelectric substrate and interdigital transducers. This type of functionalization ensures appropriate selectivity to the nano carbonic materials by grafting aliphatic primary and secondary amine groups. Aliphatic amines, according to the HSAB theory, are hard bases and can interact reversibly, at room temperature with CO ₂ (hard acid) to form carbamates. The sensing structure used is of the "delay line" type, having a double delay line to compensate the thermal drift. One of the delay lines is coated with CNOs-R-NH-R-NH ₂ , the second delay line being the piezoelectric substrate without a sensitive layer. The CNOs-R-NH-R-NH ₂ - based sensing layer for SAW CO ₂ sensor has several significant advantages: improved mechanical properties, detection at room temperature, fast response, increased selectivity.

Class

1

RO.213.

Title	Resistive sensor for relative humidity
Authors	Bogdan - Catalin Serban, Octavian Buiu, Cornel Cobianu, Maria Roxana Marinescu
Institution	National Institute for Research and Development in Microtechnologies - IMT Bucharest
Patent no.	Patent application No. A/00479, RO- BPOI, 28- 01-2022
Description	This patent application refers to the development of resistive relative humidity (RH) sensor, employing a sensing layer based on a binary nanocomposite comprising oxidized

carbon nanohorns (CNHox) – sodium lignosulfonate, oxidized carbon nanooxions (CNOox)- sodium lignosulfonate or ternary nanocomposite comprising oxidized carbon nanohorns (CNHox), oxidized carbon nanooxions (CNOox), sodium lignosulfonate.

The RH sensor includes a Kapton substrate, interdigitated electrodes and a sensing layer obtained via spin coating method. The RH monitoring capability of the sensing layers was investigated by applying a current between the two electrodes and measuring the voltage at different values of the oxygen concentration at which the sensing layer was exposed. The resistance of the sensitive layer varies with RH level. The new synthesized sensing layer used in the manufacturing of resistive RH sensor have several significant advantages:

- the presence of CNHs-ox and CNHox ensures a high specific surface area / volume ratio as well as a substantial affinity for water molecules.
- the dispersing character of sodium lignosulfonate facilitates uniform distribution of the nanocarbonic material within the nanocomposite.
- detection at room temperature.
- rapid response

Class

3

RO.214.

Title

Resistive sensor for relative humidity

Authors

Bogdan- Catalin Serban, Octavian Buii, Cornel Cobianu,

Institution

National Institute for Research and Development in Microtechnologies - IMT Bucharest

Patent no.

Patent application No. A/00476, RO- BPOI, 28- 01-2022

Description

This patent application refers to the development of resistive relative humidity (RH) sensor, employing a sensing layer based on a binary nanocomposite comprising oxidized carbon nanohorns (CNHox) – tannic acid, oxidized carbon nanooxions (CNOox) - tannic acid or ternary nanocomposite comprising oxidized carbon nanohorns (CNHox), oxidized carbon nanooxions (CNOox), tannic acid .

The RH sensor includes a Si/SiO₂ substrate, interdigitated electrodes and a sensing layer obtained via drop casting method. The RH monitoring capability of the sensing layers

was investigated by applying a current between the two electrodes and measuring the voltage at different RH levels at which the sensing layer was exposed. The resistance of the sensitive layer varies with RH level. The new synthesized sensing layer used in the manufacturing of resistive RH sensor have several significant advantages:

- the presence of CNHs-ox and CNHox ensures a high specific surface area / volume ratio as well as a substantial affinity for water molecules.
- tannic acid can form hydrogen bonds with both the hydrophilized substrate (Si/SiO_2) and oxidized carbon nanowires.
- detection at room temperature.
- rapid response

Class

3

National Institute for Research and Development in Environmental Protection - INCDPM

RO.215.

Title	Methodology for monitoring SARS-CoV-2 RNA in wastewater from Romania
Authors	György DEÁK, Monica MATEI, Mădalina BOBOC, Elena HOLBAN, Raluca PRANGATE, Răzvan AIRINI
Institution	National Institute for Research and Development in Environmental Protection
Description	<p>The presence of SARS-CoV-2 in wastewater has been reported in several studies and SARS-CoV-2 wastewater surveillance has already been implemented in several European countries, as well as in United States, Australia and China.</p> <p>Here we offer a methodology for monitoring SARS-CoV-2 RNA in wastewater from Romania. We expect that based on this we will be able to predict and early detect SARS-CoV-2, which is vital for reducing the risk of transmission.</p>
Class	4

RO.216.

Title	Pilot validation system of breeding habitats of sturgeon species
Authors	Deak Gyorgy, Matache Răzvan, Dănălache Tiberius, Raischi Constantin Marius, Prangate Raluca
Institution	National Institute for Research and Development in Environmental Protection Bucharest, Romania (INCDPM)
Patent no.	A/00549
Description	<p>The invention relates a collection installation of biological material resulting from reproduction sturgeon species in the wild. The installation consists of a meta-framework lic, exterior, support, a flat plate formed of three upper layers, of leakage and abrasion, respectively, provided with some side parts, foldable for collection in safety of biological material and with holes for draining water evenly arranged over the entire flat surface, to reduce the water pressure during handling, as well as a handling and control equipment consisting of some elements for anchoring, some clamps to hold floats that allow location during use and a system of cables for handling equipment</p>
Class	10

RO.217.

Title	Electronic tag to alarm and remote localization (Cartesian coordinates) of valuable fish (sturgeon) by using a LORA / GSM / SAT Multicale radio communication network used to reduce the poaching of the specimens
Authors	DEÁK György, GEORGESCU Tudor, BĂNICĂ Cosmin-Karl, BURLACU Iasmina-Florina
Institution	National Institute for Research and Development in Environmental Protection
Patent no.	Patent application No. A/00178/2021
Description	<p>The invention main objective is the preservation of aquatic ecosystems by located from distance the sturgeon in order to identify the poaching and to reduce the loss of specimens.</p> <p>The invention relates to an assembly composed of the tags/electronic devices for the alarming and remote localization of sturgeons and a radio communications network, LORA / GSM / SAT Multicale type. The main components of the assembly, according to Figure no.1, are:</p> <ul style="list-style-type: none"> (1) - valuable fish (sturgeon) tagged with ultrasonic transmitter and radio communication cell attached to the dorsal fin; (2) - monitoring station type DKMR-01T for receiving ultrasonic signals; (3) - radio wave transmission / reception device; (4) - GSM turn; (5) - data center monitor;
Class	10

RO.218.

Title	Modeling of body mass through morphobiometric relationships for <i>H. huso</i> tagged and monitored in the Lower Danube
Authors	György DEÁK, Monica MATEI, Mădălina BOBOC, Elena HOLBAN, Răzvan AIRINI, Raluca PRANGATE
Institution	National Institute for Research and Development in Environmental Protection
Description	The Lower Danube Basin has an important role in the biogeography of European rivers and represents a refuge for numerous important fish species, including species from the Acipenseridae family. Sturgeons are an ancient group with

unique morphological characters distributed exclusively in the Northern Hemisphere of the Earth. Over the last decade, sturgeon populations have been in an drastic decline due to human impacts, consequently, at the European scale, sturgeon species have been listed on the International Union for Conservation of Nature Red List of Threatened Species. From a taxonomic point of view, the family Acipenseridae comprises five genera with 25 species and of these 6 are native in the Lower Danube, but only 4 are currently found there. As knowledge on the behavior and ecology of sturgeon species is limited this study analyzes the informational volume accumulated during 2011-2020 by the team of experts of the National Institute for Research and Development for Environmental Protection and proposes a mathematical model for calculating the body mass through morphobiometric relationships of the *H. huso* specimens

RO.219.

Title	Distribution of emerging pharmaceutical pollutants in Arges-Vedea, Buzau-Ialomita and Dobrogea-Litoral river basins and of the Danube River area and methods of their reduction in aquatic ecosystems
Authors	Mihaela ILIE, DEÁK György, Gina GHITA, Florica MARINESCU, Alexandru Anton IVANOV, Ioana SAVIN, Marius Constantin RAISCHI, Lucian LUMINAROIU
Institution	National Institute for Research and Development in Environmental Protection (INCDDPM)
Description	Within this project, the identification, quantification and distribution of 54 pharmaceutical micropollutants as well as of elemental/isotopic inorganic pollutants, from different complex environmental matrices, respectively: wastewater, surface water, drinking water, sediment and biota in the hydrographic basins of Arges-Vedea, Buzau-Ialomita and Dobrogea-Litoral and of the Danube River, were achieved. Among the pharmaceutical micropollutants identified in the category of antibiotics, in the Arges-Vedea river basin, azithromycin and clarithromycin were most frequently detected (31.25%) while tetracycline was the least detected, with a frequency of 3.13%. In the Dobrogea-Litoral river basin, the highest concentration of paracetamol was identified in the Danube River area, Sf. Gheorghe branch, of 184 ng/L, in the Danube River - Fetesti area, km 43,

respectively, the azithromycin concentration was of 162 ng/L. The study also aimed at investigating the prevalence of antibiotic resistance of potentially pathogenic bacteria isolated from aquatic environments and evaluating the impact of effluents from wastewater treatment plants on antibiotic resistance of bacterial populations in the receiving river. Thus, for β -lactam antibiotics, *E. coli* strains isolated from wastewater showed a very high level of resistance to amoxicillin+clavulanic acid (86%), high to ampicillin (26%), intermediate to penicillin (23%) and clarithromycin (14%), and a very low level to cefazolin (3%). Preliminary tests were also performed on the removal and degradation of pharmaceutical compounds from wastewater, by electrochemical methods, adsorption with various adsorbent materials such as activated carbon powder, silica gel, chitosan, zeolite, ozonation and by biological methods.

RO.220.**Title**

AUTONOMOUS ROVER FOR AIR QUALITY DATA COLLECTION AND REPORTING

Authors

Andrei-Gabriel ILIE, DEÁK György, SZEP Robert-Eugen, Ágnes-Zsuzsa Keresztesi

Institution

INCDPM - National Institute for Research and Development in Environmental Protection

Patent no.

Patent application No. A/00230/2022

Description

The invention (see below photo) was created as a solution for receiving data from different types of environments. With his connectivity system it can send data of air quality via SMS, can be controlled remotely and monitored from long distances.

It contains a double solar cells which ensure the necessary energy for operation in good condition and also recharge his two lithium cells.

RO.221.**Title**

Research on morphological and hydrodynamic evolution tendencies in the Chilia - Bystroe transboundary area – Chilia branch hydrological conditions analysis for 1987-2021

Authors

Tudor Georgeta, DEÁK György, Arsene Miruna, Edward Bratfanof

Institution

National Institute for Research and Development in

Environmental Protection Bucharest**Description**

Chilia is one of the three main Danube branches that form its delta, a RAMSAR Wetland of International Importance and included in the World Heritage List by UNESCO, its importance resides with the fact that from Chilia bifurcates the Bystroe channel on Ukrainian territory, involved in an international controversy due to the environmental impact of the works carried out to make the channel operational for large ships navigation. This project phase's aim is to provide a better understanding of ongoing changes on the Chilia Branch by offering hydrological data analysis using daily flow and average level data recorded in Isaccea and Tulcea hydrometric stations for 1987-2021 interval. Statistical analysis algorithms were applied on a homogeneous series of monthly average flow values for the Chilia Arm to compute the discharge probability distribution, discharge cumulative frequency and hydrographs for the stations and Chilia branch.

RO.222.**Title**

Identification of sturgeon behavior in different hydromorphodynamic conditions resulting from the implementation of hydrotechnical arrangements

Authors

Elena HOLBAN, Eng. DEÁK György PhD Habil, Răzvan MATACHE Biol., Tiberius DĂNĂLACHE Dr. ecol., Monica MATEI Dr. eng., Mădălina BOBOC Eng., Marius RAISCHI Dr. Eng., Ionuț GHEORGHE Eng.

Institution

National Institute for Research and Development in Environmental Protection, Bucharest, Romania (INCDPM)

Description

The aim of this research was to evaluate the results obtained by ultrasonic tagging of sturgeon species and to collect field data for the period 2019-2021. Thus, an analysis was made of the information collected from the beginning of the period and also will be presented the migration capacity of sturgeons in the area of hydrotechnical arrangements and the possibility of passing areas in different hydromorphodynamic conditions highlighted by collecting bathymetry data. This research aims to present the situation of sturgeon species tagged with ultrasonic transmitters since the beginning of the study, both in terms of evolution by species, their migration capacity in the area of

hydrotechnical arrangements and the identification of potential swimming speeds taking into account the feeding and rest periods, respectively. At the same time, in addition to the results proposed in the study, an assessment was made of the pressures that may adversely affect the conservation status of sturgeon species and the proposed measures.

RO.223.

Title	Carbon budget methods as a tool for the monitoring of climate mitigation actions in aquatic and terrestrial ecosystems
Authors	DEÁK György, MATEI Monica, ENACHE Natalia, ROTARU Anda, LASLO Lucian, BOBOC Mădălina
Institution	National Institute for Research and Development in Environmental Protection
Description	<p>Terrestrial and aquatic ecosystems are a significant part in the dynamic of GHG cycles. Thus, the exchanges of GHG have become one of the most important ecological and climate change challenges. National, sub-national and local level carbon budgets are of interest in relation to understanding the global carbon cycle, comparing anthropogenic and biogenic sources of carbon and for the development of possible strategies for carbon sequestration. The goal of this paper is to present complementary methods for the monitoring of carbon reservoirs from soil, biomass and water: the respiration chamber and the injection kit for determining CO₂ exchange between the atmosphere and aquatic and terrestrial land use, in relation to the weather parameters, physical and chemical parameters of water and soil and drone with multispectral sensors for vegetation indexes (e.g. NDVI, NDRE, GNDVI, LCI, OSAVI).</p> <p>These carbon stocks and fluxes measurements aid in the development, implementation, and monitoring of adaptation and mitigation strategies in the target ecosystems.</p> <p>The project's objectives are to increase the scientific level of understanding on wetlands and forest carbon cycle balances. This was accomplished by performing a comprehensive CO₂ field activity in two types of ecosystems in the Bucharest area. The results showed the dependence between CO₂ and weather or climatic seasonality, depending also on other physical, chemical or vegetation parameters.</p>

RO.224.

Title **Monitoring and assessment of air quality in Bucharest city during the extreme weather events**

Authors Deák György, Natalia Raischi, Lucian Luminariu, Marius Raischi, Calin Sorina, Silaghi Cristina, Matache Razvan

Institution **National Institute for Research and Development in Environmental Protection**

Description The research activities that underline the presented work has been carried out by INCDPM in the project *Assessment of air quality at the surface and underground spaces of Bucharest city* which is part of Research Program *PN 19 43 07 01*– contract **no. 39N/2019**, financed by the Romanian Ministry of Research, Innovation and Digitalization. In urban cities, air quality is influenced by the multitude of emission sources and the increase in concentrations of specifically pollutant are also depending on the weather conditions. The resultants are based on the *in-situ* monitoring of the air quality in the Bucharest city during the *extreme weather events*. In fig. 1 are shown the infrastructure used by INCDPM to monitor the air quality and a part of the study results.

RO.224BIS

Title **The surface treatment of materials used in conservation works by using alcoholic suspensions based on nano- $\text{Ca}(\text{OH})_2$.**

Authors Mihaela-Andreea Moncea, György Déak, Ion Sandu, Monica Matei, Madalina Boboc, Gina Ghita, Ilie Mihaela

Institution **National Institute for Research and Development in Environmental Protection**

Description The present work highlights the self-healing capacity of innovative nanolime based materials, designed for monuments consolidation and preservation, plasters and architectural surfaces. In this sense, cubic physical support modeless were obtained by using both hydraulic and aerial lime. The mortar specimens were prepared by using sand/binder ratio 1:3 and water/binder ratio between 0.6 – 0.8 and cured in following conditions: 1 day in covered molds and after demolding up to 28 days in laboratory conditions ($T \approx 20^\circ\text{C}$). Additionally, for the microstructural evaluation binder pastes were casted in plastic flacons with

w/b = 0.6 and kept in laboratory conditions up to 28 days. The compressive strengths showed an increasing with 10% of values after the treatment with nanomaterials. SEM images show a porous layer, with well-defined granules of edges and corners, with large open pores (a and b) and after treatment with nano-Ca(OH)₂ based materials the surface comes smoother and the porosity is low (c and d), the self-healing effect being in this case very well highlighted.

National institute for Research and Development URBAN-INCERC

RO.225.

Title **Study of the Possibility of Increasing the Durability of Cementitious Composite Materials by Aligning with the Principles of the Circular Economy**

Authors Carmen FLOREAN, Horațiu VERMEȘAN, Elvira GREBENIȘAN, Andreea HEGYI, Adrian-Victor LĂZĂRESCU

Institution **NIRD URBAN-INCERC Cluj-Napoca Branch**

Description The framework for European waste policy and legislation is set in the context of wider EU policies and programmes, including the 7th Environmental Action Programme, the Roadmap to an Energy Efficient Europe and the Raw Materials Initiative. The 7th Environmental Action Programme sets out priority objectives for EU policy in the waste management sector. Waste hierarchy encourages the prevention or reduction of waste generation, re-use and then recovery of waste through recycling and other recovery operations such as energy recovery. The overall aim of the research is to contribute to the implementation of the principles of the Circular Economy concept through the valorisation of waste resources to obtain new composite materials with increased durability. Turning waste into resources is one of the main elements underlying the circular economy. The possibilities of recycling / reuse of some industrial wastes and by-products by including them in cementitious composites, while exploiting the specific potential of nanomaterials, i.e. TiO₂ nanoparticles, are currently being explored. The high degree of novelty, with significant contributions to the increase of knowledge in the field, is represented by the interdisciplinary analysis from the point of view of the durability of cementitious composite materials, approached both from the specific point of view of construction specialists (through conditioning related to the preservation of physical-mechanical performance), and from the point of view of chemistry and electrochemistry specialists (analysis of corrosion resistance and corrosion protection), while exploring the field of biocompatibility/biodegradability and the degree of environmental impact.

Acknowledgements

This research was financially supported by the Programme Research for sustainable and ecological integrated solutions for space development and safety of the built environment, with advanced potential for open innovation – “ECOSMARTCONS”, Programme code: PN 19 33 04 02: “Sustainable solutions for

ensuring the population health and safety within the concept of open innovation and environmental preservation” and

PN 19 33 03 01: “Researches to achieve the acoustic and thermal comfort inside the buildings, using an innovative tool for choosing the optimum structures of construction elements, from classical versus modern materials” financed by the Romanian Government.

RO.226.

Title

Influence of Heat Treatment on the Mechanical Properties of Alkali-Activated Fly Ash –Based Binders With Marble Dust Substitutions

Authors

Brăduț Alexandru IONESCU, Călin Grigore Radu MIRCEA, Mihail CHIRA, Adrian-Victor LĂZĂRESCU,

Institution

**NIRD URBAN-INCERC Cluj-Napoca Branch
TECHNICAL UNIVERSITY OF Cluj-Napoca**

Description

Marble waste contains a high level of calcium, which is obtained from the cutting process in marble production. The properties of geopolymer binders are influenced not only by the amount of alkali activators, their ratio, the molarity used, and the Si and Al content of the mineral additives used in the mixture, but also by the duration of the heat treatment and the heat treatment temperature.

This study aimed to produce alkali-activated geopolymer binders based on fly ash and marble dust. Alkali-activated geopolymer pastes were made both with heat treatment for 24h at 70°C and without heat treatment at (23±2)°C. Structural analysis by optical microscopy revealed, in the case of heat-treated samples, the formation of pores with an average size of 1÷1.5 mm, much larger than in the case of samples without heat treatment.

Acknowledgments

This research was financially supported by the Project “Entrepreneurial competences and excellence research in doctoral and postdoctoral programs - ANTREDOC”, project co-funded by the European Social Fund financing agreement no. 56437/24.07.2019. Partial support was received from Programme Research for sustainable and ecological integrated solutions for space development and safety of the built environment, with advanced potential for open innovation – “ECOSMARTCONS”, Programme code: PN 19 33 04 02: “Sustainable solutions for ensuring the population health and safety within the concept of open innovation and environmental preservation” and PN 19 33 03 01: “Researches to achieve the acoustic and thermal comfort inside the buildings, using an innovative tool for choosing the optimum structures of construction elements, from classical versus modern materials” financed by the Romanian Government.

RO.227.

Title **Analysis Regarding the Mechanical Properties of Alkali-Activated Fly Ash-Based Geopolymer Concrete Containing Spent Garnet as Replacement for Sand Aggregates**

Authors Adrian-Victor LĂZĂRESCU, Brăduț Alexandru IONESCU, Andreea HEGYI, Carmen FLOREAN

Institution **NIRD URBAN-INCERC Cluj-Napoca Branch**

Description Worldwide, research on the production and optimization of geopolymer materials is fundamentally motivated by the need, identified both in the global ecological context and at national level, to implement the principles of Sustainable Development, with sustainable consumption of resources, to capitalize on existing waste and prevent the generation of new ones. On the other hand, rapid industrial growth has witnessed the ever-increasing utilization of sand from rivers for various construction purposes, which also disturbs the environment. Recycling of garnets and their use as replacement for sand aggregates could provide an ecological solution for the production of the alkali-activated fly ash-based geopolymer binders. The aim of this paper is to study the possibility of using spent garnet as replacement for sand aggregates in the production of alkali-activated fly ash-based geopolymer binder using Romanian local raw materials and to study its influence on the mechanical performances of the binder.

Acknowledgments

This research was financially supported by the Project “Entrepreneurial competences and excellence research in doctoral and postdoctoral programs - ANTREDOC”, project co-funded by the European Social Fund financing agreement no. 56437/24.07.2019. Partial support was received from Programme Research for sustainable and ecological integrated solutions for space development and safety of the built environment, with advanced potential for open innovation – “ECOSMARTCONS”, Programme code: PN 19 33 04 02: “Sustainable solutions for ensuring the population health and safety within the concept of open innovation and environmental preservation” and PN 19 33 03 01: “Researches to achieve the acoustic and thermal comfort inside the buildings, using an innovative tool for choosing the optimum structures of construction elements, from classical versus modern materials” financed by the Romanian Government.

RO.228.

Title	Thermal Insulation Mattresses Based on Textile Waste and Recycled Plastic Waste Fibres, Integrating Natural Fibres of Vegetable or Animal Origin
Authors	Andreea HEGYI, Horațiu VERMEȘAN, Adrian-Victor LĂZĂRESCU, Cristian PETCU, Cezar BULACU, Carmen FLOREAN
Institution	NIRD URBAN-INCERC Cluj-Napoca Branch This research presents experimental results obtained after testing several thermal insulation composite products produced using a mix of sheep wool, cellulose, rPET and rPES fibres.
Description	The need for the development of these typer of materials was based on the current context that provides, worldwide, the need to identify solutions for the thermal efficiency of constructions. This could be possible only through sustainable and innovative methods and products. A viable solution is to produce thermal insulating products by carding-folding technology, using natural fibres and recycled polyethylene terephthalate (rPET) and polyester (rPES) waste, converted to fibres. Research results demonstrate the thermal insulation properties of the material but, at the same time, identifies the benefits of using such materials on the quality of the air in the interior space (the ability to adjust humidity and reduce the concentration of harmful substances) and, at the same time, the advantages of using sheep wool composite mattresses concerning their resistance to insect attack is demonstrated when compared with ordinary thermal insulation materials. Finally, sensitivity elements of these composites are observed in terms of: sensitivity to mould, and to contact with water or soil, drawing future research directions in the development of this type of materials.
	Acknowledgments This work was supported by a grant of the Romanian Ministry of Education and Research, CCDI – UEFISCDI, project number PN-III-P2-2.1-PED-2019-0463, within PNCDI III.

RO.229.

Title The Impact of the Research-Development Activity in the Alternative Energy Industry

Authors Mircea-Iosif RUS, Larissa Margareta BĂTRÂNCEA, Adrian-Victor LĂZĂRESCU

Institution NIRD URBAN-INCERC Cluj-Napoca Branch

Description Over time, it has been observed that there is an increase in energy consumption, which causes fossil fuel resources to decrease and to pollute the atmosphere. Moreover, worldwide, conventional energy is owned by a limited number of organizations that, for this reason, can afford to dictate the amount exploited and set energy prices, a resource of strategic importance. Under these conditions, renewable or alternative energy, produced by nature, has become very important, being a life-saving solution in these conditions, cheap and with a very high impact on the environment. Alternative energy is also obtained due to the research-development activity, activity from which it is going to put into practice its results. These results are present especially in the investments made, subsequently, by the companies producing alternative energy. Alternative energy has several advantages: its sustainability character because it can occur in the long run and the costs are quite low; this energy is renewable and its consumption does not have the effect of diminishing resources; renewable energy is ecological and does not affect the environment, that is why it is also called green energy; costs for this energy are reduced to zero because wind, sun, geothermal water and energy of watercourses are nothing but free and unlimited sources for alternative energy; maintenance costs are low, especially for solar and wind energy. We must not forget that these advantages of alternative energy have many years of research and development, the results of which have been put into practice.

Acknowledgements

This research was financially supported by the Programme Research for sustainable and ecological integrated solutions for space development and safety of the built environment, with advanced potential for open innovation – “ECOSMARTCONS”, Programme code: PN 19 33 04 02: “Sustainable solutions for ensuring the population health and safety within the concept of open innovation and environmental preservation” and PN 19 33 03 01: “Researches to achieve the acoustic and thermal comfort inside the buildings, using an innovative tool for choosing the optimum structures of construction elements, from classical versus modern materials” financed by the Romanian Government

RO.230.

Title **Influence of Waterproofing Agent For Mass Crystallization On The Self-Healing Property of Concrete**

Authors Tudor Panfil TOADER, Carmen DICO

Institution **NIRD URBAN-INCERC Cluj-Napoca Branch**

Description

This paper aims to analyze the self-healing capacity over time, of micro-cracks deliberately induced in a composite material, composed of raw materials of local origin (sand of granulation 0-4 mm, cement, superplasticizer additives, thermal power plant ash, and slurry lime) and integrally waterproofed by mass crystallization. The addition of waterproofing material was in a proportion of 1-3% of the cement mass.

In order to analyze the self-healing capacity, prismatic samples (dimensions of 40x40x160 mm) were made from the composite material, which were subjected to a bending effort, in order to create micro-cracks that were microscopically tracked, regarding their closure in time. To induce cracking, the static sample loading scheme was in 3 points, up to a stress of 90% of ultimate strength. After cracking the samples, the initial opening of the micro-cracks was determined, after which they were subjected to wet-dry cycles, for determined periods of time. During the conditioning of the samples, it was analyzed the micro-cracks closure, at the following time intervals: 1 day, 4 days, 8 days, 14 days and 20 days.

Following the analysis of the self-healing process of the micro-cracks, it was found the efficiency of the waterproofing addition in the closure proportion and in the speed of their closure. Thus, the micro-cracks of samples, with a 3% waterproofing content of the amount of cement, were closed in a proportion of about 99%, in a maximum of 20 days.

Acknowledgments

This research was financially supported by the Project "Entrepreneurial competences and excellence research in doctoral and postdoctoral programs - ANTREDOC", project co-funded by the European Social Fund financing agreement no. 56437/24.07.2019. Partial support was received from Programme Research for sustainable and ecological integrated solutions for space development and safety of the built environment, with advanced potential for open innovation – "ECOSMARTCONS", Programme code: PN 19 33 04 02: "Sustainable solutions for ensuring the population health and safety within the concept of open innovation and environmental preservation" and PN 19 33 03 01: "Researches to achieve the acoustic and thermal comfort inside the buildings, using an innovative tool for choosing the optimum structures of construction elements, from classical versus modern materials" financed by the Romanian Government.

RO.231.

Title **Testing the external fire behavior of ETICS systems in Romania**

Authors Adrian SIMION, Claudiu-Sorin DRAGOMIR, Daniela STOICA

Institution **NIRD URBAN-INCERC Bucharest Branch**

Description International statistics show that fires resulting from the lighting of facades outside buildings that result in the spread of fire vertically are less common than fires in compartments, but the material damage caused by them is also high. So far in Romania no experimental tests have been performed to evaluate the development and spread of fires generated from outside buildings. From the point of view of fire safety outside a building, the specialized documentation is relatively poor in information, predominating the one related to compartment fires. For this reason, the safety assessment scenarios for fires generated from the outside of thermally insulated buildings with ETICS systems are a challenge for every specialist involved in increasing the fire safety of buildings. To fill this gap, researchers at INCERC Bucharest conducted an experimental test that yielded edifying experimental results regarding the development of a fire outside a building, the evolution of temperatures on the height of the building and how the fire spreads on the combustible facade of the building.

RO.232.

Title **AN INTEGRATED SYSTEM FOR EARLY DETECTION OF THE STRUCTURAL DAMAGE TO FUTURE EARTHQUAKES**

Authors Claudiu-Sorin DRAGOMIR, Daniela DOBRE, Iolanda-Gabriela CRAIFALEANU, Emil-Sever GEORGESCU

Institution **National Institute for Research and Development in Construction, Urban Planning and Sustainable Spatial Development URBAN-INCERC**

Description The current level in the development of an integrated system to ensure the security of the built environment, with semi-automatic generation of PGA maps from seismic actions or other vibrating sources, and rapid assessment of the vulnerability of instrumented/monitored buildings is presented. In this context, the digitization process is based on

a network of sensors for monitoring the structural health of buildings, and seismic instrumentation / monitoring offers the opportunity to generate digital maps, which centralize all technical data of a building, in addition to information on the evolution dynamic defining characteristics, for the elements of resistance, or non-structural, the directions of propagation of the effects of an earthquake, or referring to the nature of the registered damages (visible or not). These sensor assemblies include electrical, optical, mechanical, photometric, photogrammetric or geodetic technologies - in conjunction with the cost-benefit function, being necessary to be controlled remotely and the evolutions in their operation to be stored automatically. The allowed digitization optimization allows the authorities and the owners to monitor not only the equipment for utilities, but also the overall behaviour of the building.

RO.233.

Title	Digitized method, a software application of acoustic calculation for the choice on acoustic criteria of optimal solutions for compound facade walls, composed of opaque part and glazed part.
Authors	Marta Cristina ZAHARIA
Institution	NATIONAL INSTITUTE FOR RESEARCH AND DEVELOPMENT IN CONSTRUCTION, URBAN PLANNING AND SUSTAINABLE SPATIAL DEVELOPMENT „URBAN-INCERC”
Description	<p>In Romania, there were made researches, conducted during 2020-2022 years in project PN 19 33.03.01 concluded with MCID, about the elaboration, for the first time, of a software application of <i>acoustic calculation</i> for the choice <i>on acoustic criteria</i> of <i>optimal solutions</i> for elements of construction, as <i>facade walls</i>, composed of <i>opaque part</i> and <i>glazed part</i>.</p> <p>For the construction of buildings with various destinations, located in urban areas, different types of facade construction elements are used, made of: 1) <i>opaque part</i> (ceramic block walls, autoclaved aerated concrete walls, sandwich walls made of gypsum board, structural type tiles of/with wood, etc.), or 2) <i>glazed part</i> (glazed walls - glass walls), or 3) <i>compound part</i> (<i>glazed + opaque</i>), (ex.: <i>compound facade walls: opaque part</i> (walls of ceramic blocks, autoclaved aerated concrete, concrete, etc.) + <i>glazed parts</i> (windows, doors)).</p> <p>This digitized method, <i>the software</i>, - based on a model of an indicative mathematical calculation -, was made to be used by</p>

architects, designer engineers, project verifiers, technical experts, etc., both, for the construction process of new buildings and for the rehabilitation/modernization of existing buildings.

Here are presented studies that shows how with *this software* is very easy to find the airborne sound insulation index, R_w , for a *compound facade wall*, made by *opaque part* (walls of ceramic blocks, autoclaved aerated concrete, concrete, etc.) and *glazed part* (windows, doors), when are known *materials* and some *specific geometric* and *acoustic characteristics*, such as: the *surfaces* of the two parts and the *airborne sound insulation index* of the *opaque part*, R_o , and of the *glazed part*, R_l .

RO.234.

Title	Agro wastes – nature based solutions to enhance resilience and sustainability of materials
Authors	Monica CHERECHEȘ, Adrian CIOBANU, Aurelia BRADU, Marius MART, Ionel PUSCASU
Institution	National Institute for Research and Development in Construction, Urban Planning and Sustainable Spatial Development “URBAN-INCERC” Iasi Branch
Patent no.	The study is subordinated to current practices regarding the implementation of nearly Zero-Energy Buildings in Romania, by improving the thermal insulation of new buildings and increasing the renewable energy consumption. <i>Applications:</i> The research presents techniques for capitalizing of a new agro waste (aggregates of sunflower stem) besides straw, hemp and sawdust, in the field of sustainable constructions, in order to establish the basic principles regarding the realization, conditions and recommended fields of use for innovative materials.
Description	<i>Advantages:</i> Thermal insulation materials or finishing / protection products with the addition of agro and / or vegetal wastes have the potential to replace conventional construction materials and to fulfill the long-term requirements of environmental sustainability. <i>Acknowledgments:</i> This study was performed within the frame of the scientific project ”Sustainable solutions for ensuring the health and safety of the population in the concept of open innovation and the preservation of the environment”, PN 19 33 04 02, Contract No. 24N/2019. The authors would like to acknowledge the financial support provided by Ministry of Education and Research, Romania.

RO.235.

Title	Dynamic action tests for electronic equipment
Authors	Adrian Ciobanu, Aurelia Bradu, Monica Cherecheș, Marius Mârț, Ionel Puscașu
Institution	National Institute for Research and Development in Construction, Urban Planning and Sustainable Spatial Development „URBAN - INCERC”, Iasi Branch
Description	The research infrastructure for dynamic action tests aimed to provide modern and complex assessment methods related to electronic devices which can be installed in environments where vibrations environment might occur. The purpose of vibration tests is to evaluate the effect caused on component parts by vibration in a specified frequency range. The vibration system can provide various tests: random test, shock test, road simulation test as well as sine chirp sweep function test, where constant velocity or acceleration can be done in frequency cyclic sweep from low to high frequency. The vibrations might damage the electronic equipment or deteriorate the functionality of its performance. Whenever a device is installed in such vibration environment, then there should be a guarantee that it will work under such condition.

RO.236.

Title	Preliminary research regarding the valorization of abrasive GARNET waterjet wastes in construction materials
Authors	Baeră Cornelia, Perianu Ion Aurel, Bolborea Bogdan, Gruin Aurelian, Vasile Vasilica, Varga Luiza
Institution	NIRD URBAN-INCERC, “Politehnica” University of Timișoara, Technical University of Cluj-Napoca, ISIM Timisoara
Description	Aggregates represent main constituents for producing concrete, mortars, cementitious or cement free composites with direct use in construction industry. Aggregates, unfortunately, represent exhaustible resources derived from nature, their excessive exploitation causing river erosion, landscape invasive modification, local fauna and flora aggression, etc. The high growth of construction industry, supported by multiple factors, increases the general demand for concrete and aggregates, consequently, fillers and sand included. Simultaneously, the waste generation rate induced by several industry in the everyday life, could offer reliable alternatives for aggregate replacement in concrete and composite materials for constructions. The spent Garnet sands, residue

generated by the abrasive waterjet material processing industry, could represent a possible solution of waste valorization in a new life cycle. The present study is focused in analyzing such a possibility, of using the Garnet waste material as sand replacement in construction materials.

This research is supported by the Programme:– “ECOSMARTCONS”, code: PN 19 33 04 02: “Sustainable solutions for ensuring the population health and safety within the concept of open innovation and environmental preservation”, financed by the Romanian Government and also by the Project “Entrepreneurial competences and excellence research in doctoral and postdoctoral programs - ANTREDOC”, project co-funded by the European Social Fund financing agreement no. 56437/24.07.2019.

RO.237.

Title	Development of a prediction model for estimating concrete compressive strength through NDT methods
Authors	Bolborea Bogdan, Baeră Cornelia, Gruin Aurelian, Dumitru-Doru Burduhos-Nergiş, Enache Felicia, Vasile Vasilica
Institution	NIRD URBAN-INCERC, “Politehnica” University of Timișoara, Technical University of Cluj-Napoca, Gheorghe Asachi Technical University, Iasi
Description	<p>The optimization of the current models used to predict, as accurately as possible, the compressive strength of concrete in existing structures, through a less invasive approach, as well as the development of new models, are current directions of maximum interest in the scientific community. The destructive method (DT), considered as the reference, involves testing the cores and has multiple drawbacks: it is invasive, induces degradation in the tested elements, it is expensive, difficult in terms of access and time consuming. The use of non-destructive methods (NDT) is preferred, but the degree of confidence is diminished compared to the reference. The present study proposes the development of a new NDT prediction model, by considering new parameters: static and dynamic modulus of elasticity.</p> <p>This paper is supported by the Programme:– “ECOSMARTCONS”, code: PN 19 33 04 02: “Sustainable solutions for ensuring the population health and safety within the concept of open innovation and environmental preservation”, financed by the Romanian Government and also by the Project “Entrepreneurial competences and excellence research in doctoral and postdoctoral programs - ANTREDOC”, project co-funded by the European Social Fund financing agreement no. 56437/24.07.2019.</p>

RO.238.**Title****Theoretical Research on Pavement as Main factor in Defining the Aesthetics of Architectural Spaces****Authors**

Luiza VARGA, Cornelia BAERĂ, Aurelian GRUIN, Inna OSTROVSCA

Institution**“Politehnica” University of Timișoara, NIRD URBAN-INCERC Timisoara Branch, Technical University of Cluj Napoca****Description**

Centuries ago, the pavement was considered a symbolic, determining factor in the overall aesthetics of the space, a form of artistic expression with a major impact in architecture. The effect of globalization felt on traditional society is also manifested in this case, through the wear and tear of identity, cultural and historical diversity. The lack of coherent capitalization of the historical cultural heritage generates apathy and the absence of awareness of the potential for artistic valorization of this surface with a great architectural impact.

The present research aims to bring more knowledge in a constantly changing field and to identify directions for solving the crisis of continuity of the cultural-historical identity of the community, through a multidisciplinary study on pavement, often neglected, rarely studied, but of a major impact on the whole architectural ensemble. The research includes the analysis of some factors economic, aesthetic, social, historical, etc., considered critical in the evaluation of the pavement as architectural element in the Romanian space.

National Institute of Research and Development for Optoelectronics - INOE 2000

RO.239.

Title	New generation of Biocompatible Thin Film Metallic Glasses
Authors	Alina Vladescu
Institution	National Institute of Research and Development for Optoelectronics - INOE 2000
Patent no.	Research project no. PCE95/2021 (PN-III-P4-ID-PCE-2020-1264)
Description	In this project, novel ZrCu-based ternary to quinary Thin Film Metallic Glasses (TFMGs), comprising 3 to 5 constituents, are proposed to be prepared as protective coatings for dental/orthopaedic implants or for their metallic components which are in direct contact with bone. A novel TFMG type consisting of Zr-Cu-X where X will be Si, Mg, Ca, Sr, Mo in various combinations will be produced. It is expected that such structures will possess high hardness, good adhesion to metallic substrate, elastic modulus close to those of bone, low internal stress, resistance against wear and corrosion, low friction and wear rate, good bioactive, osseointegrative and antibacterial properties, leading to an increased service life of the implants.
Class	4 - . Medicine - Health Care - Cosmetics

RO.240.

Title	Biodegradable materials based on hydroxyapatite used for controlling of degradation rate of Mg alloys
Authors	Alina Vladescu ¹ , Anca C.Parau ¹ , Cosmin M.Cotrut ² , Diana M.Vranceanu ² , Adrian E.Kiss ¹
Institution	¹ National Institute of Research and Development for Optoelectronics - INOE 2000 ² University Politehnica of Bucharest, Materials Science and Engineering Faculty
Patent no.	A00667/2021
Description	The patent application relates to a possibility to reduce the degradation rate of Mg alloys used for the maxillofacial surgery by coatings with thin films-based hydroxyapatite prepared by RF magnetron sputtering. The coatings exhibit a thickness ranged from 250 nm to 300 nm, being

deposited up to 400° C. These coatings resist to corrosive attack of SBF, DMEM and PBS at 37°C, having a high protective efficient in these corrosive media (min 82%).

Class 4 - . Medicine - Health Care - Cosmetics

RO.241.

Title **Optical design and experimental method for obtaining a copper based multilayer structure for transparent thermal heat reflectors**

Authors Catalin VITELARU, Iulian PANA, Anca C. PARAU, Mihaela DINU, Adrian E. KISS, Lidia R. CONSTANTIN

Institution **National Institute of Research and Development for Optoelectronics - INOE 2000**

Patent no. Research project no TE 105/2020 (PN-III-P1-1.1-TE-2019-1924)

Description The project tackles the problem of thermal loses in buildings aiming for improvement and development of energy efficient windows, by using abundant, conflict free, low cost elements and an eco-friendly synthesis methods. The main objective is the design of an optimized THR copper based structure and successful implementation of the deposition method of the multilayer structure, having: good visible transmittance ($T_{vis} > 80\%$), a neutral color (identified both visually and on the CIE diagram), time stability and low thermal oxidation of the metallic layer(s) at moderate temperatures ($\sim 200^{\circ}\text{C}$), and a very low emissivity ($< 9\%$). The deposition method chosen for this purpose is High Power Impulse Magnetron sputtering (HiPIMS), for the deposition of the reflective copper layer and Radio Frequency (RF) magnetron sputtering for the dielectric layers. The design of the structure is obtained by optical modelling using Optilayer software. The experimentally obtained structure optical properties are successfully compared with the theoretical design, showing similar characteristics.

Class 2

RO.242.

Title **Method for obtaining antimicrobial flexible screen protectors for touch screens of electronic devices used in sensitive environments**

Authors Catalin VITELARU, Anca C. PARAU, Adrian E. KISS, Iulian PANA, Mihaela DINU, Lidia R. CONSTANTIN,

Institution	Alina VLADESCU, Mihaela BADEA, Lavinia TONOFREI, National Institute of Research and Development for Optoelectronics - INOE 2000
Patent no.	Research project no 489PED/2020 (PN-III-P2-2.1-PED-2019-4966)
Description	The project approaches the problem of infections and contamination produced by pathogens found on the everyday use devices, such as mobile phones and medical devices that use touch screens. The main scope of this project is to provide an efficient method for obtaining antimicrobial coatings applied on the replaceable self-adhesive polymer covers of such devices. In this way the antimicrobial efficiency can be periodically renewed by simply changing the protection cover, providing an additional protection against potential infections. Laboratory scale deposition technology is implemented during the project, to produce coatings with proven antimicrobial activity on flexible polymer foils. The method used for deposition is magnetron sputtering, combining the use of High Power Impulse Magnetron Sputtering (HiPIMS) and Radio Frequency (RF) sputtering. The active antimicrobial agent is Silver, embedded in different oxide matrices for mechanical protection and controlled release. Antimicrobial activity was assessed using Escherichia coli bacteria at concentrations in the range of 10^4 - 10^5 CFU/mL.
Class	4

RO.243.

Title	Preparation method of high entropy alloy – HEA powders for plasma spray coatings and the obtained alloy
Authors	N.C. Zoita, C.E.A. Grigorescu, M. Dinu, A.-M. Iordache, A.C. Parau, A.E. Kiss, I. Pana, L.R. Constantin, M.I. Rusu
Institution	National Institute of Research and Development for Optoelectronics INOE-2000
Patent no.	A00728/3.12.2021
Description	The invention relates to a preparation method of high entropy alloys (HEAs) in powder form for coating deposition by plasma spray techniques and the alloys obtained by this method, for applications requiring materials with adjustable properties (hardness, wear resistance, corrosion resistance, coefficient of friction) according to specific requirements, in fields such as: automotive industry, aerospace industry,

cutting tools, medical instruments, etc.

The high entropy alloys (HEAs) are a class of single-phase alloys consisting of minimum 5 elements in near-equal proportions, presenting improved properties compared to conventional alloys. An important issue in the development of a preparation method of HEAs in powder form is to obtain the optimum compositions and to ensure their homogeneity and reproducibility by low or no polluting techniques, and with low costs.

The invention is making use of mechanical alloying (MA) technique in order to develop a simple, efficient, low cost, low or no pollution synthesis method of HEA powder, scalable to industrial level.

MA is currently used for preparing multicomponent alloy powders. It is a thermodynamically non-equilibrium process, leading to nanostructured solid solutions with almost any elemental composition, including immiscible systems. The properties of the multicomponent alloys obtained by MA are strongly dependent on the micro- or nano-structure, which can be tuned by adjusting the process parameters accordingly.

The invention claims: (1) A method based on mechanical alloying process for preparation of HEA powder for coating deposition by plasma spray technique; (2) CrCoNiVCu and TiCrAl_{0.5}NbY HEAs obtained by the above claimed method, targeting the machine and automotive industry.

Class

8

RO.244.

Title

Non-invasive method and device for detecting mines buried in the ground by using a solid state laser emitter for exciting sound waves in the ground and an optoelectronic acoustic sensor of the distributed feedback fiber-optic laser type

Authors

S. Miclos, I. I. Lancranjan, D. Savastru, M. N. Tautan

Institution

National Institute of Research and Development for Optoelectronics INOE 2000

Patent no.

Patent application No. 128068/2017

Description

The invention relates to a non-invasive method and device for detecting mines buried in the ground. According to the invention, the method consists in irradiating the surface of the ground with the laser beam generated by a high

brightness solid state laser emitter for creating a source of sound waves which propagate into the ground and are reflected by the buried mines which become secondary sound sources, said waves being then detected by means of a DFB-FL (distributed feedback fiber-optic laser) acoustic sensor.

Applications: A safe and accurate device and method to remove the antipersonnel mines buried in the ground.

Class

12

RO.245.

Title

Process and device for detecting ice on roads

Authors

D. Savastru; S. Miclos; A. Popescu; R. Savastru

Institution

National Institute of Research and Development for Optoelectronics INOE 2000

Patent no.

Patent application No. 130626/2021

Description

The invention relates to a process for detecting ice on the road from the board of a moving vehicle by analyzing the Raman spectrum and to a device applying the process. The method according to the invention consists in illuminating a narrow strip of road width by means of a laser, using cylindrical optics, at a certain chosen distance conveniently in front of the vehicle, focusing the light by means of a lens, provided with an absorption filter on the slot of a spectrograph.

Applications

The safety of vehicles in winter, especially on high-speed roads (highways) depends essentially on warning the driver of the presence of ice or icy road on that road, far enough away from the vehicle to allow a prompt reaction of the driver or of an automated system. The device considerably improves the road transport safety.

Class

8

RO.246.

Title

Accelerometric system for automatic triggering of control equipment mounted on vehicles at predetermined intervals of the distance traveled

Authors

M. Tautan, S. Miclos, A. Stoica, D. Savastru, R. Savastru

Institution

National Institute of Research and Development for Optoelectronics INOE 2000

Patent no.

Patent application No. 130784/2022

Description

The invention relates to an accelerometric system for automatic external triggering of control equipment, video cameras and radar scanners, mounted on vehicles that perform the testing of the asphalt layers of road arteries by automatically triggering this equipment at intervals of the distance predetermined by the operator in accordance with the regulations in force. To achieve this goal it is necessary for the odometric transducer to consist of a rotary transducer capable of converting angular motion into digital pulses. Such a transducer, usually called an encoder, usually consists of a cylindrical body a flange, a shaft and an output connector.

Applications: testing the quality of the asphalt layers of the road arteries.

Class

8

RO.247.

Title **Interferometric optoelectronic sensor with passive optical fiber of Twin-LPG type for determining a mechanical structure acceleration**

Authors S. Miclos, I. I. F. Lancranjan, D. Savastru, M. N. Tautan, M. A. Calin, D. Manea

Institution **National Institute of Research and Development for Optoelectronics INOE 2000**

Patent no. Patent application No. 132004/2021

Description

The invention relates to an interferometric optoelectronic sensor with passive optical fiber of Twin-LPG type, i.e. Twin-Long Period Grating, for determining the acceleration of a mechanical structure by measuring the optical power variations of the beam incident on the photo-detector, variations generated by the spectral displacements of the hyperfine interference band structures generated by the optical fiber length modification by elongation/compression under the effect of the acceleration to be determined.

Applications

In the construction and use of mechanical structures such as aircraft, sea or river vessels, automobiles or industrial installations, it is necessary to determine the acceleration imprinted by an applied force. The use of this device considerably improves the reliability of the surveyed mechanical structures.

Class

8

RO.248.

Title	Method for optimization of Cherenkov electromagnetic radiation detector in saline medium
Authors	Savu Valeriu, Rusu Mădălin Ion, Savastru Roxana, Savastru Dan
Institution	National Institute of Research and Development for Optoelectronics (INOE2000)
Patent no.	Patent application No. A/00404/2018
Description	The method of optimizing the Cherenkov detector of electromagnetic radiation in the saline environment is used to determine the positions of the optimal placement points of the detection elements for measuring the electromagnetic radiation generated by the Cherenkov cone and also to determine the optimal position of the future Cherenkov detector in saline environment. This method minimizes the number of detection elements, simplifies the measurement chain and reduces costs, using dedicated software and thus leading to the enrichment of knowledge about the distant universe, being a quick method by using a footprint of the saline environment.
Class	5

RO.249.

Title	Twin-LPG passive fiber optical operating optoelectronic device for detecting Escherichia Coli and Klebsiella Pneumoniae bacteria in current network water
Authors	S. Miclos, I. I. F. Lancranjan, D. Savastru, R. Savastru, M. N. Tautan
Institution	National Institute of Research and Development for Optoelectronics INOE 2000
Patent no.	Patent application No. A/00689/2018
Description	Twin-LPG passive single-mode fiber optic interferometric optoelectronic sensor for detecting and identifying pathogenic strains of Escherichia coli bacteria and / or Klebsiella pneumoniae bacteria species in water in the current network and measuring their concentration by measuring variations in the optical power of the incident beam on the photodetector, variations produced by the spectral displacements of the hyperfine structures of interference fringes generated by the modification of the refractive index of the water of the current network under the

effect of the infestation with pathogenic strains.

Applications

The invention is applied to the detection of pathogenic strains of *Escherichia coli* and / or *Klebsiella pneumoniae* species in running water and to determine their concentration by evaluating the changes in the optical path of a Twin-LPG fiber optic interferometer, providing an effective and cost effective mean of control of the running water network.

Class

4

RO.250.

Title

Guiding device for space rendezvous operations

Authors

L. Baschir, S. Miclos, D. Savastru

Institution

National Institute of Research and Development for Optoelectronics INOE 2000

Patent no.

Patent application No. A/00728/2019

Description

The guiding device has a pulsed laser diode which emits a laser beam with a power of 20-30 W, at a wavelength of 850 nm or 905 nm, which passes through the cutout zone of a mirror and is collimated by an objective lens in the focus of which the laser diode is placed, for illuminating a target. The beam is reflected and focused by the same objective on the active surface of a high-resolution CCD sensor after being reflected by the mirror and passing through an interference filter operating at the same wavelength with the radiation emitted by the laser diode, in order to eliminate the background noise. The data provided by the CCD sensor is transmitted to a control and guiding unit provided with a microcontroller which processes the image data. An auto-pilot generates the controls necessary for the rendezvous operation and some actuators which perform the rendezvous operation.

Applications

Guiding device for space rendezvous operations, by determining motion of image formed on high-resolution charge-coupled device (CCD) sensor of vehicle to be met, illuminated with high-power laser beam in near infrared range.

Class

8

RO.251.

Title	Smart optical device for temperature sensing, based on innovative luminescent IV-VI quantum dots-doped complex nanostructured thin films (MANUNET project-MNET20/NMCS3732)
Authors	M. Elisa, I. C. Vasiliu, S-M. Iordache, A-M. Iordache, I. Pana, C. Elosua Aguado, F. J. Arregui, D. Lopez, D. Ulieru, X. Vila, J. Caridad Hernanández, M. Á. Casanova González, J. F. de Paz Santana, M. Enculescu, A-I. Nicoara, M. Eftimie
Institution	National Institute of Research and Development for Optoelectronics-INOE 2000
Description	IV-VI quantum dots (QDs)-doped $\text{Al}_2\text{O}_3\text{-SiO}_2\text{-P}_2\text{O}_5$ films were prepared by sol-gel method, spin coating technique. Different substrates were used for deposition such as glass, ITO (indium tin oxide) layered on glass and silicon, respectively. Precursor composition, gelation time, substrate rotation speed, number of deposited layers and pH of the precursor sols were changed in order to regulate the hydrolysis and condensation mechanisms to accomplish uniform and homogeneous films. As precursors, the following reagents were used: tetraethyl orthosilicate for SiO_2 , triethyl phosphate for P_2O_5 and aluminium acetylacetonate for Al_2O_3 . Nanostructured materials were obtained by drying and subsequent annealing of the deposited films in vacuum atmosphere. Sol-gel method applied as synthesis route of PbS and PbSe QDs-doped thin films, is more appropriate to prepare optical materials. It ensures an accurate composition control of the doped films as well as a thickness uniformity and chemical homogeneity along with a molecular level mixing and processing of the precursors at relatively low temperatures. Moreover, sol-gel method is an adequate method to produce low cost QDs-doped thin films. It does not confine the choice of the substrate material, providing a very good way of exploring the optical properties of semiconductor dopants. Optical, structural and morphological characterization of the doped-films was performed. These nanostructured materials are promising candidates for temperature sensing instrumentation.

RO.252.

Title Azoderivate with ultrafast SHG response and the process to obtain it in ordered crystalline state

Authors I.C.Vasiliu, A.Emandi, I. Ionita, A. Matei

Institution Institute: National Institute of Research &Development Optoelectronics - INOE 2000

Patent no. RO 132385

Description For future photonics and optoelectronics applications, it is significantly important to discover new materials with large SHG responses that enable novel devices with high performance, small size and low cost. The present invention describe the preparation of a material with ultrafast SHG (Second Harmonic Generation) response of ~10-15 s order, using a small organic molecule from azodyes class. We have prepared powder of the organic molecule 1-phenyl-3-methyl-4-azo-(1'-carboxi phenylene)-5-one with high degree of packaging and stable in normal conditions of temperature. Our invention has demonstrated that there is a dependency between the crystallite dimensions and the intensity of SHG femtosecond response of the compound.

Applications: photonic devices based on NLO effects, including pulsed lasers, optical switches, optical modulators, photodetectors, and optical memories, highlighting the overwhelming advantages of optical techniques over their electronic counterparts

Class 10

RO.253.

Title Zinc and phosphor oxide films modified with reduced graphene oxide with controllable fluorescent properties and process to obtain them

Authors I.C. Vasiliu, A.M. Iordache, M. Elisa, I. Chilibon, C.E.A. Grigorescu, S.M. Iordache

Institution NIRD in Optoelectronics - INOE 2000

Patent no. Patent application No. A00568/2020

Description The invention refers to composite films based on oxides of zinc, phosphor and graphene with photoluminescence adjustable properties and their synthesis process by sol-gel method. Phosphor and graphene oxides modify the emission of zinc oxide from UV or visible by passivating or generation of defects at the interfaces of hybrid materials. The characteristic emission of these materials as red, blue,

yellow and orange can be enhanced or turned off as a function of phosphor oxide concentration and the thickness of the film.

Applications: The detection of various analytes based on fluorescence method and biological imaging are the targeted applications of the novel composite films.

Class 1

RO.254.

Title Films based on titanium (TiO_2) and phosphorus (P_2O_5) oxides modified with reduced graphene oxide (rGO) with controllable photocatalytic properties and process to obtain them

Authors I. C. Vasiliu, A-M. Iordache, M. Elisa, I. Pana, B. A. Sava, L. Boroica, A-V. Filip

NIRD in Optoelectronics - INOE 2000

Patent no. Patent application No. A/00342/2021

Description The invention refers to a technology using the sol-gel method to obtain with reduced costs, vitreous films with photocatalytic properties based on TiO_2 - P_2O_5 modified with reduced graphene oxide (rGO). The prepared composite films exhibit the photocatalytic properties of titanium dioxide, the phosphorus characteristics to form vitreous structures, transparent, homogenous, with large active surface and large pore volume and the attributes of graphene oxide that improves the photocatalytic properties of titanium oxide.

Applications: Photocatalysts for environmental remediation

Class 1

RO.255.

Title Spectral data mining for material identification, chemical fingerprinting and forgery detection of painted works of art (INFRA-ART) - Postdoctoral Research Project - PN-III-P1-1.1-PD-2019-1099

Authors Cortea Ioana Maria

Institution National Institute for Research and Development in Optoelectronics – INOE 2000

<http://certo.inoe.ro/infraart/>

Description The project INFRA-ART is fostering innovation and knowledge advancement in the field of heritage science, with

a specific focus on the scientific examination of painted works of art. The project exploits an existing high-top infrastructure and proposes a multi-analytical experimental approach that combines targeted spectroscopic techniques with state of the art macro-imaging analysis. The specific objectives of the present project are as follow: (1) complement in plane information with in depth data by integrating multiple spectral and imaging techniques in order to obtain an extended view of the creative process and of the various materials that were originally used to produce a painting; (2) investigate complex paintings and highlight unique technical features, characteristic patterns or typical fingerprints that may be used for attribution and forgery detection; (3) combine various processing steps and data mining techniques for automatic classification and identification of painting materials; (4) improve the range of existing services by developing new analytical packages dedicated to the art market and cultural heritage field.

RO.256.

Title	Product for smart correlation of airborne GPR and imagistic data in to a multi-layered package - PEGASUS
Authors	The National R&D Institute for Optoelectronics – INOE 2000; Energy & Eco Concept (ENEC); Wing Computer Group (WING)
Institution	The National R&D Institute for Optoelectronics – INOE 2000; Energy & Eco Concept (ENEC); Wing Computer Group (WING)
Description	<p>The main goal of the project is to create a pilot model for correlating aerial imaging and geophysical data (GPR), able to characterize with high accuracy not only the soil surface but also the subsoil, resulting in a product with wide applicability in the field of cultural heritage.</p> <p>Precisely correlated and mapped aerial data resulting from the proposed product can be used to investigate extensive archaeological sites, historical monuments, civil engineering, etc.</p> <p>Among the novelties and major advantages of the proposed product, we highlight the following:</p> <p>a) Scheduled flights can be synchronized with other records of remote sensing data using the same flight path that allows data to be correlated;</p>

- b) The addition of a sensor capable of conducting low altitude radar investigations will complete the existing package of sensors for aerial imaging investigations, thus obtaining not only information about the ground surface but also about the subsoil;
- c) Small number of measurements required to cover the entire investigation area;
- d) The possibility of investigating difficult areas;
- e) Investigation speed higher than ground-coupled GPR (10 m/s for aerial investigation vs. 2 m/s for average human speed under optimal conditions);
- f) Automatically scheduled flight provided by UAV capabilities allows stand-alone operation, night-time investigations and eliminates the human error factor.
- g) Efficient management of ground decisions and intelligent and fast orientation of operators on areas of interest;

RO.257.**Title**

Biocleaning of mural paintings with new ecological products based on microbial metabolites (BioCleanMur)

Authors

Ioana Gomoiu¹, Luminita Ghervase², Ileana Mohanu³

Institution

(1) Institute of Biology Bucharest of the Romanian Academy, (2) National Institute of Research and Development for Optoelectronics INOE 2000, (3) CEPROCIM S.A.

Description

The project aims to develop new methods of biocleaning mural paintings. The objectives were designed so as to find better, more efficient and safer (both for the cultural item and for the operator) alternatives for removal of organic compounds (wax, oil, soot) and consolidants from previous restorations (Paraloid B72 acrylic resin, transparent dispersion of casein). To this aim, different approaches have been investigated. The first one implied bacterial esterases immobilized in polysaccharide-type gels, and another implied micro-fungi cultures, which have not been used until now to this aim. The proposed biocleaning methods have the advantage of being highly selective, efficient and non-toxic, suitable for *in situ* use on both straight or inclined surfaces, which additionally have the role of preventing biodegradation by ensuring preventive conservation.

RO.258.

Title	Scientific method for controlled laser cleaning of polychrome objects
Authors	Monica Dinu, Luminita Ghervase, Lucian Cristian Ratoiu, Roxana Radvan
Institution	National Institute of Research and Development for Optoelectronics, INOE 2000
Patent no.	Patent application No. A 00706/2020
Description	The method consists in mapping the color areas of the investigated object using a 3D scanner/hyperspectral camera, elementary chemical analysis (XRF or LIBS - for the case of multilayer objects), establishing the appropriate laser cleaning regime for each color cluster, generating a 2D/3D map (depending on the volume of the object and its surface) and the application of the laser cleaning process controlled by the generated map.
Class	14

RO.259.

Title	Integrating Platforms for the European Research Infrastructure ON Heritage Science
Authors	Roxana Radvan, Monica Dinu
Institution	National Institute of Research and Development for Optoelectronics, INOE 2000
Patent no.	Type of action: H2020-INFRAIA-2019-1
Description	<p>The IPERION HS consortium is determined to take up the challenge outlined in the Horizon 2020 for European research infrastructures, which calls for the establishment of a unique European research infrastructure for Heritage Science.</p> <p>IPERION HS integrates national facilities of recognized excellence in Heritage Science and aims at establishing a distributed RI with a sustainable plan of activities, including offering access to a wide range of high-level scientific instruments, methodologies, data and tools for advancing knowledge and innovation in Heritage Science. IPERION HS connects researchers in the Humanities and Natural Sciences and fosters a trans-disciplinary culture of exchange and cooperation for the growth of the European Research Area. IPERION HS pursues the integration of European world-class facilities to create a cohesive entity playing a leading role in the global community of Heritage Science.</p> <p>INOE is contributing with state-of-the-art equipment for in situ aerial investigations and complex GIS data packages. Also, INOE is conducting the IPR strategy activities.</p>

The National Research and Development Institute on Occupational Safety - "Alexandru Darabont"

RO.260.

Title	Analysis of the Immune Status of Museum Employees to Assess the Level of Damage to Their Health
Authors	Iuliana-Pamela SCARLAT , Raluca-Aurora ȘTEPA Laboratory of Chemical and Biological Risks,
Institution	The National Research and Development Institute on Occupational Safety - I.N.C.D.P.M. "Alexandru Darabont"
Description	<p>The purpose of this research was to assess the immune status of employees in a Romanian museum and to improve the assessment of high risk factors for the prevention of occupational diseases. The analyzes were performed before the pandemic and involved 58 museum employees, including 49 women and 9 men. Simple radial immunodiffusion plates were used to determine IgA, IgM, IgG immunoglobulins and C3 and C4 components of the complement system (SC). A 96-well ELISA kit was used to determine IgE. The results of the leukocyte formulas showed changes compared to the reference values, for 95% of the participating volunteers, in at least one of the analyzed indicators.</p>

Admitting the importance but also the limitations of existing legislation, as well as the need for efforts to improve it, it follows that the analysis of the results of this study and other similar research is a source of potential improvements in the legal framework and specific practices

RO.261.

Title	Research on the exposure of workers in a courier company to the exhaust emission of diesel engines
Authors	Maria Haiducu, Raluca-Aurora Ștepa, Elena-Ruxandra Chiuțu, Iuliana-Pamela Scarlat
Institution	The National Research and Development Institute on Occupational Safety – INCDPM „Alexandru Darabont”
Description	<p>The research presents the research on the development of a method for analysis of elemental carbon from Diesel emissions in the workplace based on existing methods and studies on the exposure of workers in a courier company to emissions of Diesel engines in the context of occupational exposure limit in Directive (EU) 2019/130 on the protection of workers from the risks related to exposure to carcinogens or mutagens at work. New data on the</p>

carcinogenicity of Diesel engine emissions and the change in their classification from potentially carcinogenic (Group 2B) to carcinogenic (Group 1), as well as the high number of workers exposed to these types of chemical pollutants, highlighted the need to set occupational exposure limits for emissions Diesel engines in the work environment.

RO.262.

Title	"Partnership for knowledge transfer and research on assessment and prevention of occupational risk that can lead to disasters (PROC) - Research on the development of procedures for assessment of occupational risks to which are exposed visually impaired persons engaged in productive activities"
Authors	Doru Costin Darabont, Trifu Alina, Badea Onut Daniel, Antonov Anca Elena
Institution	National Research and Development Institute of Occupational Safety (INCDPM) - "Alexandru Darabont"
Description	<p>Within the project „Partnership for knowledge transfer and research on assessment and prevention of occupational risk that can lead to disasters (PROC)”, a decision support expert-system was developed to assist / support managerial decisions in the field of prevention and management of occupational risks to which people with visual impairments are exposed.</p> <p>This decision support expert-system is a system whose mission is to facilitate the activity of decision makers (managerial staff in an economic unit), who are on different levels of management (from the supervision of technological processes to top management), in the sense of taking better documented decisions (more efficient). Such expert-system provide sufficient support to the decision-maker (related to occupational risks) to minimize certain risks that have been identified.</p> <p>This expert-system was designed in multi-layer architecture to meet the support needs of decision makers. The basic layer of the expert-system consists of an Information Tutorial System followed by an intermediate layer, a Reference System - an occupational risk assessment expert-system on the basis of which the decision will be taken. The last layer, the top layer of the expert-system is a Procedural System that includes prevention procedures and risk control measures.</p>

National Institute of Research & Development for Technical Physics, Iasi

RO.263.

Title	Method for the preparation of an immunogen based on gold nanoparticles for the production of SARS-CoV-2 coronavirus vaccines
Authors	Herea Dumitru-Daniel, Chiriac Horia, Lupu Nicoleta
Institution	National Institute of Research & Development for Technical Physics
Patent no.	Patent application No. a 2020 00657 / 21.10.2020
Description	The invention relates to a method of preparing an immunogen based on gold nanoparticles for the production of coronavirus vaccines. The method according to the invention consists in the synthesis of gold nanoparticles (nAu) by a hydrothermal method using tetrachloroauric acid and an aluminum citrate (cAl) coating agent, resulting in core-shell nanostructures (nAu-cAl), which are used as such as immunogens or are functionalized with recombinant immunogenic proteins specific to coronavirus infectious agents, resulting in a compound with immunogenic properties, having increased biocompatibility and high agglomeration stability in highly saline environments, including blood.
Class	4

RO.264.

Title	Atomizing method for producing soft amorphous magnetic powders
Authors	Murgulescu Iulian, Chiriac Horia, Lupu Nicoleta
Institution	National Institute of Research & Development for Technical Physics
Patent no.	Patent application No. a 2019 00373 / 21.06.2019
Description	<p>The method involves the successive fragmentation of the molten alloy jet by shearing, due to its interaction with two gas jets and one liquid jet, geometrically oriented at different angles, depending on the direction of the molten alloy jet.</p> <p>The high volume of the amorphous phase in the powder composition is provided. The powders have a smaller average size than other methods, a significant percentage of powders having dimensions below 20 μm and a small volume of submicron particles.</p> <p>The method can be used to produce amorphous spherical powders from soft magnetic materials.</p> <p>ADVANTAGE - The atomization method to produce soft amorphous magnetic materials in the form of powders with spherical particles, having average dimensions of less than 50 μm.</p>
Class	5

National Research and Development Institute for Non-ferrous and Rare Metals – IMNR

RO.265.
Title **New product fabricated by extrusion-based 3D printing from marine bio-waste**
Authors Laura Madalina Cursaru¹, Daniela Tarnita², Gabriela Dumitrescu³
¹National R&D Institute for Non-ferrous and Rare Metals – IMNR, Pantelimon, Ilfov Romania;

Institution ²Faculty of Mechanics, University of Craiova, Romania;

³„Cantacuzino” National Military Medical Institute for Research and Development, Bucharest, Romania

Patent no.

The general objective of the project is development and testing of a demonstrative experimental model for 3D printed products based on nanostructured hydroxyapatite (HAp) from unconventional natural sources (marine organisms from Black Sea), with improved biomechanical properties for potential applications in bone reconstruction.

In this project, hydroxyapatite has been synthesized from natural sources by pressure-assisted hydrothermal method and further used for the fabrication of 3D porous scaffolds by extrusion-based 3D printing technique.

Description Obtaining 3D HAp nanostructures with improved biomechanical properties is a real challenge for this project and involves several aspects: i) use of non-toxic polymeric binders for the preparation of paste to be extruded in additive manufacturing process; ii) printability/flowability/wettability of the paste resulted from HAp nanostructured powder and polymeric binders; iii) formation of tough 3D structures (good compressive strength) with controlled porosity and shape.

Nanostructured hydroxyapatite powder from whelk shells, with controlled composition, morphology, and structure, suitable for additive manufacturing has been obtained in this project, resulting 3D products with high compressive strength, controlled porosity, tailored pore size and shape.

Main applications are related to bone reconstruction. It is expected that the new material used as bone implant allows vascularization of surrounding tissue due to its interconnected porosity, leading to a product with higher

level of functionality, without the need of a second surgical intervention after a period.

Raw materials used in HAp synthesis are water soluble, with no environmental impact. Synthesis and processing of HAp are environmentally friendly and low energy consumption technologies.

This work was supported by UEFISCDI through grant PN-III-P2-2.1-PED-2019-3090 (contract no. 499PED/2020), within PNCDI III.

RO.266.

Title

Novel technology for manufacturing a multifunctional hybrid membrane for advanced purification of wastewaters

Authors

Radu-Robert Piticescu, Laura Mădălina Cursaru, Maria Eliza Pușcașu, Ștefania Chiriac, Lidia Licu

Institution

National R&D Institute for Non-ferrous and Rare Metals – IMNR, Pantelimon, Ilfov Romania

Patent no.

Description

For the first time ZnO-CNT based powders prepared through a hydrothermal process at high pressures were used to obtain 3D structures by additive manufacturing using an air pressure extrusion process. The objective is to develop novel membranes adapted to water treatment having excellent antifouling properties (50% reduction flux decline in time and >20% increase in permeability) and high separation performance (>20% increase in permeability) and also the ability to be used for separation and purification of phenolic compounds from natural plant extracts, increasing the separation efficiency (>20% reduction flux decline in time and >20% increase in permeability) compared to the state-of-the-art membranes.

This work was supported by UEFISCDI through the M-ERA.NET-MANUNET Programme (contract no. 208/2020).

National Institute for Research and Development in Electrochemistry and Condensed Matter

RO.267.

Title	Development of „n-p” heterojunctions based on n-type ZnO and p-type CuMnO₂, integrated in sensitive modules
Authors	Lazau Carmen, Poienar Maria, Vlazan Paulina, Orha Corina, Bandas Cornelia, Vajda Melinda, Nicolaescu Mircea
Institution	National Institute for Research and Development in Electrochemistry and Condensed Matter
Patent no.	Patent application No. A/00671/27.10.2020
Description	The invention relates to the development of sensitive modules based on "n-p" heterojunctions, where obtained by coupling n-type ZnO semiconductor films and p-type CuMnO ₂ semiconductor films. The as-deposited thin films meets all the physical condition to achieve the heterojunction formation. The sensory modules obtained showed a reverse diode-type semiconductor heterojunction behavior. Obtaining bidimensional nanocomposite heterostructure by integrate "n-p" type metal oxides semiconductors allows to combine the physical and chemical properties of the components in a single system, and this leading to the improvement of electrical and optical properties and the rapid recombination of photogenerated holes and electrons.
Class	14

RO.268.

Title	First Rotary Ionic Engine with Contra-Rotating Propellers
Authors	Marius Chirita, Adrian Ieta, Virgil Rotaru, Liviu Mocanu, Mihai Marghitas, Mircea Nicolaescu
Institution	INCEMC Timisoara, Romania
Patent no.	-
Description	We demonstrate and study coaxial ionic contra-rotating propellers (CRP) systems with zero angular momentum for the first time. Such systems can be useful to the design of zero-angular momentum ionic drones with no shaft adaptors. Emitter electrodes on a 25 cm diameter (P1) and 12.6 cm diameter (P2) propellers were optimized for speed in grounded cylinder electrodes. For P1 systems, up to 936

rpm were recorded for single propeller systems while for CRPs 710 rpm was the maximum obtained. For (P2) single propeller systems a maximum of 2812 rot/min was recorded versus 1720 rot/min previously reported. CRPs spinning up to 2035 rpm, -29.5 kV, and 340 μ A (source limit) were also designed.

Class

8

National Research and Development Institute for Textiles and Leather INCDP

RO.269.
Title
Fertilizer Based on Keratin Hydrolysate and Method of Preparation
Authors

Gaidau Carmen Cornelia, Niculescu Mihaela-Doina, Epure Doru-Gabriel, Berechet Mariana Daniela, Stepan Emil

Institution

National Research and Development Institute for Textiles and Leather - Division Leather and Footwear Research Institute

Patent no.

RO133338 B1

The invention relates to a keratin-based fertilizer for foliar fertilization of cereal plants, sunflower, rapeseed or for organic crops, and to the method of obtaining it, having applications in agriculture with many advantages:

-keratin hydrolyzate as an organic fertilizer capitalizes on a renewable resource, sheep's wool, which is largely a waste (36t/year in Romania);

-keratin has an amino acid composition in which the amino acids with sulfur and cysteine can be a long-term source of organic sulfur for various stages of development of plants that have a special need for sulfur (cereals, sunflower, rapeseed);

- keratin amino acids can stimulate the growth of plants from germination phase, acting as systemic biostimulator and allowing the reduction of the concentration of pesticides and insecticides;

-keratin can stimulate the development of nitrogen-generating microorganisms in the soil;

- through its water retention properties in a proportion of up to 35% of its mass, keratin is a moisture reservoir that protects the plant against climate change and drought;

-keratin is amphoteric and allows the environment to adapt to changes in pH, acting as a buffer;

-keratin has properties to chelate metals and therefore to retain microelements;

-keratin is miscible with collagen hydrolyzate, allowing inclusion of macroelements and microelements into soil or foliar fertilizer formulations;

-the process of solubilization of keratin is simple, with low consumption of materials and energy and allows to obtain keratin hydrolysates with high molecular weight (by alkaline hydrolysis) and low molecular weight (by chemical-enzymatic hydrolysis), for various fertilizer formulations.

Class

3. Agriculture and Food Industry

RO.270.

Title Membranes with collagen and doxycycline for dentistry uses and method for their preparation

Authors Madalina Georgiana ALBU

Institution INCDTP – Division Leather and Footwear Research Institute

Patent no. Patent No. 128972 /30.03.2017

Considering the high incidence of **periodontal disease**, the **novelty** of the invention is development of a drug delivery system based on natural polymeric support (collagen) and drug (doxycycline) with **controlled** biodegradation and release of drug in a targeted tissue and over a certain time. This drug delivery system **designed in the form of membrane** (0.5 x 1 cm) with biocompatible and osteogenetic properties, able to treat the infected soft and hard tissue, is **useful** especially in parodontosis but also for gingival and bone regeneration.

Advantages compared with similar products / treatments:

Description

- Developing a treatment with local/ topical application for periodontal disease or gingival infection, in the form of drug delivery systems, manifested by controlled release of doxycycline from a natural polymeric support, the collagen.
- Using topical release systems is more advantageous compared to systemic administration because limitations of the first-pass effect are avoided and risks and inconveniences of intravenous therapy are eliminated.
- Collagen membranes with doxycycline provide a favorable environment for tissue regeneration, are biocompatible, biodegradable over time, allowing the cells to synthesize their own matrix over a period of 3 weeks, are non-toxic and release the drug (doxycycline) in a controlled manner in 21-28 days.

The production price of this product is about 0.7 euro/piece and a product from the same class of biomaterials such as PerioChips (gelatin with chlorhexidine) is 21 Euro/piece. The Doxicoll product has high maturity level (TRL7) and it made the subject of a spin off project.

Class

4

RO.271.

Title	Nourishing cream for superficial burns
Authors	Marin Maria Minodora, Madalina Georgiana Albu Kaya, Georgeta Bumbeneci, Gheorghe Coara
Institution	National R&D Institute for Textiles and Leather - Division: Leather and Footwear Research Institute,
Patent no.	Patent application No. A 00262/18.05.2021 The invention relates to the creation of a cream and the new and balanced formulation of the active components which aim at restoring the superficial tissues of the skin in case of minor burns. The problem solved by the invention is the use of natural preservatives in the form of cold-extracted oils in order to eliminate the parabens used to preserve the creams used to restore damaged tissues in case of superficial burns. The application of the invention in <i>dermatology</i> leads to the following advantages:
Description	<ul style="list-style-type: none"> ➤ favoring the exchange of water on the skin by rhythmically increasing, depending on the application, the water content of the skin, an essential phenomenon in the process of tissue recovery after burning ➤ normalization of acid balance and improving skin elasticity and blood circulation, ➤ favoring the influence of skin metabolism by intervening in protein exchanges ➤ good protection of the epidermis against environmental factors.

RO.272.

Title	Textile composites based on polymeric films containing ferromagnetic and paramagnetic materials for electromagnetic screens
Authors	Aileni Raluca Maria, Chiriac Laura, Toma Doina
Institution	National Research and Development Institute for Textiles and Leather
Patent no.	Patent application No. A/00283/ 26.05.2021 The invention refers to a composite material with electroconductive properties obtained by ultrasound-assisted film deposition. The composite is based on a textile layer coated by ultrasound-assisted deposition with a polymeric film based on a polymer matrix with nickel microparticles (A) or a polymeric matrix with nickel and aluminum microparticles content (B). The novelty consists of developing the textile composite
Description	

material by depositing the polymeric film A or B based on nickel and aluminum microparticles directly on the textile support by immersion and ultrasound technology, followed by crosslinking at 105 - 155°C. This functionalization allows the deposition of a hydrophilic film, perfectly adherent to the fabric's surface, having an electrical surface resistance between 10^2 and $10^3 \Omega$, specific to the electroconductive materials for electromagnetic screens.

The textile composite material obtained has applications in the development of electromagnetic screens, conductive electrodes, and technical applications for microelectronics, the field of medical monitoring or interactive intelligent textiles.

RO.273.**Title**

Protective uniform for emergency medical responders

Authors

Toma Doina, Salistean Adrian, Popescu Georgeta, Popescu Alina, Badea Ionela, Popescu Adriana Iuliana

Institution

INCDTP - National Research and Development Institute for Textile and Leather

Patent no.

Patent application no. A2021/00772

The invention refers to a system of protective clothing in the modular structure for protecting emergency medical responders against the multiple hazards, specific to the intervention missions.

Description

The system according to the invention consists of three layers of different clothes, the first layer (1), worn in direct contact with the skin, is a costume made up of blouse, made of knitted fabric of 85% cotton fiber and 15% polypropylene yarns, with a mass of 200-230 g/m² and pants made of woven fabric from a mixture of fibers that contain 30-60% aramid fibers, 20-50% flame retardant cellulose fibers, 10-20% polyamide fibers, 2% antistatic fibers with a mass of 190-220 g/m², the second layer (2), for protection against cutting /stinging, a jacket made of knitted fabric of high tenacity polyethylene fibers in combination with other technical fibers, with a mass of 440-450 g/m², and the third layer (3) on the outside, the protection layer specific to the intervention mission, a jacket made of a layered textile support, laminated in 3 layers (outer layer: 100% PES fabric + intermediate layer: PTFE film + inner layer: 100% PA knit) breathable, with a mass of 180 - 200 g/m². The protective clothing has performances according to: SR EN ISO 11612:2015 Protective clothing standard.

**National Institute for Research - Development of Machines
and Installations designed for Agriculture and Food
Industry - INMA Bucharest, Romania**

RO.274.

Title	EQUIPMENT FOR HOEING ON THE ROW AND BETWEEN THE VINES – EPV 2.2
Authors	Marin Eugen, Manea Dragoș, Mateescu Marinela, Bălțatu Carmen
Institution	National Institute for Research - Development of Machines and Installations designed for Agriculture and Food Industry - INMA Bucharest, Romania
Description	The equipment for hoeing on the rows and between the vines is intended for the mechanized execution of the work of mobilizing the soil between the vines at the same time with the execution of the cultivation work on the interval between the rows, in plantations with vertical vines' leading management systems on the stem, upwards, with tutor at each vine stalk.
Class	(3) Agriculture and Food Industry

RO.275.

Title	KIT FOR PRECISION FOLIAR FERTILIZATION OF VEGETABLES
Authors	Matache Mihai, Găgeanu Iuliana, Voicea Iulian, Gheorghe Gabriel, Persu Cătălin, Dumitru Cristinel
Institution	National Institute for Research - Development of Machines and Installations designed for Agriculture and Food Industry - INMA Bucharest, Romania
Patent no.	Patent application No. A-00631 / 2021
Description	The invention relates to a kit for precision foliar fertilization of vegetables which can be installed on classic machines with ramp intended for fertilizing outdoor vegetable crops, to perform foliar fertilization of both the stem and the leaves of vegetables, in order to reduce the amount of fertilizer applied.
Class	(3) Agriculture and Food Industry

RO.276.

Title	COIL ELEMENT FOR CYLINDRICAL SIEVE
Authors	Mircea Costin, Nenciu Florin, Vlăduț Valentin, Cioca Lucian Ionel
Institution	National Institute for Research - Development of Machines and Installations designed for Agriculture and Food Industry -INMA Bucharest, Romania
Patent no.	Patent application No. A-00361 / 2021
Description	The invention relates to an innovative subassembly that mounts inside cylindrical grain separators to improve their performance called "Novel coil subassembly for cylindrical sieve". The novel subassembly allows versatile operation of the equipment, being able to be converted easily to the form of a helical coil with variable pitch, a homogenization palette, or grain mixer/agitator, in order to separate the impurities from the seed mass introduced in the sieve, obtaining qualitative good seeds for sowing or grinding. The innovative element improves the separation process, allows a high level of customization, increases the efficiency and cleaning capacity of cylindrical sieves.
Class	(3) Agriculture and Food Industry

RO.277.

Title	HEMP-FIBER PROCESSING EQUIPMENT
Authors	Stroescu Gheorghe, Olan Mihai, Păun Anișoara, Zaica Alexandru
Institution	National Institute for Research - Development of Machines and Installations designed for Agriculture and Food Industry - INMA Bucharest, Romania
Patent no.	Patent application No. A-00422 / 2021
Description	The invention relates to a mobile equipment with electromechanical actuation intended for the processing of hemp stalks for fiber from experimental plots.
Class	(3) Agriculture and Food Industry

RO.278.

Title	GRANULAR ECO-FERTILISING BIOCOMPOSITES SPREADER
Authors	Marin Eugen, Manea Dragoș, Mateescu Marinela, Greblea Stelian, Gheorghe Gabriel, Constantinescu Mihai, Fătu Ana-Cristina
Institution	National Institute for Research - Development of Machines and Installations designed for Agriculture and Food Industry

	- INMA Bucharest, Romania
Patent no.	Patent application No. A-00171 / 2021
Description	The invention relates to a mechanical spreader, for the equipment applying granular eco-fertilising biocomposites, used in agriculture for soil improving, restoring quality and fertilising.
Class	(3) Agriculture and Food Industry

RO.279.

Title	TECHNOLOGY AND EQUIPMENT FOR ACTIVE MONITORING AND COLLECTION OF PLASTIC WASTE FROM OUTDOOR ACVACOLE SYSTEMS
Authors	Vlăduț Valentin, Păun Anișoara, Caba Ioan, Voicea Iulian
Institution	National Institute for Research - Development of Machines and Installations designed for Agriculture and Food Industry - INMA Bucharest, Romania
Patent no.	Patent application No. A-00534 / 2021
Description	The invention relates to a mobile equipment with active monitoring and hydraulic drive for collecting plastic waste from the surface of reservoirs.
Class	(3) Agriculture and Food Industry

RO.280.

Title	TECHNICAL SYSTEM FOR HARVESTING MEDICINAL PLANTS - SRPM
Authors	Muscalu Adriana, Tudora Cătălina, Vlăduțoiu Laurențiu, Cristea Mario, Grigore Ioan, Bărcanu-Tudor Elena (SCDL Buzău)
Institution	National Institute for Research - Development of Machines and Installations designed for Agriculture and Food Industry - INMA Bucharest, Romania
Description	The technical system for harvesting medicinal plants - SRPM - is intended to optimize the harvesting operation within the cultivation technologies of some annual and perennial species of medicinal and aromatic plants, belonging to different botanical families, cultivated by farmers on small plots.
Class	(3) Agriculture and Food Industry

RO.281.

Title	DESIGN OF EXPERIMENTAL MODEL OF AN INTELLIGENT MOBILE PLATFORM INTENDED TO CARRY OUT THE MAINTENANCE WORKS FOR CROPS IN PROTECTED AREAS - EIIC
Authors	Cujbescu Dan, Voicea Iulian, Persu Cătălin, Găgeanu Iuliana, Matache Mihai, Gheorghe Gabriel, Dumitru Dragoș
Institution	National Institute for Research - Development of Machines and Installations designed for Agriculture and Food Industry - INMA Bucharest, Romania
Patent no.	Patent application No. A-00640 / 2021
Description	The experimental model of the EIIC smart mobile platform is intended for crop maintenance work in protected areas.
Class	(3) Agriculture and Food Industry

RO.282.

Title	TECHNOLOGICAL SYSTEM FOR INTENSIVE FISH BREEDING IN POLY CULTURE REGIME
Authors	Voicea Iulian, Matache Mihai, Oprescu Remus, Vlăduț Valentin
Institution	National Institute for Research - Development of Machines and Installations designed for Agriculture and Food Industry - INMA Bucharest, Romania
Description	The experimental model of the automated monitoring and control system for the polyculture system for the intensive breeding of some fish species consists of: Water quality monitoring subsystem basin (pond) polyculture system, monitoring and nutrition control subsystem (system feeding) fish species, aeration subsystem. All these 3 component subsystems are monitored and controlled via a PLC (programmable logic controller).
Class	(3) Agriculture and Food Industry

RO.283.

Title	INNOVATIVE TECHNICAL SYSTEM FOR HARVESTING HEMP STALK – SRC-0
Authors	Nedelcu Ancuța, Ciupercă Radu, Zaica Ana (INMA Bucharest), Popa Lorena-Diana (SCDA Secuieni, Neamț county)
Institution	National Institute for Research - Development of Machines and Installations designed for Agriculture and Food Industry - INMA Bucharest, Romania

Description	The innovative technical system for harvesting hemp stalks will work in aggregate with an agricultural tractor of min. 45 HP and consists mainly of the following assemblies: cutting device, sheaf binder, loading system, unloading system, installation for monitoring the work process and warning the operator in case of equipment malfunctions.
Class	(3) Agriculture and Food Industry

RO.284.

Title	EQUIPMENT WITH INTERCHANGEABLE ACTIVE PARTS FOR HARVESTING MEDICINAL PLANTS
Authors	Muscalu Adriana, Tudora Cătălina, Bîrsan Mariana, Ganea Ioan
Institution	National Institute for Research - Development of Machines and Installations designed for Agriculture and Food Industry - INMA Bucharest, Romania
Patent no.	Patent application No. A-00415 / 2020
Description	The invention relates to a trailed equipment intended for harvesting medicinal plants with different types of inflorescences using active parts such as mowers with straight or curved blades, respectively, with interchangeability possibilities.
Class	(3) Agriculture and Food Industry

RO.285.

Title	BIOREACTOR FOR PROCESSING SLUDGE FROM WASTEWATER PRETREATMENT PLANTS
Authors	Găgeanu Iuliana, Marin Eugen, Voicea Iulian
Institution	National Institute for Research - Development of Machines and Installations designed for Agriculture and Food Industry - INMA Bucharest, Romania
Patent no.	Patent application No. A-00397 / 2020
Description	The invention relates to a bioreactor for processing sludge from wastewater pretreatment plants intended for anaerobic treatment by homogeneous cold mixing in different proportions of components of sewage sludge, compost and soil to obtain a composition with agronomic properties useful for recovery in agriculture.
Class	(3) Agriculture and Food Industry

RO.286.

Title	INTEGRATED SYSTEM AND METHOD FOR OBTAINING BIOACTIVE SUBSTANCES FROM MEDICINAL AND AROMATIC PLANTS
Authors	Voicea Iulian, Matache Mihai, Nae Gheorghe
Institution	National Institute for Research - Development of Machines and Installations designed for Agriculture and Food Industry - INMA Bucharest, Romania
Patent no.	Patent application No. A-00288 / 2020
Description	The invention relates to an integrated system and method for obtaining bioactive substances from medicinal and aromatic plants using organic biofertilizers / bioinsecticides by simultaneous ultrasonic extraction and percolation processes, which allows almost total extraction of the bioactive substances from the plants' cells.
Class	(3) Agriculture and Food Industry

RO.287.

Title	DRUM FOR DRIP IRRIGATION TUBING
Authors	Manea Dragoș, Popa Radu
Institution	National Institute for Research - Development of Machines and Installations designed for Agriculture and Food Industry - INMA Bucharest, Romania
Patent no.	Patent application No. A-00497 / 2019
Description	The invention relates to a drum on which the drip irrigation tube is fixed, in the form of a coil, a drum intended for agricultural machinery for laying the drip tube on the soil surface for surface irrigation or for burying the drip tube for underground irrigation.
Class	(3) Agriculture and Food Industry

RO.288.

Title	EQUIPMENT FOR HARVESTING GREEN HEMP
Authors	Păun Anișoara, Bogdanof Gabriel, Ganea-Christu Ioan, Ciupercă Radu, Matache Mihai
Institution	National Institute for Research - Development of Machines and Installations designed for Agriculture and Food Industry - INMA Bucharest, Romania
Patent no.	Patent application No. A-00408 / 2019
Description	The invention relates to a hydraulically driven trailed equipment intended for the fractional harvesting of green hemp stalks in small and medium farms, for their further processing.
Class	(3) Agriculture and Food Industry

National Institute for Research and Development in Mine Safety and Protection to Explosion - Insemex Petroșani

RO.289.

Title	Stand for testing the temperature and flammability proof of self-contained breathing apparatus, based on compressed air
Authors	Irimia Alin, Găman George Artur
Institution	NATIONAL INSTITUTE FOR RESEARCH AND DEVELOPMENT IN MINE SAFETY AND PROTECTION TO EXPLOSION -INSEMEX PETROȘANI
Patent no.	C.B.I. a 2018 00892
Description	The invention relates to the construction of a stand for testing the resistance of open circuit insulating devices upon exposure to high temperature. According to the invention, is ensured a stable operation of the elements involved in producing the required temperatures during the tests. To achieve the functional purpose, the temperature will be monitored at two points inside the oven, located at the bottom and at the shoulders of the dummy and using a pyrometer for the burner battery.
Class	5

RO.290.

Title	Stand for determining the self-ignition temperature T_i of flammable liquids with high viscosity.
Authors	Ghicioi Emilian, Găman George Artur
Institution	NATIONAL INSTITUTE FOR RESEARCH AND DEVELOPMENT IN MINE SAFETY AND PROTECTION TO EXPLOSION -INSEMEX PETROȘANI
Patent no.	C.B.I. a 2018 00910
Description	The invention relates to a stand for determining the self-ignition temperature of flammable liquids with high viscosity, which at ambient temperature are in solid phase. The invention provides the material basis for knowing the self-ignition temperature T_i of highly flammable liquids, which are in solid form at ambient temperatures, allowing the establishment of maximum safe process temperatures, which provide explosion / fire protection for industrial activities where flammable liquids are processed, either as

primary or intermediate products, obtained in the distillation processes of residues resulting from the refining of crude oil

Class 5

RO.291.

Title Test stand for igniting the explosive dust/air atmosphere by capacitive electrostatic discharges

Authors Gabor Dan Sorin, Găman George Artur

Institution NATIONAL INSTITUTE FOR RESEARCH AND DEVELOPMENT IN MINE SAFETY AND PROTECTION TO EXPLOSION -INSEMEX PETROȘANI

Patent no. C.B.I. a 2018 00934

Description The invention relates to the production of a test stand for igniting the explosive dust/air atmosphere by capacitive electrostatic discharges, a stand in which an explosive test mixture consisting of air and flammable dust with a concentration that must fall between the lower explosion limit and the upper explosion limit is being used. The mixture can be ignited by a electrostatic discharge.

The realized stand ensures the optimization of the initiation process of the explosive dust/air atmosphere by precisely establishing the delay between the moment when the dust turbulence begins and the moment of the appearance of the electrostatic discharge.

Class 5

RO.292.

Title Continuous monitoring and recording system of gas explosion parameters

Authors Vlasin Nicolae-Ioan, Găman George Artur

Institution NATIONAL INSTITUTE FOR RESEARCH AND DEVELOPMENT IN MINE SAFETY AND PROTECTION TO EXPLOSION -INSEMEX PETROȘANI

Patent no. C.B.I. a 2018 00933

Description The invention relates to a system for monitoring and continuously recording the parameters of gas explosions. The system is capable of analyzing the explosion phenomena of air-combustible gas mixtures at higher recording speeds of the parameters.

The invention provides the material basis for understanding

the mechanisms of ignition and propagation of gas explosions in controlled environments (at various gas concentrations, in a quiet or turbulent state of the explosive mixture), as well as for calibrating computational simulations of flammable gas explosions.

Class

5

RO.293.

Title

Method for preventing spontaneous combustions in coal mines and surface storages, by thermography applied in the extractive industry.

Authors

Tomescu Ion-Cristian, Găman George Artur

Institution

NATIONAL INSTITUTE FOR RESEARCH AND DEVELOPMENT IN MINE SAFETY AND PROTECTION TO EXPLOSION -INSEMEX PETROȘANI

Patent no.

C.B.I. a 2018 00932

Description

The invention relates to a method for preventing spontaneous combustions which occur in open underground coal deposits, in exploitation or in surface storages, In accordance with the invention, it is ensured: the development of a smart method for preventing spontaneous combustions by thermographic monitoring of temperature fields and reducing risks generated by the occurrence of special situations in coal beds or within a surface storage, in order to ensure the safety of workers,

The invention is a result of industrial research in the field of endogenous fires or of coal self-ignition risks or of surface coal storages

Class

12

RO.294.

Title

Computerized stand for the preparation of a mixture of flammable/toxic/asphyxiating gases

Authors

Simon-Marinica Adrian Bogdan, Găman George Artur

Institution

NATIONAL INSTITUTE FOR RESEARCH AND DEVELOPMENT IN MINE SAFETY AND PROTECTION TO EXPLOSION -INSEMEX PETROȘANI

Patent no.

C.B.I. a 2019 00807

Description

The invention relates to a computerized stand for the preparation of a mixture of flammable/toxic/asphyxiating

gases, with the purpose of obtaining gas mixtures at concentrations in the explosive range, the operating principle of the stand is based on mixing two volumetric flows, controlled by programmable microprocessors, at which the gases are stored and circulated at atmospheric pressure with the aid of cylindrical injectors, driven by stepper motors so that the gas circuit does not require valves and at the outlet there is a homogenization chamber with agitator and dedicated flammable/toxic/asphyxiating sensor to confirm the programmed concentration

Class 5

RO.295.

Title Continuous invasive determination method of air velocity.

Authors Cioclea Doru, Emeric Chiuzan

Institution NATIONAL INSTITUTE FOR RESEARCH AND DEVELOPMENT IN MINE SAFETY AND PROTECTION TO EXPLOSION -INSEMEX PETROȘANI

Patent no. C.B.I. a 2020 00338

Description The continuous invasive determination method of air velocity shall take into account the entire measuring section, the location and the measuring surface are chosen and the air parameters, the equivalent surfaces and centers of gravity within the measuring surface are determined, the system for the continuous determination of the static, dynamic, and total average air pressure is set up and installed at the measuring point, and the system for continuous determination of the mean pressure is connected, the data resulting from the continuous measurements are collected, finally the average speed at the level of the measuring surface is established indirectly.

Class 5

RO.296.

Title Continuous air speed determination system

Authors Cioclea Doru, Emeric Chiuzan

Institution NATIONAL INSTITUTE FOR RESEARCH AND DEVELOPMENT IN MINE SAFETY AND PROTECTION TO EXPLOSION -INSEMEX PETROȘANI

Patent no. C.B.I. a 2020 00369

Description

The system for the continuous determination of the air speed, uses rectangular profiles that can be structured from cross type components, with connecting elements made of linear rectangular profiles, screw-type stiffening elements, Pitot-Prandtl tubes, primary connecting hoses connected to the pressure sockets, two barrels equipped with several connecting elements, each connecting element is provided with a shut-off valve / opening, secondary connecting hoses connected to the barrels, respectively a pressure measuring device, the data resulting from the continuous measurements are collected, finally the average speed at the level of the measuring surface is established indirectly.

Class

5

National Research & Development Institute for Welding and Material Testing – ISIM Timisoara.

RO.297.

Title	<p>Research on the development of new innovative methods for the application of the friction stir welding process in order to expand the possibilities of application in priority areas (Project PN 19 36 01 01 – Program Nucleu ISIM Timisoara 2019-2022)</p> <p>(Part I of the project - FSW-IG)</p>
Authors	<p>Lia-Nicoleta Boțilă, Radu Cojocar, Victor Verbițchi, Ion-Aurel Perianu, Iuliana Duma, Cristian Ciucă</p>
Institution	<p>National Research & Development Institute for Welding and Material Testing – ISIM Timisoara.</p>
Description	<p>The project aims to :</p> <ul style="list-style-type: none"> - develop new knowledge in the field of welding of non-ferrous metals and steels, using innovative variants of friction stir welding in inert gas environment (FSW-IG Friction Stir welding-Inert Gas) and underwater friction stir welding (SFSW - Submerged Friction Stir Welding). - apply FSW-IG and SFSW welding in order to improve the quality of welded joints of different metallic materials for use in priority areas (e.g. aluminum alloys, copper, magnesium, titanium, carbon and stainless steels). <p>Friction stir welding is a solid state welding process (process temperature < 0,8*melting temperature), environmentally friendly, with well-known economic, metallurgical and environmental advantages (no pollutants, fumes and radiation, no filler materials required or expensive consumables, etc.).</p> <p>Part I of the project is presented, in which the FSW-IG welding was approached.</p> <p>Research activities regarding SFSW are currently underway (representing the part II of the project) and are expected to be completed in December 2022.</p> <p>Applying a shielding gas to FSW-IG welding for a wide range of materials (e.g. Cu 99 copper, DD13 steel, AZ31B magnesium alloy, TiGr2 titanium, AISI 304L stainless steel) can lead to improve the process conditions, protection of the welding tools and welding materials against oxidation, but also to obtain better quality welds compared to welding in ambient environment</p>

RO.298.

Title	Method for monitoring the friction stir welding process in inert shielding gas environment FSW-IG
Authors	Cojocaru Radu, Boțilă Lia-Nicoleta
Institution	National Research & Development Institute for Welding and Material Testing - ISIM Timisoara Romania
Patent no.	Patent application No. A/00746/18.11.2020
Description	<p>Friction Stir Welding – Inert Gas (FSW-IG) is a new method of applying the FSW process which aims to protect the welding tool and materials to be welded against oxidation and contributes to the improvement of the quality of welded joints.</p> <p>The invention relates to a method for monitoring of the friction stir welding process in inert gas environment FSW-IG. An inert gas enclosure is fixed on FSW welding machine table and closed with a lid fixed on the main shaft housing of the FSW machine. The infrared thermographic camera is positioned on the lid through an access element and fixed on the main shaft housing of the FSW machine. This will allow the access of the thermographic camera lens in the welding zone in order to focus and measure the temperature on the joining line, at a short distance behind the welding tool.</p> <p>Applications: monitoring of the welding processes for various industrial applications (automotive, aeronautics, machine building, etc.)</p>
Class	5. Industrial and laboratory equipment

RO.299.

Title	Measuring system and method of abrasive water jet diameter, to control the cutting process
Authors	Sistem și metodă de măsurare a diametrului jetului de apă cu abraziv, pentru conducerea procesului de tăiere
Institution	Ion-Aurel PERIANU; Dan IONESCU;
Patent no.	Victor VERBIȚCHI
Description	<p>National Research & Development Institute for Welding and Material Testing – ISIM Timisoara</p> <p>Patent application No. A 2014 00350 of 2014</p> <p>Novelty items</p> <p>Measuring the diameter of the abrasive water jet on its image, because direct measurement is not possible, due to the very high kinetic energy of the jet.</p>

Components (Figure 1)

high pressure pump (1); high pressure pipe (2); cutting head (3); abrasive dispenser (4); abrasive water jet (5); video camera (6); drive system (7); travel rail (8); cutting material (9); collecting tank (10); computer numerical control unit - CNC (11); data and supply bus (12); computer (13); camera computer data bus (14); computer-CNC data bus (15); computer-dispenser data bus (16); computer-actuator data bus (17); pressure actuator (18).

Claims

1. System of measuring the diameter of abrasive water jet, characterized in that it measures the diameter on an image of the abrasive water jet (5), taken by a video camera (6), which transmits the image to a computer (13), equipped with specialized software, so that the computer (13) transmits real-time correction signals, to control the cutting process.
2. Method of measuring the diameter of abrasive water jet, characterized in that it uses an image of the abrasive water jet (5) as an intermediate model for measuring, so that, according to the invention, the image is taken by a video camera (6) and is processed by a computer (13), which transmits correction signals, to control the cutting process.

Applications

- Control of abrasive water jet of cutting machines, on rated pressure of 3000 - 4000 bar
- Improving the turbulent flow in hydraulic turbines
- Reducing the destructive effects of cavitation
- Improvement of hydraulic equipment.

Class

5

RO.300.**Title****Sonotrode for ultrasonic applications****Authors**

Nicuşor-Alin SÎRBU, Gabriela-Victoria MNERIE

Institution**National Research & Development Institute
for Welding and Material Testing – ISIM Timisoara****Patent no.**

Patent application No. A/00335/15.06.2021

Description

An economically improved innovative constructive solution for sonotrodes is presented, that are similar in geometry and manufacturing method. The sonotrode is manufactured by combining two subassemblies through the FSW process.

Materials used to manufacture the sonotrodes:

- similar materials (figure 1) are: titanium alloys (Ti grade 1

and grade 5); high resistance aluminum alloys; tool steel; heat treated carbon steels that have minimum internal friction losses. A sonotrode designed out of two similar materials subassemblies, with a median joining area on the upper cylindrical zone. FSW (friction stir welding) of the two subassemblies takes place without machining the edges (figure 1a); for coaxially reasons it is imposed to machine, the edges of the joining area (figure 1b).

- dissimilar materials (figure 2): for the inferior subassemblies that are made out of low alloyed carbon steel, high alloy carbon steel; for the upper subassembly the materials used are titanium alloys, high speed tool steel and high alloyed steels; this solution allows sonotrodes to be repaired after the active part of the tool is deteriorated, thus it can be reintroduces into production after minor repairs. The joint area is highlighted in the proximity of the active area of the sonotrode; joint developed using the FSW process without machining the edges of the two subassemblies (figure 2a); in the joining area the edges are machined for coaxially reasons (figure 2b).

Applications:

- developing sonotrodes that are economically improved, while maintaining their technical performances;
- repair of sonotrodes will be easier and prolong the lifespan of the sonotrodes by reintroducing them into production.

Class

5. Industrial and laboratory equipment

Regional Institute of Gastroenterology and Hepatology Cluj-Napoca

RO.301.

Title	Process for Preparing a Product with Regenerative and Antimicrobial Applicability
Authors	Matea Cristian, Mocan Lucian, Iancu Cornel, Mocan Teodora
Institution	Regional Institute of Gastroenterology and Hepatology Cluj-Napoca
Patent no.	Patent application No. 131849/2020
	The invention relates to a process for preparing a product to be used in bone regeneration. According to the invention, the process consists in preparing, in the first stage, silver nanoparticles stabilized with citrate, which is then replaced with polyethyleneglycol dithiol, after which they are functionalized by covalent binding with JAG-1 protein, and then the so-functionalized nanoparticles are subjected to successive stages of centrifugation and redispersion by ultrasound treatment in double distilled water, for removing secondary reaction products.
	Applications
Description	The invention proposes a product with regenerative and antimicrobial applicability. Thus, we propose a method for obtaining AgNP-PEG-JAG-1. In a first step of AgNP synthesis (9 mg AgNO ₃ dissolved in 50mL H ₂ O., Heating at 100°C and addition of sodium citrate, reaction under stirring until color change.). In the second stage, the replacement of the citrate on the AgNP surface with dithiol polyethylene glycol (5mLH ₂ O. 1mLPEG 100μM, with pH adjustment,) will be performed, followed by the addition of Jag-1 protein (1mL JAG-1 5 μM, 1mLDMSO, 120min, continuous stirring). , RT). Then, finally, redispersion in H ₂ O to remove by-products.
Class	4

RO.302.

Title	Procedeu De Obținere a unui Produs Carcinoembrionar cu Aplicabilitate în Imunoprofilaxia Cancerului Pancreatic și Colonic
Authors	Iancu Cornel, Matea Cristian, Mocan Lucian, Mocan Teodora

Institution	Regional Institute of Gastroenterology and Hepatology
Patent no.	Patent No. 131850/2020
Description	The invention relates to a process for preparing a carcinoembryonic product to be applied in pancreatic and colonic cancer immuno-prophylaxis. According to the invention, the process consists in that, in the first stage carboxylated carbon nano-tubes of MWCNT type are obtained, after which they are functionalized by covalent binding with the carcinoembryonic antigen, then the so-functionalized nanostructures are subjected to successive stages of centrifugation and redispersion by ultrasound treatment in double distilled water, for removing the secondary reaction products.
Class	4

Research and Development Station for Cattle Breeding Dancu, Iasi

RO.303.
Title **Lactose-free Yogurt Enriched with Pumpkin Seeds for Sustainable Health**
Authors Ariton Adina Mirela¹; Neculai-Valeanu Andra-Sabina¹; Elena Ungureanu²; Trinca Carmen²
Institution Research and Development Station for Cattle Breeding Dancu, Iasi 1); Iasi University of Life Sciences 2)

Patent no. -

Description

Given fermented dairy products have long been recognized to provide health benefits, expanding the product range to include other types of health-promoting foods is a natural progression for the dairy sector. Functional dairy products have gradually become more widely available in everyday life, and they have grown in popularity in recent years. Consumers' concerns about their wellbeing are fueling the growth of functional dairy products market, thereby the use of various ingredients in the formulation of yogurts intended for "special diets", in order to diversify a dairy product particularly appreciated by consumers, is a constant concern for specialists in the milk industry. The focus of the present research was the development of lactose-free yogurt enriched with pumpkin seeds. Pumpkin seeds, like other oilseeds or oils, are a very good source of protein, fiber and omega 3 fatty acids, as well as other valuable minerals such as vitamin E and zinc, that may improve the satiety degree, along with other health benefits. Furthermore, pumpkin seeds are commonly used as traditionally medicine against intestinal parasites. Cucurbitin, an amino acid found in these seeds, exhibits a significant antihelminthic effect by paralyzing worms and stimulating their elimination, which may be extremely beneficial for children. The enrichment of yogurt with pumpkin seeds has improved the texture, physico-chemical and sensory properties. This new yogurt may be produced in industrial workflows without changing the technological procedures and may bring multiple benefits for consumers with special needs, such as lactose intolerance.

Class

3

RO.304.

Title	Formulation of a multifunctional nanocomposite hydrogel based on natural polysaccharides, biogenic copper nanoparticles and essential oils
Authors	NECULAI-VALEANU Andra-Sabina ¹ ; ARITON Adina-Mirela ¹ ; RIMBU Cristina-Mihaela ² ; MADESCU Bianca ^{1,2} ; POROSNICU Ioana ¹ ; VAIDA Gheorghe ³
Institution	Research Station for Cattle Breeding Dancu, Iasi, Romania; Iasi University of Life Sciences, Romania Academy of Agricultural and Forestry Sciences Gheorghe Ionescu-Șișești
Patent no.	-
Description	<p>Copper nanoparticles are of tremendous interest due to their strong antibacterial properties, having potential to enhance the physico-chemical and antimicrobial characteristics of hydrogels. The goal of this research was to develop a multifunctional hydrogel embedded with copper nanoparticles, manufactured in an eco-friendly manner, with potential applications in Bovine Mastitis. Cinnamon extract was mixed with the CuSO₄ (pentahydrate copper sulphate) for the biological synthesis of CuNPs. The presence of the CuNPs was confirmed by UV–Visible spectroscopy, the spectrums being recorded from 200 to 800 nm. Xanthan gum, a natural polysaccharides, was used for the synthesis of hydrogels: control gel (CuSO₄ alone), G1 (with biogenic CuNPs) and G2 (containing CuNPs and essential oils (oregano, cinnamon, clove, eucalyptus, thyme, and lavender). The antimicrobial activity was assessed comparatively against Gram-positive, Gram-negative bacteria and fungal species common in Bovine Mastitis. Hydrogel G2, embedded with biogenic CuNPs and essential oils, presented a higher antimicrobial activity against both Gram-positive and negative bacteria. It also displayed antibiotic activity against MRSA ATCC 33591, a methicillin-resistant <i>Staphylococcus aureus</i> strain with public health significance. When coupled with the specified essential oil blend, copper sulfate demonstrated strong synergistic antibacterial action.</p> <p>Applications</p> <ul style="list-style-type: none"> • <i>Dairy industry</i> - Alternative therapy for bovine mastitis aiming at reducing the massive economic losses induced by this disease. • <i>Veterinary medicine</i> – reduction of antibiotic consumption in farms • <i>Public Health</i> – prevention of ANTIBIOTIC RESISTANCE emergence, which poses serious threats to

both public and animal health.

- *Accordance with European Commune Agriculture Policy strategy* - sustainable animal health solution that supports the production of safe and high-quality food products.

RO.305.

Title

Foam Teat Dip embedded with Green Silver Nanoparticles for Udder Care

Authors

NECULAI-VALEANU Andra-Sabina¹; ARITON Adina-Mirela¹; RIMBU Cristina-Mihaela²; VAIDA Gheorghe³

Institution

Research Station for Cattle Breeding Dancu, Iasi, Romania; Iasi University of Life Sciences, Romania

Patent no.

Academy of Agricultural and Forestry Sciences Gheorghe Ionescu-Șișești

Description

-

Udder hygiene is an important aspect of the daily milking routine. Using the appropriate udder hygiene products and techniques may help improve a BOVINE MASTITIS prevention program's effectiveness. The goal of the present research was the development of a foam teat dip embedded with green synthesized silver nanoparticles (AgNPs) for udder care and bovine mastitis prevention. Silver nanoparticles were synthesized in an eco-friendly manner, using Cinnamon extract as both reducing and capping agent. In the formulation of the foam cleanser several ingredients were considered. Oregano and Lavender essential oils were added for their antimicrobial, softening and skin relaxing properties. Lactic acid, which promotes skin cell renewal and exfoliation was added with the purpose of improving skin texture and appearance. Cocamidopropyl betaine, a gentle surfactant derived mainly from coconut oil was chosen due to its very low irritant potential. The antimicrobial activity of the foam cleanser was assessed against Gram negative, Gram positive, yeast as well as antibiotic resistant bacteria (MRSA) commonly involved in Bovine Mastitis. Although the benefits of pre-milking teat disinfection may vary depending on management, practices and bacterial strains present in the environment, the foaming teat disinfectant may reduce bacterial counts on teat skin and the overall bacterial contamination of milk.

Applications

- Large-size commercial dairy farms
- Ecological Dairy Farms
- Family Farms

Advantages

- covers the surface of the teats and enables deep cleaning, without impacting the environment
- facilitates the fast and sustainable implementation of good teat hygiene practices pre and post milking.

Class

3

RO.306.**Title**

Dairy Products for Special Dietary Needs - Development of a Lactose Free Yogurt Fortified with Organic Freeze-Dried Blackberries

Authors

Andra-Sabina Neculai-Valeanu, Adina-Mirela Arition, Cristina Rimbu, Carmen Trinca

Institution

Research Station for Cattle Breeding Dancu, Iasi, Romania; Iasi University of Life Sciences, Romania

Patent no.

-

Description

Today, over 70 percent of the global population suffers from hypolactasia (lactose intolerance) which is typically undiagnosed and can result in a long-term decline in quality of life. The strong relationship between nutrition and well-being has determined an increase in public awareness regarding the importance of functional food, health becoming now one of the main drivers of consumer food selection. As a result, one of the most important areas of research in the food industry field is the development of lactose-free functional foods to match consumer needs. Fermented milk products may be a valuable part of a lactose-free diet. The association of pre and probiotics from yogurt with the health benefits of blackberries, which are packed with antioxidants (i.g. anthocyanins, ellagic acid, resveratrol), fibers, and vitamins may help improve blood sugar and insulin response, as well as alleviate inflammation. The present research relates to the development of a novel dairy snack made with freeze-dried blackberries from local, organic farms, with the goal of meeting consumers' requirements for healthy foods, dietary needs (i.e. lactose-free), valorization of local raw materials, and nutrition recommendations in terms of protein, fat, fibers, and bioactive compounds.

Applications

- Dairy products processing units
- Nutrition Program Plans → design of special dietary needs meal plans
- Small agro farms
- Cooperatives

Advantages

- meets consumers' requirements for healthy foods, dietary needs (i.e. lactose-free) and nutrition recommendations in terms of protein, fat, fibers, and bioactive compounds.
 - Valorization of local organic blackberries
 - Freeze-dried fruits retain better their flavor and nutrients
 - No added no sweeteners, additives or preservatives
- Suitable for children, teenagers and adults with lactose intolerance

Class

3

RO.307.

Title

N-FEED. An eco-friendly feed ingredient for cattle, based on insect protein from Black Soldier Fly

Authors

Carlos Bendezu¹; Neculai-Valeanu Andra-Sabina^{1,2}

Institution

¹Futura BSM Venezuela; ²Research & Development for Cattle Breeding Dancu Iasi

Patent no.

-

Description

The COVID-19 pandemic, climate change and more recently the Ukraine war have emphasized the significance of having resilient food production systems that may function in any situation, ensuring access to an adequate amount of food, at accessible prices. Cattle farmers, have to constantly face other challenges, such as reducing their operating costs to maintain profitability while ensuring high-quality protein feed that meets nutritional demands. Rising energy tariffs, land and water use, and labor costs are factors that directly influence production costs. Reevaluating the traditional feeding of cattle by including new ingredients that are available, accessible, produced locally and sustainably, is an action with multiple benefits and beneficiaries. In the context of overpopulation in which we find ourselves, it is estimated that in 2035 the demand for protein will increase to 250 million tons per year, therefore, insects are positioned as one of the most viable sources of protein, for both human and animal consumption. Insect protein, specifically that obtained from the Black Soldier Fly, could drastically reduce all food production risk factors and variables that impact on production costs, in addition to achieving a balance in the use and conservation of the resources used, the economic benefit and the social benefit.

Applications: dairy cattle farms; cattle feed producers

Advantages:

- Resilient, sustainable and climate friendly protein production process

NATIONAL

- A promising, high-quality alternative to soy protein that could drastically reduce all food production risk factors
- Global market for edible insects is estimated to reach USD 1,181.6 million in 2023 and USD 7,960.00 million in 2030.

Class

3

RO.308.**Title****PROWATER. Nutritional water, enriched with insect protein from Black Soldier Fly****Authors**Carlos Bendezu¹; Neculai-Valeanu Andra-Sabina¹**Institution**¹Futura BSM Venezuela; ²Research & Development for Cattle Breeding Dancu Iasi**Description**

Good health depends on the consumption of sufficient nutrients, vitamins, minerals and water. The amount of energy depends on age, sex, metabolism and physical activity. Energy is obtained from fats, carbohydrates and proteins. Proteins play a fundamental role in the body, fulfilling specific functions. The daily protein intake of an average adult ranges from 1.0 g - 1.5 g per Kg of body weight. Armed conflicts, terrorism, political instability, lack of access to drinking water and medical care, sanitation problems, diseases, food insecurity, hunger, and the effects of climate change may negatively impact populations. It is imperative to seek feasible and fast technical solutions, capable of mitigating existing problems. The malnutrition that affects millions of people, should be faced from multiple angles. One of them is the production of new foods, with technologies and processes that may be replicated locally, in order to become autonomous. The properties of proteins from Black Soldier Fly, together with existing technologies (HPLC, Supercritical Fluids, Ultrasounds), are the starting point to produce a nutritional water, which contains four amino acids (*Lysine, Methionine, Phenylalanine and Threonine*) and retains its organoleptic properties (color, smell, taste). When a person consumes the recommended two (2) liters of water per day, they will consume also the approximate protein specified for an average adult.

Class

3

Romanian Research & Development Institute For Gas Turbines Comoti

RO.309.

Title	UNMANNED AERIAL VEHICLE, SUCH AS QUADCOPTER, WITH VARIABLE WINGS, VECTORIZED ENGINE AND METHOD OF FLIGHT AT FIXED POINT AND FORWARD
Authors	Tiberius-Florian FRIGIOESCU, Mihaela-Raluca CONDRUZ, Teodor-Adrian BADEA, Alexandru PARASCHIV
Institution	ROMANIAN RESEARCH AND DEVELOPMENT INSTITUTE FOR GAS TURBINES - COMOTI
Patent no.	RO 134896 A0
Description	<p>The invention relates to an unmanned aerial vehicle, such as a quadcopter with independent detachable wings, with vectorized engines and to a method of flight at fixed point and forward, used in surveillance and data recording missions. The vehicle consists of three zones, a first central zone there is a power source and electronic control components, including a control board, the second zone, positioned in the four quadrants, ensures the change of the wings' angle of incidence and the third zone arranged at each end of the second zone which comprises the vectorized engines. The claimed method of forward flight of the UAV consists in tilting the aerial vehicle with a certain angle towards the front direction, then increasing the angle of incidence of the wings depending on the speed of travel, rotation</p> <p>of front and rear engines and reducing/maintaining the speed of engines with increasing autonomy/max forward speed. Applications: Payload transport, surveillance, infrastructure inspections</p>
Class	8

RO.310.

Title	AUTOMATED INSTALLATION FOR TESTING THERMAL-BARRIER COATINGS TO THERMAL SHOCK, OXIDATION AND CORROSION
Authors	Alexandru PARASCHIV, Mihaela-Raluca CONDRUZ, Cristian PUSCASU, Tiberius-Florian FRIGIOESCU
Institution	ROMANIAN RESEARCH AND DEVELOPMENT

NATIONAL

Patent no.	INSTITUTE FOR GAS TURBINES - COMOTI RO 134516 A0
Description	<p>The objective of the invention is to solve a practical problem regarding the thermal cycling testing of thermal barrier coatings and refractory materials used to manufacture and protect gas turbine hot section components. The proposed invention provides automated testing of two samples to an individual or combined cycles of thermal shock, oxidation or/and hot corrosion by spraying corrosive particles until a video monitoring system and self-detection of the coating exfoliation indicate a certain level of coating exfoliation.</p> <p>Applications:</p>
Class	5

RO.311.	
Title	AUTOMATED TEST BENCH FOR UNMANNED AERIAL VEHICLES WITH PROPELLER-DRIVEN ELECTRIC PROPULSION
Authors	Tiberius-Florian FRIGIOESCU, Teodor-Adrian BADEA, Mihaela-Raluca CONDRUZ, , Alexandru PARASCHIV
Institution	ROMANIAN RESEARCH AND DEVELOPMENT INSTITUTE FOR GAS TURBINES - COMOTI
Patent no.	U2021_00010
Description	<p>Autonomous test bench, with software interface, for brushless motors with propeller for unmanned aerial vehicles. This bench was designed to evaluate the performances of a motor configuration and it consists of 2 computers, a metal structure with linear bearings and a rod, structure on which the propeller motor is mounted. The R1 computer controls the engine speed through the R2 computer which will also display, record, vectorize and save the values of motor's force, voltage, intensity, temperature and sound. The software interface allows to enter the maximum percentage of pulse-width modulation (PWM), maximum intensity, maximum power and display the processed data.</p> <p>Applications: Testing propulsion systems with propellers for UAVs</p>
Class	5

RO.312.

Title	Mobile Test Bench for Contra-Rotating Fans Rotor Testing
Authors	Răzvan Marius CATANĂ, Gabriel DEDIU, Cornel Mihai TARABÎC, Mihai Horațiu ȘERBESCU
Institution	ROMANIAN RESEARCH & DEVELOPMENT INSTITUTE FOR GAS TURBINES COMOTI
Patent no.	RO 135127 A0
Description	The invention is referring to a mobile test bench, designed at a reduced scale, dedicated to experimental research for contra-rotating fan rotors, with fix and variable pitch blades, for turbofan engines, through which rotor performances are determined, as air mass flow, overall pressure ratio, actual rotor work, adiabatic efficiency and thrust, for fan optimization in order to reduce the turbofan engine fuel consumption. The turbofan working regimes analysis is performed by a turbo machinery specific law, named similarity law. The invention allows to install and to test different geometry of rotor fans, because it has a variable hub diameter of fan flow section
Class	8

RO.313.

Title	Mobile Test Bench of Testing Fans for Turbofan Engines
Authors	Răzvan Marius CATANĂ, Gabriel DEDIU, Mihai Horațiu ȘERBESCU
Institution	ROMANIAN RESEARCH & DEVELOPMENT INSTITUTE FOR GAS TURBINES COMOTI
Patent no.	RO 133517
Description	The invention is referring to a mobile test bench, designed at a reduced scale, dedicated to experimental research of a fan stage, with fix and variable pitch blades, for turbofan engines, through which the fan stage performances are determined, as air mass flow, overall pressure ratio, actual rotor work, adiabatic efficiency and fan thrust, in order to optimize the fan and to reduce the fuel consumption of turbofan. The turbofan working regimes analysis is performed by a turbo machinery specific law, named similarity law
Class	8

SC BIOTEHNOS SA

RO.314.

Title	Porous orthotic structures functionalized with antimicrobial powders, polypeptide fragments and plant extracts used in orthopedics and traumatology
Authors	D. N. Batalu ¹ , N. Dobre ¹ , I.O. Trancu ^{1,2} , B.G. Dumitriu ³ , L. Olariu ^{3,4} , M.A. Grigorescu ⁵ , M. Burdusel ⁵ , G.V. Aldica ⁵ , P. Badica ⁵ , C. Gaidau ⁶ 1. University Politehnica of Bucharest, Romania 2. University of Medicine and Pharmacy "Carol Davila" Bucharest, Romania 3. BIOTEHNOS, Otopeni, Romania 4. Academy of Romanian Scientists - associate member, Bucharest, Romania 5. National Institute of Materials Physics (INCDFM), Magurele, Romania 6. National Institute for Textiles and Leather (INCDTP), Division Leather and Footwear Research Institute (ICPI), Bucharest, Romania
Institution	
Patent no.	Patent application No. A/00589 , September 2021
Description	The invention relates to the production of medical devices, with a porous interface and a multifunctional role, intended to immobilize joints or fractures and having a complementary role in the treatment of difficult or delayed healing wounds. This system is 3D printable from biocompatible, polymeric materials (PLA, PLLA, PEEK etc. or elastic TPU), which can be thermoformable, but rigid/elastic below 50°C. This feature leads to a customizable pattern according to the patient's condition. The porous assembly, with a controlled configuration, allows active substances loading, in particular those with skin regeneration properties: flavones, polyphenols, polyacetylenes, polypeptide fragments of keratin, chitin and other antibacterial additions. The specific design of the porous interface directs the release of the active substances at the site of the injury, providing additional protection and healing properties, allowing natural ventilation of the skin, and accelerating the processes of skin relief. Studies developed through BIOTEHNER Project, ctr.5PTE-2020.
Class	

RO.314BIS

Title	Innovative in silico modelling strategies and technological optimisation for the design of marine bioactive complexes
Authors	Laura Olariu ^{1,2} , Manuela Diana Ene ^{1*} , Sorin Draga Coleta ¹ , Raluca Papacoea ³
Institution	1. BIOTEHNOS, Otopeni, Romania 2. Academy of Romanian Scientists, Bucharest, Romania, correspondent member 3. University of Medicine and Pharmacy "Carol Davila" Bucharest, Romania
Description	<p>The development of an innovative in silico interrelation modeling algorithm for the design of pharmaceutically active substances for specific target diseases and the optimization of advanced processing and manufacturing technologies can lead to the efficient use of biological raw material resources without harming the ecosystem. In silico modelling, which is accepted by international bodies both in the context of the 3R concept and for the identification of new therapeutic values of bioactive complexes/ drugs, involves process innovations through computational evaluation and construction of three-dimensional structural design of receptors/ enzymes and ligands. The technological steps of raw material processing have carried out well-defined analytical screening by chromatographic, SDS-page electrophoretic and zymographic techniques. After the technological optimization we isolated and identified biologically active protein molecules with protease and superoxide dismutase enzymatic activity with high purity.</p> <p>For these biologically active molecules, pharmacological and toxicological profiles were then developed using in silico prediction methods and feedback of the analytical characterization and efficacy of the biological activities.</p> <p>Thus, ADMET parameters (adsorption, distribution, metabolism, excretion and toxicity) were evaluated with ChemoPy software, providing preliminary toxicity data at the cellular level. Descriptive studies on how to specifically address the potential variety of enzyme classes contained in biological starting materials coupled with in vitro predictions increase the opportunities to develop prototypes with new therapeutic potential. Studies developed through SMIS 122180/CTR. 256/ 2020 project</p>

Romanian Inventors Forum

RO.315.

Title **MOUTHWASH PREPARATION PROCESS**
Authors Earar Kamel, Sandu Andrei Victor, Virvescu Dragoș Ioan, Sandu Ion, Bălan Gheorghe, Sandu Ioan Gabriel, Frățilă Dragoș Nicolae
Institution **Romanian Inventors Forum**
Patent no. RO135634 (A2)

Description The invention relates to a process for the preparation of a mouthwash composition to be used in the pharmaceutical and cosmetic industries. According to the invention, the process consists of the steps of preparing supernatants from extracts of essential oils in solution of ethyl alcohol 90...95%, from medicinal plants selected from mint, basil, rosemary, chamomile flowers, green tea and cardamom seeds, adding thymol, pineapple juice supernatant, colloidal crumb of sea salt and sodium bicarbonate, pasteurizing the mixture by heating it at 72°C for 10...15 seconds, fast cooling to 4°C, adding an aqueous perhydrol solution and stabilizing the dispersion with disodium glycerol phosphate and natural emulsifier, under vigorous stirring, to result in a composition with synergistic antiseptic effect and effect of protection of the oral mucosa.

Class 4

RO.316.

Title **PROCESS FOR STOPPING INSECTO-FUNGAL ATTACKS IN OLD WOODEN ARTIFACTS**
Authors Colbu Dumitru Eugen, Sandu Ion, Vasilache Viorica, Sandu Irina Crina Anca, Ghavidalesfahlan Amir, Colbu Gheorghe, Sandu Ioan Gabriel, Colbu Nicoleta, Sandu Andrei Victor
Institution **Romanian Inventors Forum**
Patent no. RO135385 (A2)

Description The invention relates to a process for treating old wood artifacts in order to stop insecto-fungal attack, to be applied in workshops for preservation-restoration of art works and antique furniture. According to the invention, the process consists of the following successive stages: sanitizing, cleaning and consolidating the surfaces to be treated, using a solid dispersion consisting of wax : paraffin or colophony : teak wood crumbs in a gravimetric ratio of 5.0:3.5:1.5, in

fluid state, at a temperature of 64...66°C, by brushing in several layers, after which teak wood veneer sheets of 1.0...1.5 mm are applied by lining in one or two layers, with polymeric adhesive films of acrylic or collagen type and then, on the veneer-lined surfaces, cellulosic or urea-formaldehyde transparent films are applied, and possibly dispersions of acrylic copolymer and fine crumb teak wood in a ratio of 1:1 in dilutant, at three concentration levels, in order to provide a final thickness of the applied layer of 200 µm, at the most.

HELICOMED**RO.317.**

Title **Device for learning writing-reading stage**
Authors Georgeta Burlea, Anamaria Burlea, Lucian Ștefan Burlea
Institution **Your Company/Institute/University**
Patent no. RO 125059/2013

The technical problem, which the present invention solves, consists in bringing together, within a single device, both the function of visualizing a letter, a formed word, and the graphic representation of the meaning of the formed word, and the possibility of writing the letter/word on a tablet incorporated in the said device, the visual perception of the image of the letter or word being word being correlated with the auditory perception of phonemes.

Description

The idea of the patent was based on the knowledge of rigorous international and national studies that have highlighted the extent of dyslexic dysgraphic syndrome, the dramatic implications it has on the development of the child's personality, his mental and physical health, but also on the fact that in Romania there are no effective methods of diagnosis. At the same time, there is a lack of validated tools for the comprehensive assessment of children, with the help of which risk factors can be detected early on and which need to be eliminated in good time.

Class

4

HIDRA-Z WORLD PROJECT S.R.L.**RO.318.****Title** Alkaline water with zinc and silver**Authors** Margineanu Sorin Adrian**Institution** HIDRA-Z WORLD PROJECT**Patent no.** 131041**Description**

Alkaline water with zinc and silver is a water created to regulate enzymatic activity and reduce oxidative stress, without triggering strong alkalizing reactions.

All known antioxidants up to this time have dosage limitation, because the amount expressed in grams / mole is very high, relative to the number of bonds that are suitable to bind free radicals.

The only structure with low molar weight, suitable to be used as an antioxidant is water (18 grams / mol) compared to other antioxidants.

The H-OH structure gives the water the acid structure and the base at the same time. Being a suitable structure for making a product with antioxidant effect were taken into account the other chemical elements that are specific to cell membranes. The ones that were of interest were those responsible for polarization-repolarization, because here is actually the key to entering the cell, the substances that can produce mutations at the DNA level.

The heaviest calculations were for establishing the doses so that alkaline water with zinc and silver to be the most powerful antioxidant, for all types of reactive oxygen species and at the same time not to produce alkalization of the body. By reducing the number of free radicals, regulating the permeability of cell membranes, regulating zinc-dependent enzymes, an increase in oxygenation at the cellular level was obtained and in this way oxygen was used without creating, in excess, reactive oxygen species.

In the patent is written only the composition, but the way of structuring the mineral clusters was not listed.

Class

4 - Medicine – Health Care – Cosmetics; 14 Others

Gabriel Petre GORECKI

RO.319.

Title	Digital videocapilaroscope
Authors	Gabriel Petre GORECKI, Daniel Cochior, Dan CUSTURA-CRACIUN, Horatiu Moldovan, Radu Stoica, Lucian Florin Dorobantu
Institution	Titu Maiorescu University of Bucharest, Faculty of Medicine
Patent no.	Patent application No. A00285/2018
Description	Our project proposal regards the creation of an experimental device (HD wireless videocapilaroscope) a hardware and software solution used for an early and non-invasive diagnosis in emergency situations. The videopailaroscope collects both dynamic and morphological data by analyzing the microscopic vessel distribution in the oral mucosa in order to diagnose and treat (following software processing) the early systemic microvascular changes that precede the onset of septic shock and, consequently, multiple system organ failure. The digital quality of the image is paramount for a correct analysis of the basic morphological and dynamic microvasculature parameters. By the end of the software analysis, the program will elaborate a report regarding every area of interest, which can be printed or stored. The relevant parameters of the oral mucous microcirculation are certified as being pathognomonic for the onset of septic shock, based on correlations between experimental and clinical data.
Class	4

RO.320.

Title	Management algorithm for obese parturients with liver dysfunction - <i>Research project</i>
Authors	Cristina Oana Daciana TEODORESCU, Amarin Remus POPA, Gabriel Petre GORECKI, Andrei George TEODORESCU
Institution	University of Oradea, Faculty of Medicine
Description	The research project plans to develop a management algorithm for obese pregnant patients with liver dysfunction, with the primary objective to evaluate the impact of obesity during pregnancy and all the other issues that might arise with the newborn during antenatal, peripartum and

postpartum period.

The target of this project is to create a management algorithm for obese parturient with hepatic dysfunction for an easy and rapid monitoring of the patient. This algorithm will be used as a mobile application both for the physician and the patient.

RO.321.

Title **Staging method for management of biohumoral changes in pregnant woman with COVID 19 infection - *Research project***

Authors Marilena Băluță, Liana Pleș, Gabriel Petre Gorecki

Institution UMF Carol Davila

Description

The risk of infection of the pregnant woman with Covid 19 seems to be equal compared to the general population, however the evolution of the disease can be modified by the presence of pregnancy both by the age of the viral strain and immunosuppression following pregnancy, pregnant women having a higher risk of developing an average or severe form.

Covid 19 infection triggers a systemic inflammatory response, and in order to reduce perinatal morbidity and mortality, it is absolutely necessary to initiate a correct treatment depending on the particularities and associated pathologies that the pregnant woman presents.

An algorithm for dynamic investigation of inflammation markers: CRP, IL-6, Fertinine, Serum lactate, leukocytes, lymphocytes, D-dimers, acid-base balance bring a clinical benefit by establishing and monitoring the response to treatment.

The dynamics of serum markers of inflammation together with the clinical evolution and gestational age dictate the therapeutic behavior.

Amalia Gabriela Diaconeasa**RO.322.****Title****A procedure for stimulating tissue preservation and differentiation****Authors****Amalia Gabriela Diaconeasa****Institution****SC Creative Lime Web****Patent no.****-**

This innovation represents a new approach to aging based on a new theoretical model.

Aging is an intriguing phenomenon, negligible or hard to detect in various species, but obvious in some homeotherms. So far, there is no clear definition of aging, although there are two widely accepted criteria for aging, advanced by Finch and Austad (Finch and Austad, 2001) : 1. an increase in mortality rate with age; 2. a decrease in fitness (the ability of producing viable offspring). Because these criteria are contradictory,

we need newones to identify aging.

According to the biochemical hypothesis of aging we developed, the culprit of aging in eukariotic organism, even unicellular (yeasts), may be an improper differentiation interfering with specific functions.

Description

In order to test this hypothesis, we conducted a pilot-study on mice, both males and females (15 months), addressing different parts of the process of tissue differentiation, focusing on the processes that can be affected during aging: cell proliferation and survival, extensive tissue differentiation, stimulation of cell stress response and repair, and some deleterious cell changes associated with aging. We used substances already used in humans, in the same recommended doses as in humans. Obviously, up until now they have been used they are used for other purposes than aging. Their influence on aging is predicted by this hypothesis.

Our results show a significant increase in the average and maximum lifespan in both sexes . Another experiment using some of these substances shows also a significant increase in fertility in old mice. words)

Class**4**

Monica Gabriela Dinu**RO.323.****Title****SPIRULINFOOD- COMPOSITION AND METHOD FOR HEALTHY FOOD****Authors**

Dinu Monica Gabriela

Patent no.

Patent application No. A23L 33/105 (2016.01) (21) a 2019 00918

Description

THE COMPOSITION AND THE PROCESS According to the invention consist in establishing the destination of the SPIRULINFOOD powder mixture for the manufacture of ice cream both in domestic and industrial fields, but also for sherbets, wafers, bakery products - pastry, confectionery, etc., based on rice flour. The goal is to determine the proportion of spirulina: another ingredient: thickener. Then correct the rice flour with guar gum until the rheological parameters are obtained or you want according to the destination of the flours (wafers, cakes, etc.).

The invention relates to a mixture composition based on spirulina, to a process for the preparation and to an ice cream food product based on it. The composition according to the invention is in the form of doses packed in 20 g paper sachets, consisting (in mass percent) of 30% spirulina, 50% sea buckthorn and 20% guar gum. The process according to the invention consists in homogenizing the spirulina with a stabilizer, then adding aloe vera in two stages, with homogenization, followed by decontamination, mixing dosing and packaging in doses of 20 g.

Class

Irina Mihaela Matran

RO.324.

Title	Composition and process for obtaining a range of various cereal flours and functional products with sericine addition, as non-conventional ingredient
Authors	Irina Mihaela Matran, Monica Gabriela Dinu
Patent no.	-/ Patent application No. A 00588/ 14.08.2018
Description	The invention relates to the composition and method of obtaining flour assortments (from various cereals) and bakery products such as pastry, confectionery, etc., which incorporate various percentages of sericin with a technological and nutritional role, for later use manufacture of various products (cakes, cakes, bakery products, pastry, biscuits, pasta, pizza dough, etc.). Food industry
Class	3

RO.325.

Title	Nutraceutical Formulas Antioxidants And Prebiotics For Foods
Authors	Irina Mihaela Matran, Monica Tarcea
Patent no.	-/ Patent application No. A 00815/2021
Description	The invention relates to antioxidant and prebiotic nutraceutical compositions and processes for obtaining foodstuffs which have incorporated these compositions. These formulas are composed of bovine lactoferrin, coconut sugar, inulin and tricalcium phosphate and may be added to the following food categories: milk-based beverages, fermented milk-based beverages (including yogurt-based beverages), yogurt, ice cream, foodstuffs for special medical purposes, cheese-based products, chewing gum, processed cereal-based foods (solids), cakes and pastries and sweets. Food industry
Class	3

Mircea-Gabriel Lazareanu**RO.326.****Title****Portable multifunctional cooler powered according to the operating characteristics of the spring-steel****Authors**

Mircea-Gabriel Lazareanu

Institution**Clubul Copiilor si Elevilor Pascani****Patent no.**

-

The operation of the cooler is based on the energy accumulated in the steel-spring lamellar spring, which by expansion and with the help of a speed multiplier, puts into operation, as a generator, a direct current machine with permanent magnets.

Description

The DC generator will produce a voltage of about 9 V at rated speed, used to supply a heating resistor in a heat exchanger for the commissioning of the cooling system using the freon as a cooling agent.

For other uses, a battery of about 9 V DC voltage can be attached to the portable cooler, used after charging in various uses; for example, to supply consumers with household lighting.

Class

14

VALEXAMA FARM

RO.327.

Title Method and device for recovering the kinetic energy produced during the braking process, for its reuse during the start-up process

Authors Vasile LOGHINESCU

Institution VALEXAMA FARM

Patent no. GB2591859

Description A method of recovering the kinetic energy from a compression braking process is achieved by transforming the mechanical work of cylinder 1 integrated in the engine block 3 of a vehicle, driven by crankshaft 2 by means of a connecting rod-crank mechanism 20, to produce a quantity of compressed air. The compressed air is directed through the pipes 5, 6, 8, homogenizing turbine 4, solenoid valve R2 and one-way valve 13 to a compressed air tank 15 which contains compressed air from an external source through the supply valve 16 at a minimum allowable pressure P_0 . The air is further compressed during the braking process until the pressure reaches a maximum allowable pressure P_S . The pressure is controlled by the overpressure safety valve 14 and the pressure sensor 21. The potential energy stored as compressed air in the tank can then be used to drive a crankshaft drive turbine 17 which rotates the crankshaft, during the start-up process of the vehicle.

Class

14

Vasile Turcu

RO.328.

Title	“Earth” type electric generator(with two rotors)
Authors	Turcu Vasile
Institution	Private researcher
Patent no.	Patent application no. a 2020 00396 from 13/07/2020 O.S.I.M.
Description	<p>The electric generator with two rotors (Earth type) is an alternator which has a dynamo in the center. On the outside is a fixed induced coil which generates alternative energy, like the alternator. The rotor is a dynamo that I turned into two rotors: the internal rotor which is the dynamo rotor and the external rotor which is the dynamo stator. The internal rotor is the induced that generates continuous electricity. The external permanent magnet rotor is the inductor for the internal rotor and the fixed coil. The internal rotor and the external rotor rotate in the opposite direction to each other. The mechanical energy consumed is water (hydropower plant), steam under pressure (thermal power plant), wind (wind), etc. For this prototype they opted for wind produced by two compressors. This generator generates about three times more power than the classic electric generator and the economic efficiency increases by about 50%.</p>
Class	2. Energy and sustainable development

A BETTER LIFE SOLUTIONS

RO.329.

Title

iSentinel® Safe City® earthquake intelligent protection and warning solutions for a safe community life

Authors

Mircea MANOLESCU

Institution

A BETTER LIFE SOLUTIONS

Patent no.

RO120284

Description

iSentinel® Safe City® is an array system of proactive, fully customizable Home / Immo / Industry / Infrastructure *iSentinel® earthquake intelligent protection and warning solutions*, with independent functioning at the individual level and connected as a network, optimized by real time AI feedback and VR support, providing the community safety by individual life saving, building, facilities and asset protection of individual houses, office buildings, blocks of flats, industry plants and community infrastructure.

Each unity, structured on three levels: detection / decision / execution, is fully independent and autonomous, able to protect the assigned objective in disaster conditions when part or the whole infrastructure is unfunctional (general blackout, no communications, part of buildings collapsed etc.).

All the protections are triggered seconds or tens of seconds before the arrival of the destructive wave of a major earthquake thus saving life and protecting the building from fires and explosions and preventing the destruction of building facilities, industrial equipment and the dangerous substances linkage, which are a threat for human life and for the environment.

iSentinel® Safe City® ensures physical protection in case of building collapse by individual multifunctional indestructible shelters integrated in the furniture both for residential and office or industrial environments and providing seconds or tens of seconds of warning before seismic movement begins. In case of building collapse, it provides life support until the rescue teams extrication.

iSentinel® Safe City® also offers protection against all the predictable and controllable risks for the community even between the earthquakes by connecting and communicating with other systems as the Fire Panel or the BMS (Building Management System).

Class

12

Răzvan Marius CATANĂ

RO.330.

Title **FAN ROTOR FOR TURBOFAN ENGINE**

Authors Costin Panaitescu Răzvan Marius CATANĂ

Patent no. RO 127764

Description

The invention is referring to a new fan rotor configuration and constructive solution, for turbofan engines, a fan rotor that is split in two different sections rotors, a section with fix pitch blades dedicated for engine primary flow, and a section with variable pitch blades dedicated for engine secondary flow. This new fan rotor is designed for a secondary flow optimization at different engine working regimes, in order to decrease the specific fuel consumption and to reduce the gas emissions of turbofan engine. The new fan rotor can be developed for the next generation of turbofan engines; currently a fan with variable blades is applied on engine demonstrator named ultra high bypass ratio (UHBR), by Rolls Royce engine manufacturer.

RO.331.

Title **MIXED TURBOFAN ENGINE WITH PRIMARY REVERSE FLOW**

Authors Răzvan Marius CATANĂ, Dorin Stanciu, Costin Panaitescu

Patent no. RO 130120

Description

The invention is referring to a new turbofan engine model, with a specific gasodynamic and spool configuration, a mixed flow turbofan, where the air mass for the primary flow is dragged separately than the air mass for the secondary flow, on different directions, and from different engine rotors, designed to increase the thrust, to reduce the engine noise level, and to reduce the specific fuel consumption. Currently a similar technical solution of invention, about gasodynamic and spool configuration, was applied for GE Catalyst turboprop, an advanced engine patented by General Electric engine manufacturer.

RO.332.

Title	STUDIES AND EXPERIMENTAL RESEARCH IN THE EVALUATION OF GAS TURBINE ENGINES OPERATING REGIMES BY TESTING ON THE TESTBENCH AFTER A SUPPLEMENTARY INSTRUMENTATION AND PROCESSING OF THE MEASURED DATA
Authors	Răzvan Marius CATANĂ, Ion FUIOREA
Institution	POLITEHNICA UNIVERSITY OF BUCHAREST THE FACULTY OF AEROSPACE ENGINEERING
Description	<p>The thesis presents a practical and simple technical solution of a particular model calculation for gas turbine engine operating regimes, with the mention that for the engine is known only the data from the takeoff regime, which is accessible and available for analytical simulation, with the purpose to be used for hand calculus or implemented in an accessible calculation software, without the need for using advanced numerical computing methods or other gas turbine engine performance simulation softwares.</p> <p>The analytical model calculation is based on an experimental data analysis method research of engine main parameters, from the minimum regime (idle) to the maximum regime (takeoff), for three different types of engines, a turboshaft (TV2-117A), a turboprop (AI-20M) and a turbojet (Viper 632-41), following engines experimentation on the test bench. The research method was based on parameters percentage (%) variation analysis, by reporting all main parameters (prm) from each regime (R) to the main parameter from the maximum regime (TO)</p>
Class	

Nicolae Nicusor**RO.333.****Title** **Water running engine****Authors** Nicolae Nicusor**Patent no.** Patent application no A00583/2017**Description**

This paper presents the necessary and sufficient details to it be making an engine mechanism what consist as main parts from a cylindrical water tank with a floating body, also cylindrical inside, and an exhaust pump with flexible membrane, pump situated next to the tank and positioned below its lower surface. The exhaust pump with flexible membrane works driven by elastic force of some springs or by a weight/ballast. The connection between the tank with the flexible membrane located next of the tank, will be assured by a lever, another component of the mechanism. This mechanism is complex, consisting of many other mechanical elements for connecting and maintaining movement and performing an operating cycle. The invention is destined to obtain mechanical work, implicitly energy, from any water source (stationary or flowing).

Class

Ion Cristescu**RO.334.****Title**

INSTALLATION FOR OBTAINING ETHYLS ESTERS AND GLYCERINE THROUGH PROCESSING SEEDS OF OLEAGINOUS PLANTS

Authors

ION CRISTESCU

Patent no.

Patent RO130217 B1/2021

Description

The invention refers to a chemical installation for obtaining ethyls esters synthetic fuels and glycerine through processing seeds. The parts components of installation: extractor module with recirculating turbine rotor in communication with separator filter of solid phase and vaporizer in vacuum of extractant solvent with condenser vapours solvent, the vegetable oil obtained enters a transesterification catalytic reactor module in communication with gravitational separator phases without miscibility ethyls esters – glycerine, ethanol excess, catalyzer, phase with miscibility enters into vaporizer in vacuum glycerine-ethanol what communication with condenser vapours. Basic catalyzer is in recirculating from vaporizer in transesterification catalytic reactor module with liquid ethanol through pressure difference. Advantages: - the extraction efficiency with organic solvent (heptane) for obtaining vegetables oils is more with 10% in comparison with mechanical pressing; - little time for extraction equilibrium in every step through recirculating purify solvent; - the efficiency catalytic process transesterification of glycerine esters from vegetables oils in ethyls esters fuels is 97%...98%.

RO.335.**Title**

REACTOR HYDROLYSIS FOR OBTAINING HYDROXYLS COMPOUNDS THROUGH BASIC HYDROLYSIS OF OILS SEEDS OLEAGINOUS PLANTS

Authors

Cristescu Ion

Patent no.

Patent RO 132191 B1/2021

Description

The invention refers to a reactor hydrolysis of oils seeds oleaginous plants, homogeneous chemical system for manufacturing liquid soap detergent composition and superior alcohol (glycerine). The parts components of reactor: cylinder thermal block (T) with basic hydrolysis cylinder compartment (1) of vegetables oils, is assembled a

recirculating rotor(2) ascending-descending reaction mass and compartment (1) is in communication with vacuuming compartment (3) condenser water vapours through pipe with tap(1e) and this compartment (3) is in communication with compartment (1) through pipe with tap(3)..Advantages: - growth thermal efficiently through heat transfer more 60% in comparison with reactor well-known; - productivity of reactor more with 10% in comparison with reactors well-known; - functional stability.

RO.336.**Title****Authors****Patent no.****CATALYTIC REACTOR FOR ESTERIFICATION
ION CRISTESCU**

Patent RO131161 B1/2021

Description

The invention refers to a catalytic reactor for esterification destination of production tributylphosphate(TBP) extractant for isotopics azotates of thorium,uranium,plutonium in nuclear chemical technology.This TBP is obtained from 1-butanol in esterification with phosphoric acid and sulphuric acid catalyzer.The parts components:catalytic module esterification(E) block cylindrical vertical(1) with heat exchanger for heating reaction mass of temperature of process.In this module(E) is assembled a rotor(2)for recirculating reaction mass.In thermal mantle of module(E) is assembled a turbine rotor(4) for recirculating thermal agent heated electrical thermoresistance(5),rotor(4) actioned in rotation with electromotor(3) together rotor(2).This module(E) is in communication with gravitational separator reaction mass(6) biphasic is in communication with condenser(8) for vacuuming in block reactor(1),separator(6),column(7) and exit mass TBP.Catalytic reactor has fractionating distillation column in vacuum(7) of reaction water and separating 1-butanol excess . Advantages: - growth conversion grade 1-butanol in TBP more 0,85; - realizes specific material consumption 0,92 kg butanol/kg TBP; - functional stability.

Constantin Croitoru

RO.337.

Title Process for obtaining a natural food sweetener from grapes and directly obtained sweetener

Authors CROITORU CONSTANTIN (SOLE AUTHOR)

Patent RO 131639 / 30.01.2018

Description

The invention relates to a natural grape sweetener and to a process for obtaining it. The sweetener is a rectified concentrated must similar to the original products, which differs from them by their high content in free varietal aromas of 5 ... 40 mg/l and precursors of varietal aromas of 0.12 g/l ... 0,6 mg/l. Its elaboration process includes antioxidant protection and grape processing with obtaining of pomace and separation of stems, refrigeration of pomace at 16...18 °C, enzymatic treatment with 3 ... 5 g of pectolytic enzyme preparation/hl pomace cooled, pressing the enzymatically treated pomace with the resulting of must fractions and the marc grapes, assembly of all the must fractions, strong sulphitation of the assembled must with 600 mg SO₂/l, sedimentation of bourbes, separation of the settling must, bentonization of settling must with 1.5 ... 2 g/l bentonite, rest necessary for the sedimentation of the suspensions for 3 ... 5 days, filtration of the clarified must, a possible additional bentonization of the must followed by a new filtration, correction of the free SO₂ content of the conditioned clear must up to the level of 450 ... 500 mg/l, temporary storage, rectification by ion exchange of clear must, concentration of rectified must by reverse osmosis, temporary storage followed by final physico-chemical control. This process protects the free varietal aromas and precursors aromas and ensures the multiplication of the initial contents of these aromas up to 4 times by reverse osmosis concentration, improving the sensory profile of the treated wines

RO.338.

Title Process for elaborating an assortment of malt must and malt must thus obtained

Authors CROITORU CONSTANTIN

Patent RO 131981 / 30.08.2018

Description

The invention relates to a process for obtaining a malt must having sensory qualities suitable for wine industry. The process uses pre-conditioned and maltified barley seeds, dry or wet grinding of dry malt, mashed-saccharification of the milled malt according to an original brewing diagram (bringing to 45 °C with 40 min maintenance and treatment with an enzyme preparation complex

based on α -amylase, endoprotase and β -glucanase at a dose of 2 ... 2.5 kg/t malt, progressive increase by 1 °C / min to 55 °C and maintenance 20 min, progressive increase with 1 °C/min to 63 °C with 60 min maintenance, progressive increase with 1 °C/min to 70 °C with 10 min maintenance, progressive increase with 1 °C/min up to 74 °C with maintenance 20 min and raising the temperature of 76 °C in order to separate the primary malt wort with an extract at least 11% and a pH at least 5.2 and the wort, treatment with hops with a partial dose of only 25 ... 30%, boiling for only 30 minutes, reconstitution with softened drinking water of the initial level of extract at least 8 % of the partly hops and partly boiled must malt, pH correction to the optimum value of 5 with citric acid and possibly cranberry juice, temporary biological stabilization with sulfur dioxide in doses of 150 mg/l and potassium sorbate in doses of 250 mg / l or sorbic acid in doses up to 200 mg/l, separating the resulting malt must.

RO.339.**Title**

Process for obtaining a low-alcohol cocktail-type beverage based on red wines and malt must and the beverage thus obtained

Authors

CROITORU CONSTANTIN

Patent

RO 131983 / 30.08.2018

Description

The low alcohol drink has 7 ... 8 % vol. alcohol, 10 ... 20 g/l reducing sugars, a total acidity of at least 4.5 g/l in tartaric acid, a maximum volatile acidity of 0.8 g/l in acetic acid, a non-reducing dry extract of minimum 25 g/l and maximum 180 mg/l total SO₂ of which at least 30 - 40 mg/l free SO₂, sorbic acid maximum 200 mg/l. It consists of 65 % red wines of noble varieties of which free run wines with over 13 % vol. alcohol up to 40 % and press wines at least 60 %, 34 ... 35% malt must obtained after a patented process and 0...1 % concentrated cranberry juice. The process includes making the raw blend based on the optimal microblending variant, choosing the container with height / diameter ratio ≤ 1.5 , transfer and homogenization of the blend components, rest of 2 ... 3 days in order to sediment the suspensions, circulation of the partially clarified liquid fraction from the precipitated sediment, sensory and physico-chemical control of the homogeneous crude blend, possible composition corrections in order to establish the final blend, ensuring protein stabilization with tannin and gelatin or only with bentonite, rest of 7. ...10 days required for suspension sedimentation, sediment filtration, tartaric stabilization by metatartaric acid treatment and biological stabilization by correction of sorbic acid content up to a maximum of 200 mg/l and total sulfur dioxide content up to a maximum of 180 mg/l, final filtration with plates and then with cartridges.

DFR Systems

RO.340.
Title
Installation for wastewater treatment by hybrid processes of biological treatment and photocatalysis
Authors

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Patent

Patent application No. A/00248/10.05.2022

Description

The invention relates to a wastewater treatment plant by combining two processes, the biological one with mobile artificial support (SAM) and the photocatalysis one. The aim of the invention is to improve / increase the efficiency of removal of organic pollutants from wastewater to CO₂ and H₂O by introducing two stages of degradation with synergistic effect, as follows:

- biological stage - which is based on the degradation of organic pollutants with the help of microorganisms and fixed biofilm technology - mobile artificial support (SAM).
- photocatalytic stage - which is based on the degradation of organic pollutants by photocatalysis performed by semiconductor nanoparticles of TiO₂ under the action of UV radiation. The principle of operation of the plant consists in the biological treatment of wastewater with the preliminary disposal of carbon compounds in the percentage of 75-95%, followed by the completion of the removal of carbon-based pollutants by photocatalysis, finally achieving an overall efficiency of 98-100% purification.

RO.341.

Title	Installation for removal of organic pollutants from wastewater based on photocatalysis and biological processes
Authors	Ileana Cristina COVALIU-MIERLĂ ¹ , Mihai NIȚĂ-LAZĂR ² , Ioana Corina MOGA ³ , Iuliana PAUN ² , Gigel PARASCHIV ¹ , Monica VAIDEANU ² , Alina BANCIU ² , Gabriel PETRESCU ³ , Adrian Gabriel TĂNASĂ ³
Institution	¹ University POLITEHNICA of Bucharest ² Research and Development Institute for Industrial Ecology ECOIND Bucuresti ³ DFR Systems SRL
Description	<p>An experimental installation for wastewater treatment was designed and built, consisting of 2 main basins, one for the biological treatment stage with biofilm carriers and a basin for photocatalysis.</p> <p>The efficiency of the removal of anionic surfactants on the installation was determined by the partners. The efficiency obtained after a retention time of 3 hours reached 80% for an analyzed surfactant. This removal percentage can be attributed to a mixed process of bacterial biodegradation and adsorption of surfactants on activated sludge due to the electrical charge interaction of anionic surfactants with activated sludge chemical compounds.</p> <p>This work was supported by a grant of the Romanian Ministry of Education and Research, CCDI - UEFISCDI, project number PN-III-P2-2.1-PTE-2019-0628, within PNCDI III.</p>



PARADIS INTERNATIONAL COLLEGE

Proiect clasa a IV-a Tornada

Materiale necesare:

- 3 plăci de polistiren gros;
- Spumă poliuretanică;
- Silicon;
- Licheni;
- Acrilice;
- Copaci, case din plastic;
- Bețe de frigărui;
- Spray colorant;
- Vată.

Etape de lucru

1. Colorarea bucăților de polistiren



2. Pregătirea vatei



3. Decorarea cu licheni, copaci, animale și fixarea luminilor



Proiecte clasa a XI-a
Galton board and the Normal Distribution

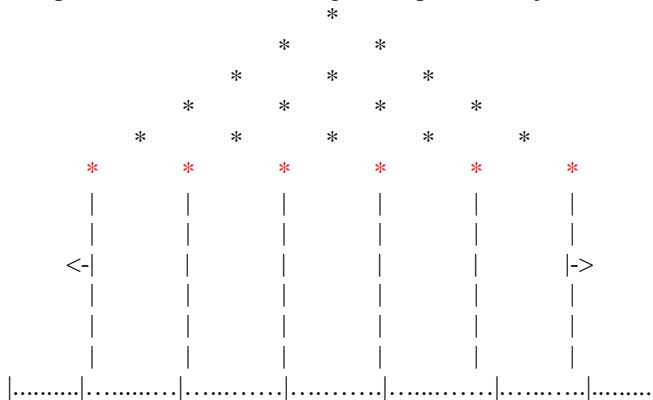


Materiale necesare:

- 3 plăci de polistiren gros;
- O placă de plexiglas;
- Silicon;
- Acrilice;
- Cuie de 12 cm;
- Spray colorant;
- Instalatie de brad.

Descriere proiect:

Haosul devine ordonat: bilele cad haotic sub acțiunea gravitației printre cuiele dispuse sub forma unui triunghi de tipul de mai jos



pe o placă suport și în cele din urmă bilele ajung în niște compartimente ocupând regiunea de sub o curbă numită clopotul lui Gauss. Spunem că bilele urmează sunt repartizate normal.

- Nu putem spune cum va cădea o singură bilă, sau 10 bile, sau 50 de bile, dar vom putea spune cu precizie că majoritatea bilelor vor ajunge în dreptul poziției din care au plecat (vârful triunghiului și 1 pas stânga-dreapta), iar restul vor ocupa cozile de sub curbă lui Gauss.
- Probabilitatea unui bile de a ajunge într-un anumit compartiment/urnă/fantă urmează o distribuție binomială.
- Aruncând 50 de bile, 100 de bile, 300 de bile etc., deci un număr suficient de mare atunci distribuția înălțimilor va aproxima o distribuție normală.

Placa lui Galton ilustrează astfel teorema limită central (miracolul lui Gauss) care ne spune că pentru un eșantion suficient de mare, distribuția binomială aproximează o distribuție normală.



Arta îmbinată cu știința

Folosind știința pentru a-și exprima latura artistică, elevii noștri din clasa a XI-a au conceput un sistem de „vizualizare” a muzicii.

O oglindă atașată unui difuzor a fost folosită pentru a proiecta un fascicul laser, iar vibrațiile oglinzii au făcut ca lumina să „daneze” pe ecran, pe pereți și pe tavan.



Glocken Droid

David Grigore a V-a A

Scopul proiectului este de a cânta automat la instrumentul muzical glockenspiele.

Este creat din piese LEGO Mindstorm EV3 și programat pe aceeași platformă.

Este compus din două brațe mobile și o cutie principală pentru control, astfel știind să cânte melodiile create din note și timpi.

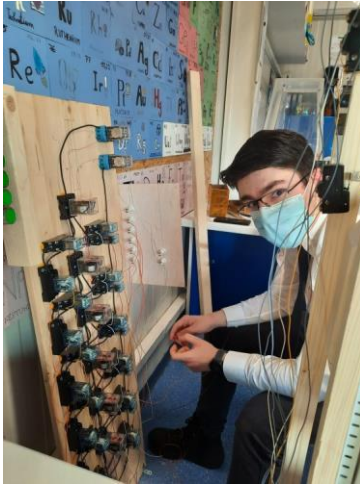


Liftul

Cristian Ghidireac a X-a

Apeși un buton și ai ajuns la etajul tau. Pare ușor, dar este întradevăr?

De ce este nevoie pentru a controla un lift? Cristian Ghidireac, elevul nostru din clasa a X-a a aflat și ne arată și nouă, cu un model al unui lift complet construit de el, cu propriul panou de control funcțional.



Becul lui Edison

Manole Darius Andrei – clasa a II-a A

Începând cu anul 1878, Edison a început să lucreze intens la conceperea unui sistem de iluminare electric care să poate fi folosit la scară largă – practic, ceea ce astăzi numim bec.

Primele becuri începuseră să apară încă de la începutul secolului 19; unii dintre cei mai de seamă oameni de știință ai lumii au creat câte o variantă, însă fiecare dintre acestea avea carențe serioase: fie durata de “viață” era mult prea scurtă, fie producerea lor necesita cheltuieli exagerate, fie aveau un consum de curent electric mult prea mare. Edison a reușit să ofere întregii lumi un echilibru între acestea.

Dacă forma pe care avea să o aibă becul și materialul din care era construit balonul (sticlă) erau certe, Edison avea o singură incertitudine: care este cea mai bună opțiune pentru materialul din care va crea filamentul. După o serie lungă de experimente, cel mai potrivit s-a dovedit a fi carbonul.

Astăzi, după aproape 143 de ani de la primul test al unui bec, Manole Darius Andrei va recrea acel moment, prin experimentul lui.



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27 May 2022

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Brandul EUROINVENT, susținut de Forumul Inventatorilor Români și de Europe Direct Iași, reprezintă un proiect modern, care a permis în ultimii 14 ani realizarea unei manifestări complexe, cu multiple ținte, adresându-se tuturor creatorilor de bunuri materiale și spirituale (inventatori, universitari, cercetători științifici, artiști etc.). S-a dorit acest lucru, pentru a atrage atenția guvernanților asupra faptului că inventica este un segment al creativității naționale, care asemănător artei și științei, trebuie să fie subvenționată de stat, iar brevetarea să fie gratuită. Mai mult, proprietatea intelectuală și cea industrială să fie protejate prin legi diferite, să nu mai existe sistemul de re-brevetare a invențiilor, ci doar cel de transfer tehnologic, sub formă de Patent (licența de aplicare).

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Această sărbătoare a științei, tehnicii și artei românești, organizată sub sigla „Zilele Europei la Iași”, se desfășoară prin implicarea tuturor actorilor și vectorilor sociali: studenți, cadre didactice universitare, cercetători, artiști, mass media, mediul de afaceri, autorități etc. Un aport deosebit în aceste manifestări îl au cele cinci universități de prestigiu ale Iașului, care s-au remarcat prin performanță și tradiție de-a lungul istoriei lor, fiind recunoscute atât în țară, cât și în străinătate ca principalii formatori de inteligență românească și surse veridice ale cercetării fundamentale și tehnologice performante. Implicarea celor cinci universități în toate edițiile de până acum a condus la formarea și dezvoltarea de lideri ai creativității în domeniile lor de specializare.

Prin aceste manifestări se dorește o participare activă, printr-o bună conlucrare și dialog între inventatori, studenți, specialiști din diverse domenii, artiști, mediul academic și cel industrial.

EUROINVENT înseamnă un eveniment complex alcătuit din: Salonul European de Invenții și Cercetare Științifică, Salonul de Carte și Salonul de Artă, un rol important avându-l Workshop-ul organizat sub sigla „Cercetarea tehnico-științifică în contextul contemporan european”, unde se dezbate teme actuale de cercetare și aspecte moderne ale celor trei tipuri de proprietate: intelectuală, industrială și culturală, având în vedere printre altele, stimularea actului de creație și protecția dreptului de autor.

În ultimii șase ani acest workshop, având genericul **„Cercetări științifice prin elaborări electivă”**, s-a alăturat Conferinței Internaționale de Cercetări Inovative - componentă principală a EUROINVENT-ului, cunoscută sub titlul: International Conference for Innovative Research (ICIR).

Cu ocazia zilelor dedicate inventatorilor sau instituțiilor de cercetare și de învățământ din țările participante la aceste manifestări, se vor prezenta sistemele actuale de transfer tehnologic, dinamica brevetării și alte aspecte privind ingineria creativității, respectiv rezultatele deosebite obținute de către școlile de invenție în formarea tinerilor.

Volumul de față cuprinde un număr de 13 lucrări elaborate de doctoranzi și masteranzi sub conducerea unor membri din comisiile de îndrumare a tezelor de doctorat și de dizertație, selectate de un grup de referenți, în acord cu direcțiile de cercetare din învățământul superior ieșean și cu evenimentele care vor fi marcate la a 14-a ediție a EUROINVENT.

Sub titlul **„Cercetarea românească în conext european”**, lucrările au fost grupate pe următoarele secțiuni: Știința Conservării Bunurilor de Patrimoniu Cultural și Natural, Științe Conexe, Invenție și Istoria Neamului Românesc. Au fost acceptate lucrări în limba română și engleză, cu o bibliografie recentă și selectivă.

Prof.univ.emerit dr. Ion SANDU,

Președinte de Onoare al Forumului Inventatorilor Români

Membru corespondent al Academiei Oamenilor de Știință din România

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International Conference on Innovative Research

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Iasi – Romania

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- Romanian Inventors Forum
- Faculty of Materials Science and Engineering, The “Gheorghe Asachi” Technical University of Iasi, Romania
- ARHEOINVEST Platform, Alexandru Ioan Cuza University of Iasi
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Keynote Speaker – Abilio P. SILVA

Keynote Speaker – Mohd Mustafa Al Bakri ABDULLAH

Invited Speaker – Yulia IVASHKO

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The poster features a background image of a large, ornate, light-colored building with multiple towers and spires, likely a historical or cultural landmark. The text is overlaid on this image. In the bottom left corner, there is a blue silhouette of a head profile facing right, filled with white stars, with a white lightbulb icon inside. A registered trademark symbol (®) is next to it.

ICIR EUROINVENT
International Conference
on Innovative Research
26-27 MAY 2022, Iași - Romania

Event organized under aegis of
EUROINVENT
European Exhibition of Creativity and Innovation

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