



**"TRAIAN VUIA" INTERNATIONAL EXHIBITION
OF INVENTIONS AND INNOVATIONS TIMISOARA
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**Stimați organizatori, invitați și colaboratori ai Universității de Științele
Vieții "Regele Mihai I" din Timișoara,**

Parafrazându-l pe Mircea Eliade care spunea că „Sensul existenței și datoria fiecărui om este creația”, consider că, în era tehnologiei și a comunicării, sensul existenței unui om de știință devine inovația. Ca rezultat al cercetării și transferului tehnologic aflate în creștere exponențială, inovarea aduce societății contemporane un progres fără precedent, cu un extraordinar potențial de dezvoltare în toate domeniile cunoașterii științifice.

În calitate de Rector al Universității de Științele Vieții "Regele Mihai I" din Timișoara, îmi exprim recunoștința de a conduce o instituție aflată într-un parteneriat deosebit de fructuos cu Societatea Inventatorilor din Banat, cu rezultate admirabile care ne-au condus astăzi la organizarea celei de-a XI-a ediții a Salonului Internațional de Invenții și Inovații „Traian Vuia ” Timișoara 2025.

Universitatea noastră abordează inovația ca rezultatul suprem al progresului științific, ca element de bază care aduce plus valoare maximă în societate, ca încununare a îmbinării fericite între cunoaștere, cercetare științifică, educație profesională și transfer tehnologic. Colectivul de cadre didactice și de cercetători al Universității pe care sunt onorat să o conduc, este deschis și implicat în proiecte și activități care au ca finalitate majoră invenția și, implicit, inovația.

În numele conducerii Universității de Științele Vieții "Regele Mihai I" din Timișoara, le mulțumesc membrilor Societății Inventatorilor din Banat pentru onoarea de a lucra în parteneriat cu instituția noastră și îmi exprim deschiderea și pentru implicarea în proiecte ulterioare. Îmi doresc și vă doresc să petrecem împreună trei zile pline de entuziasm, curiozitate și iluminare, sub semnul respectului față de valorile științifice în centrul cărora se situează oamenii și creșterea calității vieții acestora!

Cu deosebită considerație,

**Rector Universitatea de Științele Vieții "Regele Mihai I" din Timișoara, Prof. univ.
dr. ing. Cosmin Alin POPESCU**

Distinguished organizers, dear guests and collaborators of the University of Life Sciences "King Mihai I" from Timisoara,

Paraphrasing Mircea Eliade's words, "The meaning of existence and the duty of every human being is creation", I believe that, in the age of technology and communication, the fundamental purpose for being a scientist becomes innovation. As a result of exponential growth in research and technology transfer, innovation is bringing unprecedented progress to contemporary society, with extraordinary potential for development in all areas of scientific knowledge.

As the Rector of the University of Life Sciences "King Mihai I" from Timisoara, I express my gratitude for leading an institution working in a particularly productive partnership with the Society of Inventors from Banat. The admirable results we have achieved together have led to the organization of the XIth edition of the International Exhibition of Inventions and Innovations "Traian Vuia" Timisoara 2025.

Our university approaches innovation as the ultimate result of scientific progress, as a foundation element that brings maximum added value to society, as the actualization of the synergy between knowledge, scientific research, professional education and technology transfer. The team of teaching staff and researchers of the University, which I am honored to represent, is receptive and involved in projects and activities which target invention and innovation.

On behalf of the management of the University of Life Sciences "King Mihai I" from Timisoara, I would like to thank the members of the Society of Inventors from Banat for the honor of collaborating with our institution and to express our hope to join forces in further projects.

I hope we will spend together three days full of enthusiasm, curiosity and enlightenment, inspired by the respect for scientific values, at the core of which is the hope to improve the quality of human life!

Sincerely,

***The Rector of the University of Life Sciences "King Mihai I" from Timisoara
Prof. Eng. Cosmin Alin POPESCU***

Stimați participanți la cea de a XI-a ediție a Salonului Internațional de Invenții și Inovații” Traian Vuia” Timișoara 2025,

Dacă vechii greci se temeau de infinit și de necunoscut, în prezent, tendința este de a combina într-un mod nou, structuri deja existente, de a provoca în permanență mintea umană să producă elemente imprevizibile și originale.

Creativitatea este un proces complex, intuitiv și spontan. Elementul cheie în procesul creativității este OMUL!

În Universitatea de Științele Vieții” Regele Mihai I” din Timișoara, preocuparea pentru cercetarea științifică o însoțește pe cea didactică. Suntem mereu conectați la nou, la transformare, la informații care ne îmbogățesc experiența deja formată. Ne dorim ca rezultatele cercetărilor noastre să fie diseminate, așteptăm ca munca noastră să dea roade, să fie un progres, o invenție care să depășească definiția unui concept și să funcționeze.

Prin definiție, profesorul are menirea de a aprinde în sufletul fiecărui discipol, bucuria cunoașterii, dar și bucuria creației. Cultivarea gândirii inovatoare în învățământul universitar a devenit o permanentă preocupare.

Suntem onorați să fim organizatorii unui eveniment care celebrează cercetarea, inventica și care demonstrează că rezultatul colaborării reprezintă un flux permanent și reciproc de informație, noutate și progres. În acest context, îmi exprim gratitudinea pentru investirea în calitatea de Președinte a celei de a XI-a ediții a Salonului Internațional de Invenții și Inovații” Traian Vuia” Timișoara 2025, prețuirea pentru organizatori și parteneri, precum și admirația în fața inestimabilelor creații ale minții și dăruirii umane.

”A cerceta înseamnă a vedea ceea ce a văzut toată lumea și a gândi într-un mod în care nimeni nu a gândit”.

**Președinte SALON,
Prof. univ. dr. Narcisa MEDERLE
Universitatea de Științele Vieții” Regele Mihai I” din Timișoara**

Esteemed participants at the XIth edition of the International Exhibition of Inventions and Innovations "Traian Vuia" Timisoara 2025,

If the ancient Greeks feared the infinite and the unknown, today the tendency is to combine existing structures in a new way, constantly challenging the human mind to produce unpredictable and original elements.

Creativity is a complex, intuitive, and spontaneous process. The key element in the creativity process is THE HUMAN BEING!

The University of Life Sciences "King Mihai I" from Timisoara is concerned with scientific research as much as the didactic process. We are always connected to novelty, transformation, and information that enriches our already established experience. We want the results of our research to be disseminated, we hope our work may come to fruition, and be a breakthrough, an invention that goes beyond the conceptual phase and that works.

The teacher is meant to ignite in the soul of each disciple the joy of knowledge, but also the joy of creation. Cultivating innovative thinking in academic education has become a permanent concern of ours.

We are honored to be the organizers of an event that celebrates research, invention and demonstrates that the result of collaboration represents a permanent and reciprocal flow of information, innovation, and progress. In this context, I express my gratitude for being invested as a President of the XIth edition of the International Exhibition of Inventions and Innovations "Traian Vuia" Timișoara 2025, my appreciation for the organizers and partners, as well as my admiration for the priceless creations of the human mind and endowment.

"To research is to see what every one has seen and to think in a way that no one has thought."

***President of the Exhibition,
Prof. Narcisa MEDERLE,
University of Life Sciences "King Mihai I" from Timisoara***

Dragi prieteni,

Suntem onorați să deschidem ediția a XI-a a Salonului Internațional de Invenții și Inovații „Traian Vuia” Timișoara 2025.

Inventica este fundamentală în evoluția lumii, fără inventatori, omenirea ar fi pierit demult în luptele crâncene cu natura dezlănțuită.

Activitatea noastră, a organizatorilor și partenerilor, este justificată și binevenită, mai ales în aceste vremuri când statutul inventatorului este amenințat de interminabilele crize financiare, politice, medicale, precum și de invazia agresivă a kitsch-ului.

Timp de trei zile, Timișoara va fi din nou capitala inventicii românești, unde, inventatori și cercetători din țară și străinătate vor crea un spectacol tehnic, alcătuit din produse comerciale, prototipuri, machete, înregistrări video din mai multe domenii: mecanică, mașini, utilaje, informatică, electronică, construcții, securitate, salvare, materiale și echipamente menajere, agricultură, medicină, instrumente muzicale, alimentație, băuturi, sănătate, noutăți practice, protecția mediului, etc.

Am realizat o campanie de promovare a Salonului prin societăți comerciale, institute, instituții, școli, universități, pentru a arăta, la cât mai mulți oameni din toate categoriile, importanța evenimentului.

Societatea Inventatorilor din Banat este alături de Universitatea de Științele Vieții” Regele Mihai I” din Timișoara într-un parteneriat interactiv și funcțional ale cărui rezultate sperăm să fie încununate cu succes, iar ideile inovatoare prezentate la acest Salon să ajungă în circuitul economic.

”Cea mai mare performanță a mintii este creatia. Nu invenția ne face un popor măreț, ci felul în care ne folosim de ea”.

***Președinte Societatea Inventatorilor din Banat,
Ing. Inv. Remi RĂDULESCU***

Dear friends,

We are honored to open the XIth edition of the "Traian Vuia" International Exhibition of Inventions and Innovations Timisoara 2025.

Invention is fundamental in the evolution of the world, without inventors, humanity would have perished long ago in the fierce battle with nature.

Our activity, as organizers, is justified and welcome, especially currently, when the status of the inventor is threatened by the endless financial, political, medical crises, and the aggressive invasion of kitsch.

For three days, Timisoara will yet again be the capital of Romanian invention, where inventors and researchers from the country and from abroad will create a technical show, made up of commercial products, prototypes, models, video recordings from several fields: mechanics, machines, equipment, IT, electronics, constructions, security, household materials and equipment, agriculture, medicine, musical instruments, food, beverages, health, practical novelties, environmental protection, etc.

We carried out a campaign to promote the Salon to commercial companies, institutes, institutions, schools, universities, to show the importance of the event to as many people from diverse environments as possible.

The Society of Inventors from Banat and the University of Life Sciences "King Mihai I" from Timisoara are in an interactive and functional partnership, the results of which we hope will be rewarded with success, and the innovative ideas presented at this Salon will enter the economic circuit.

"The greatest achievement of the mind is creation. It is not the invention that makes us a great people, but the way we use it."

***President of the Society of Inventors from Banat,
Eng. Inv. Remi Rădulescu***

Stimați organizatori, participanți și invitați ai celei de-a XI-a Ediții a Salonului Internațional de Invenții și Inovații, „Traian Vuia”, Timișoara, 2025

Compania Romvac este unul dintre cei mai mari producători și distribuitori locali de vaccinuri și medicamente de uz veterinar din România, anul acesta împlinind jumătate de secol de existență. Cu o istorie marcantă pe piața veterinară, Romvac deține în portofoliul actual, peste 300 de produse biologice și medicamente care se adresează tuturor speciilor de animale crescute în România și care se vând atât pe piața internă, cât și internațională.

O coordonată a succesului nostru este și faptul că liniile noastre tehnologice certificate GMP, ne permit condiționarea produselor în toate formele: soluții injectabile, comprimate, pulberi etc.. Toată activitatea noastră este susținută și prin modernizarea spațiilor de producție și a laboratoarelor, dar și prin menținerea propriei rețele naționale de distribuție care cuprinde 36 de depozite teritoriale și 3 farmacii veterinare.

De-a lungul timpului, Compania Romvac și-a realizat produsele pe tehnologii proprii, unele unicat, nefiind necesară achiziționarea know-how-ului. Astfel, Romvac deține 18 brevete de invenție, toate utilizate în producție.

Unul dintre produsele care au marcat istoria companiei este vaccinul pentru boala tumorală la păsări, Romvac deținând brevetul de invenție pentru procedeul de preparare a vaccinului contra bolii Marek dintr-o tulpină de virus herpes de curcă. Acesta este primul vaccin contra unui proces tumoral de origine virală, folosit industrial la păsări. Cu ajutorul său, au fost vaccinate peste 100 de milioane de păsări, în România.

La fel de important este și brevetul privind obținerea vaccinului inactivat contra leucozei enzootice bovine și ovine și procedeul de preparare a acestuia. Deoarece acest vaccin s-a administrat cu succes la bovine și ovine, după modelul nostru publicat în revistele de specialitate, s-a realizat în Japonia, un vaccin care se folosește la oaie.

Tot Romvac deține și brevetul de invenție pentru un procedeu de obținere a unui vaccin contra parvovirozei canine, produs care se realizează și în prezent, în institut.

În anul 1982, s-a preparat un vaccin contra difterovariolei aviare, pentru care s-a folosit o tehnologie nou brevetată și recunoscută în literatura de specialitate.

Un alt procedeu brevetat este cel de preparare a vaccinului contra jigodiei la câine, care a fost admis pentru producție. Vaccinul contra bolii Carré se prepară și în prezent.

Romvac este cel care a produs primul vaccin anti-pasteurelic realizat în Europa și care s-a folosit industrial la păsările crescute în România. Pentru prepararea vaccinului anti-pasteurelic aviar, compania deține un procedeu brevetat. Acest produs este un mod prin care se dovedește că omul poate interveni în protecția animalelor contra unor germeni patogeni care produc boli grave la păsări.

Mergând pe principiul dezvoltării continue și nerenunțând nicio clipă la cercetarea științifică, compania noastră a trecut dincolo de granițele domeniului

veterinar, ajungând pe cel uman cu Oul hiperimun și gama de suplimente alimentare Imunoinstant, care sunt, de fapt, soluția împotriva rezistenței la antibiotice. Pentru realizările sale în acest domeniu, Romvac a obținut deja, 2 brevete de invenție pentru procedeul de obținere a IgY și metoda de evaluare imunobiologică a activității specifice a imunoglobulinelor din oul de găină, IgY.

Produsele Imunoinstant conțin imunoglobuline Y specifice, adică anticorpi ce acționează ținut preventiv și curativ împotriva virusurilor, fungilor și bacteriilor patogene, ajutând în același timp, la sporirea imunității organismului, mai ales în fața unor situații solicitante pentru sănătatea noastră, dar și în boli autoimune, precum psoriazisul pe care am reușit să îl vindecăm clinic. Unice și inovatoare, produsele Imunoinstant conțin IgY specifice care acționează împotriva infecțiilor urinare, genitale, respiratorii, gastrice, cutanate etc., provocate de 30 de agenți patogeni cu incidență mare în România, precum: Pseudomonas aeruginosa, Klebsiella pneumoniae, Salmonella spp., Escherichia coli, Enterococcus faecalis, Salmonella enteritidis, Salmonella typhimurium, Streptococcus mutans, Staphylococcus aureus, Streptococcus grup B, Helicobacter pylori, Clostridium difficile, Candida etc.

Activitatea de cercetare a științifică a Companiei Romvac s-a extins și asupra sectorului agricol, prin elaborarea unor produse prietenoase cu natura ca întreg – sol, aer, apă, plante, animale, oameni. Romvac a creat mai multe produse naturale pe bază de culturi bacteriene benefice și proteine bioactive din zer, cu rol probiotic, imunomodulator, bioconservant sau biofertilizator. Astfel, a apărut Rom-Agrobiofertil pe bază de 3 bacterii benefice existente în microflora solului, respectiv Azospirillum lipoferum, Azotobacter chroococcum și Bacillus megaterium. Certificat ECOCERT pentru culturi bio, biofertilizatorul Rom-Agrobiofertil NP este o alternativă ecologică pentru îmbogățirea nutritivă a solului, în vederea asigurării unui spor de producție la plantele cultivate.

Romvac și-a constituit povestea bazându-se pe cercetare științifică și inovație, elemente cruciale pentru progresul continuu al medicinei, pentru îmbunătățirea calității vieții oamenilor și pentru a face față provocărilor constante din domeniul sănătății globale. Inovația înseamnă progres și dezvoltare continuă pentru societate.

De aceea, organizarea celei de-a XI-a ediții a Salonului Internațional de Invenții și Inovații "Traian Vuia" Timișoara 2025, eveniment care promovează creativitatea, cercetarea științifică și inovația, reprezintă un demers nobil și demn de tot respectul nostru pentru inițiativa sa, dar și pentru diseminarea rezultatelor și utilității acestora, publicului larg.

**Președintele C.A. & Director General al Romvac Company S.A.
Dr. Viorica CHIURCIU, DVM, PhD**

Dear organizers, participants and guests of the XIth Edition of the International Salon of Inventions and Innovations, "Traian Vuia", Timișoara, 2025

Romvac Company is one of the largest local producers and distributors of veterinary vaccines and medicines in Romania, celebrating half a century this year. With a remarkable history on the veterinary market, Romvac produces today over 300 biological products and medicines for all animal species raised in Romania, which sell both on domestic and international market.

One of the keys to our success is the fact that our GMP-certified technological lines allow us to manufacture products in all forms of presentation: injectable solutions, tablets, powders etc. Our achievements are due to the modernization of production spaces and laboratories, as well as to our own national distribution network with 36 regional warehouses and 3 veterinary pharmacies.

Over time, Romvac Company has developed its products using proprietary technologies, some unique, without the need to acquire external know-how. Thus, Romvac holds 18 patents, all used in production.

One of the products that set a mark on our company's history is the vaccine for avian tumor disease, Romvac holding the patent for the preparation method of Marek disease vaccine from a turkey herpes virus strain. This is the first vaccine against a viral tumor disease, used on a large scale in poultry. The vaccine against Marek Disease was administered in Romania, to over 100 million birds.

Equally important is the patent for the inactivated vaccine against enzootic bovine and sheep leukosis and its preparation method. Due to the successful administration of this vaccine to cattle and sheep, a similar vaccine, based on our published formula in scientific journals, was developed and used in sheep, in Japan.

Romvac also holds the patent for a method of obtaining the vaccine against canine parvovirus, a product that is still produced in the institute.

In 1982, a vaccine against avian diphtheria was prepared, using a newly patented and recognized technology in the scientific literature.

Another patented method regards the preparation of the vaccine against canine distemper / Carré disease, still produced nowadays.

Romvac produced the first anti-pasteurella vaccine in Europe, used at large scale for poultry in Romania. Romvac also holds a patented method for the preparation of this vaccine, thus showing that humans can protect animals against pathogenic germs that cause serious diseases in poultry.

Always focused on scientific research and continuous development, our company has ventured beyond the veterinary boundaries, reaching human medicine field with the Hyperimmune Egg and the Imunoinstant food supplements, which are, in fact, the solution to overcome antimicrobial resistance. For its scientific achievements, Romvac has already obtained 2 patents for the method of obtaining Y immunoglobulin and also for the immunobiological evaluation method of the specific activity of IgY - egg yolk antibodies.

Imunoinstant products contain specific egg yolk antibodies that act preventively and curatively against viruses, fungi and pathogenic bacteria, also helping to increase body's immunity, especially when dealing with health challenges, as well as in autoimmune diseases such as psoriasis which we have managed to cure clinically. Unique and innovative, Imunoinstant products contain specific IgY that act against urinary, genital, respiratory, gastric, skin etc. infections caused by 30 pathogens with high incidence in Romania, such as Pseudomonas aeruginosa, Klebsiella pneumoniae, Salmonella spp., Escherichia coli, Enterococcus faecalis, Salmonella enteritidis, Salmonella typhimurium, Streptococcus mutans, Staphylococcus aureus, Streptococcus group B, Helicobacter pylori, Clostridium difficile, Candida etc.

Romvac's scientific research activity has also extended to the agricultural field, developing products environmentally friendly to soil, air, water, plants, animals and people. Romvac has created several natural products based on beneficial bacteria and bioactive whey proteins with probiotic, immunomodulatory, bioconservant effect and also effect of biofertilizer on plant growth. Rom-Agrobiofertil NP biofertilizer was created based on 3 beneficial bacteria existing in soil microflora, namely Azospirillum lipoferum, Azotobacter chroococcum and Bacillus megaterium. ECOCERT certified for organic crops, Rom-Agrobiofertil NP biofertilizer is an ecological alternative for nutrient enrichment of soil, to increase production in crops.

Romvac has built its story based on scientific research and innovation, crucial elements for the continuous progress of medicine, for improving people's quality of life and for being able to successfully face constant challenges in global health. Innovation means continuous progress and development for any society.

Therefore, the organization of the 11th Edition of the "Traian Vuia" International Exhibition of Inventions and Innovations Timișoara 2025, an event that promotes creativity, scientific research and innovation, represents a noble approach worthy of all our respect for its initiative and, also, for disseminating the results and their usefulness to the general public.

***CEO & General Manager - Romvac Company S.A.
Dr. Viorica CHIURCIU, DVM, PhD***

Dr. Viorica Chiurciu recomandă

imun instant G

supliment alimentar din Oul Hiperimun integral

- adjuvant împotriva a diferite infecții bacteriene și fungice
- adjuvant în diferite boli autoimune (psoriazis)
- adjuvant pentru imunitate
- cu anticorpi IgY specifici
- pulbere liofilizată
- pentru copii, adulți și vârstnici

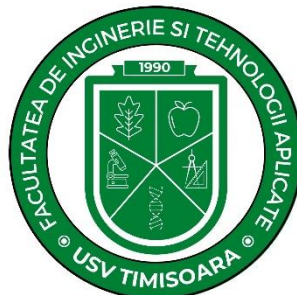
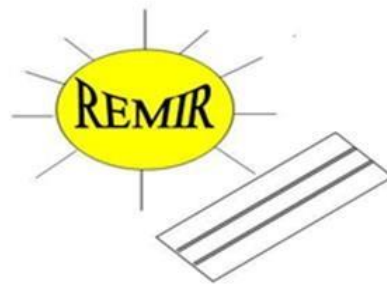


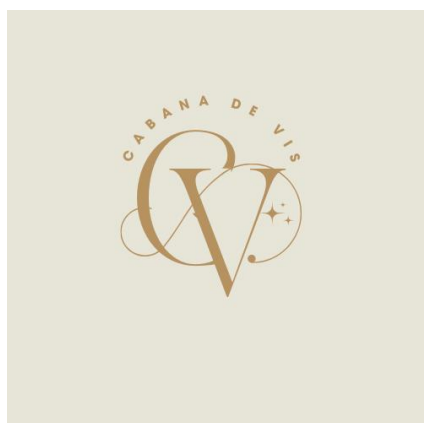
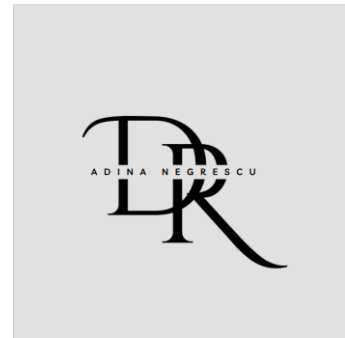
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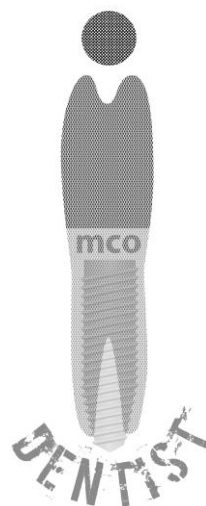
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Klebsiella pneumoniae
Salmonella spp.
Escherichia coli
Enterococcus faecalis
Salmonella enteritidis
Salmonella typhimurium
Streptococcus mutans
Staphylococcus aureus
Streptococcus grup B
Proteus spp.
Acinetobacter baumannii
Helicobacter pylori
Clostridium difficile
Candida albicans
Candida glabrata
Candida krusei
Streptococcus pneumoniae



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"ALEXANDRU IOAN CUZA" UNIVERSITY OF IASI, ROMANIA

SYNTHESIS AND APPLICATION OF NOVEL NANOPARTICLES FOR MICROPOLLUTANT REMOVAL

Category: Research project - PN-IV-P1-PCE-2023-0303

Authors: Andreea Elena Maftai, Mariana Neamțu, Brîndușa Drăgoi, Nicoleta Basoc

Description: Consumer demand for continuous products promotes industrial development, contributing to the release of dangerous and persistent pollutants into natural systems. The European Environmental Regulations for Water Quality intend to strengthen water quality standards and reduce the contaminant concentration in urban wastewater management. Therefore, expectations for wastewater treatment will increase, and eco-friendly materials should be feasible options for pollutant removal. In the last years, in wastewater treatment technologies, an increasing consideration has been given to advanced oxidation processes (AOPs) because they are effective at the removal of several emerging contaminants. Reactive Oxygen Species (ROS) play an important role in wastewater treatment processes and other biological, medical, and pharmaceutical practices. The photochromic characteristics of novel ionic liquid-functionalized spiropyrans provide an alternative method for removing pollutants from water. Therefore, the catalytic activity of spiropyran materials has been evaluated in the degradation of Bisphenol A (BPA), a contaminant frequently present in food containers, water bottles, and even within metal cans.

Class of Inventions: Environmental Protection and Energy

***CENTER FOR STUDY AND RESEARCH FOR AGROFORESTRY BIODIVERSITY
"ACAD. DAVID DAVIDESCU", ROMANIAN ACADEMY***

RESEARCH ON THE INSTITUTIONAL CAPACITY OF THE PUBLIC-PRIVATE PARTNERSHIP TO ACTIVELY CONTRIBUTE TO THE PERFORMANCE OF AGRICULTURE

Category: Research project

Authors: Gabriel Popescu, Ioana Corina Moga

Description: In the spirit of increasing the role of local stakeholders in the management of public policies, it is necessary to strengthen, consolidate, and develop institutional relationships based on public-private partnerships in agriculture. In this context, institutions founded on public-private partnerships play a decisive role in the knowledge market, by promoting elements of progress, mitigating the effects of natural risk factors, and supporting the development of smart, resilient, and diversified agriculture in both crop production and livestock sectors. All these efforts will lead to increased yields, as well as enhanced economic, social, and environmental efficiency. The project ADER 21.1.1/2023 aims to strengthen the institutional capacity of public-private partnership relations, as a foundation for enhancing competitiveness in agriculture, by developing and intensifying associative structures.

Class of Inventions: Agriculture and Horticulture

METHOD AND DEVICE FOR WATER SAVING IN WALL-MOUNTED BOILERS WITHOUT STORAGE AT START-UP FROM COLD STATE

Category: Patent - RO 131401 B1

Authors: Diaconu Bogdan, Cruceru Mihai, Popescu Luminița Georgeta, Racoceanu Cristinel, Jucan Ioan Daniel, Borcoși Ilie, Cruceru Vlad Ionuț, Anghelescu Lucica

Description: The invention relates to a device integrated on the domestic hot water pipe of a wall-mounted boiler, equipped with an automatic measuring, control, and command system, designed to eliminate water losses during the transient heating phase, when the temperature is not yet suitable for consumption. The device is activated upon detecting flow in the hot water pipe, triggered by the opening of a tap. Its operation is conditioned by the correct start-up of the pump (P), which initially circulates water through a test pipe (2) to verify the pressure regime. If this is within the required parameters, the discharge is switched to the recirculation pipe (1). After the temperature suitable for consumption is reached, circulation is directed through the wall-mounted boiler, and the device deactivates. The water savings obtained are proportional to the number of boiler start-ups from a cold state and vary depending on the boiler type, the cold-water temperature, and user behavior.

Class of Inventions: Environmental Protection and Energy

CORNELIUGROUP RESEARCH-INNOVATION ASSOCIATION

CORNELIUGROUP CAMP LEARNING IN NATURE

Category: Trademark - Educational program

Authors: Corneliu Birtok Baneasa & Team

Description: Starting from the concept of ""outdoor education"", Corneliu Group Camp - Learning in Nature aims to offer young people an optimal framework for the preparation of educational projects, in parallel with the development of the creative spirit and connection with nature. Another important part of Corneliu Group Camp – Learning in Nature project is environmental protection through implementation of Sustainable Development Goals.

Class of Inventions: Environmental Protection and Energy

DEXTER'S LABORATORY

Category: Trademark - Educational program

Authors: Corneliu Birtok-Baneasa & Team

Description: DEXTER's laboratory is an educational program of the CORNELIUGROUP research-innovation Association that supports students who want to carry out diploma projects with practical realization. CORNELIUGROUP provides students with the material base as well as specialized staff with extensive experience in the field of engineering. Creative projects, teaching materials, experimental stands for the construction of road vehicles designed and made by students for the laboratory study. Puma AIR by CORNELIU is a project carried out by students of the Faculty of Engineering Hunedoara-Politehnica University of Timișoara through the educational program Dexter's Laboratory supported by the Corneliugroup Research - Innovation Association. The goal is to transform a normal car into a sports car to participate in certain motor sports competitions.

Class of Inventions: Arts, Musical Instruments, and Educational Materials

WEEKEND INVENTIONS - AIR by CORNELIU

Category: Trademark - 106011/ 17.11.2009

Authors: Corneliu Birtok-Baneasa & Team

Description: Weekend inventions - Air by Corneliu, are creative-innovative concepts intended for a wide range of consumers and aim to increase the quality of life through the use of environmentally friendly products. The following products are part of the Weekend Inventions range:

- Soap AIR by CORNELIU, an explosion of imagination, originality, inventiveness, colors, harmony, scents and shapes;
- MicroU, multifunctional and ecological alternative to the glasses case, with the role of protection and, at the same time, of cleaning them, without resorting to wet wipes, which are difficult to recycle;
- BircoR, soap holder made of natural materials (rock) of different shapes and sizes. BircoR: reduces stress, improves dexterity, and brings us closer to nature;
- SeptoBirCor hand sanitizer, the hands are disinfected and, at the same time, hydrated, eliminating side effects such as dehydration, irritation and the appearance of skin cracks.

Class of Inventions: Healthcare, Medicine, and Cosmetics

**COUNTY CENTER OF EXCELLENCE – PRAHOVA
“ELIE RADU” HIGH SCHOOL, MUNICIPALITY OF PLOIEȘTI**

INTERACTIVE FACADES MADE WITH OPTICAL FIBER

Category: Research project

Author: Vlădescu Mihai Albert

Description: The project *“Optical Fiber Facades for Public Advertising”* presents an innovative approach that combines architecture with communication technology. Optical fibers integrated into building facades transform the static exterior into dynamic, luminous displays with both aesthetic and functional purposes. The systems transmit light discreetly and evenly, generating vibrant patterns, animations, and messages, while preserving the harmony of the building's design. The structures thus become living canvases, projecting content that captures public attention without overwhelming the urban landscape. Optical fibers distribute light efficiently, consuming much less energy than conventional advertising screens. External light sources, such as LEDs or laser diodes, power the fibers integrated into panels made of glass, polymers, or composite materials. The surfaces can shine with customizable designs, from static branding to animated sequences and interactive content controlled by sensors. The adaptability of the system makes it suitable for smart cities, where buildings interact with their environment and follow the principles of sustainability.

Class of Inventions: Architecture and Constructio

DFR SYSTEMS SRL

DEVELOPMENT AND VALIDATION OF A COMBINED TRI-COMPONENT INTEGRATED SYSTEM FOR WASTEWATER TREATMENT

Category: Research project

Authors: Ioana Corina Moga, Ovidiu Iordache, Bogdan Cazan, Gabriel Petrescu

Description: The project scope is the development of a combined wastewater (specific to textile and leather industry) treatment method, coupled with the execution of a customized innovative treatment installation, with high efficiency and versatility, overcoming the disadvantages of currently used physical-chemical treatment. The proposed technology relies on complementarity between three key components for reduction and breaking down of main pollutants in the treated wastewater volume. The three components refer to macromycetes strains, MBBR specific HDPE carriers and sonication treatment. Macromycetes strains will be immobilized on biofilm carriers, for mechanical biomass

fixation. High yields of biomass will be targeted, by macronutrients enhancement of growth rates. Several strains will be taken into consideration, such as: *Trametes versicolor*, *Pleurotus pulmonarius*, *Pleurotus ostreatus*, *Morchella importuna*, *Pleurotus eryngii*, *Pleurotus djamor*, *Pholiota nameko*, *Pholiota adiposa*, *Lentinula edodes*, *Ganoderma lucidum*, *Ganoderma lingzhi*, *Flammulina velutipes*, *Fusarium oxysporum*, *Ceriporus squamosus* etc. Biotreatment will be closely followed by sonication process that will be used for destruction of both microbial load in the treated wastewater, yielding a post-sterilizing effect after the first treatment stage, and disruption of organic matrixes that are difficult to degrade.

Class of Inventions: Environmental Protection and Energy

INNOVATIVE FLOTATION INSTALLATION WITH HYBRID ECOLOGICAL NANOMATERIALS, USED IN WASTEWATER TREATMENT

Category: Research project

Authors: Ioana Corina Moga, Ileana Cristina Covaliu-Mierla, Gigel Paraschiv, Gabriel Petrescu

Description: The project aims to develop an innovative technology for treating industrial wastewater heavily loaded with fats and colloidal particles, using a flotation process supported by hybrid eco-friendly nanomaterials. The proposed technology advances from experimental validation to the design and testing of a pilot installation capable of treating up to 50 m³/day of industrial wastewater. The technical solution is based on dissolved air flotation, enhanced through a fine-bubble diffusion system and the addition of eco-friendly magnetic nanomaterials. These stabilize the foam and retain pollutants, preventing recontamination of the water. The nanomaterials can later be recovered through their magnetic properties, regenerated, and reused, increasing both efficiency and sustainability of the process. Key advantages include achieving a very high pollutant removal efficiency (96–100%), recovery and reuse of nanomaterials, reduced environmental impact, and the generation of patentable know-how that provides a competitive advantage in the wastewater treatment market. Furthermore, the proposed solution combines technical performance with economic and environmental benefits, offering a superior alternative to conventional wastewater treatment methods.

Class of Inventions: Environmental Protection and Energy

DRUGON INTERNATIONAL SRL; THE NATIONAL INSTITUTE FOR LASER, PLASMA & RADIATION PHYSICS (INFLPR)

ENHANCEMENT OF CUTTING TOOLS SURFACES FOR DRY/WET MACHINING OF WOOD BY HARD COATINGS DEPOSITION

Category: Research project - PN-IV-P7-7.1-PED-2024-1580, within PNCDI IV (project no. 95PED/2025-DURUZ)

Authors: C.P. Dragomir, E. Grigore, D.M. Vranceanu, F. Baiasu, M. Gherendi, M. Mocanu

Description: Dry machining of wood or wooden furniture is highly challenging due to high-speed operations and the composite-like nature of wood, which contains fibers and knots. These factors cause mechanical shocks and tool overheating, leading to surface damage and tool failure. This project aims to enhance the durability and performance of cutting tools used in the wood industry by developing a duplex surface treatment. The approach involves applying TaN and (Ta,Al)N thin film coatings (2–10 µm thick) on tools that have undergone plasma nitriding. These coatings will be deposited using HiPIMS (High Power Impulse Magnetron Sputtering). After optimizing the process, the treated tools will be tested under real working conditions, and results will be compared to those from uncoated tools to evaluate performance improvements.

Class of Inventions: Mechanics, Industrial Processes, and Metallurgy

***"GEORGE EMIL PALADE" UNIVERSITY OF MEDICINE, PHARMACY, SCIENCE AND
TECHNOLOGY OF TARGU MURES***

**FOODSTUFF AS ADJUVANT IN PREVENTION/TREATMENT OF NON-ALCOHOLIC HEPATIC
STEATOSIS**

Category: Patent - 2024000412

Authors: Irina Matran, Claudia Bănescu, Rodica Talmaci

Description: An adjuvant food has been developed in the prevention and/or treatment of non-alcoholic fatty liver disease. The new food is prebiotic, with high protein content and low glycemic index. It does not contain dyes, preservatives, gluten or lactose. It prevents non-alcoholic fatty liver disease by decreasing liver enzymes: aspartate aminotransferase, alanine aminotransferase, alkaline phosphatase, total cholesterol and blood sugar. The new food can be consumed in the car, office, subway, or traditionally, in the family. The evaluation of the efficacy of the new innovative food was verified preclinically, on male and female Sprague-Dawley rats, of the same age. All approvals were obtained according to national and European legislative regulations. Both the ingredients and the packaging of this food contribute to the achievement of the Sustainable Development Goals (SDGs), respectively the transition of innovations/intellectual property to sustainability.

Class of Inventions: Healthcare, Medicine, and Cosmetics

NATURAL VEGAN PREMIXES FOR APPETIZER OR DESSERT MUFFINS

Category: Patent application - A/00341/ 2025

Authors: Irina Matran, Stefania Serban, Claudia Banescu

Description: The technical problem solved by the invention consists in establishing the natural components and association ratios within three premixes for appetizer or dessert type muffins, prebiotic, gluten-free, lactose-free, added sugar and ammonium bicarbonate. By applying the invention, the following advantages are obtained: prebiotic food, muffins can be served as an appetizer or dessert, rich in protein and fiber, it is 100% vegan, can be certified as a "Vegan" food, can be certified organic, Halal or Kosher, does not contain dyes and preservatives, does not contain gluten or lactose, does not contain added sugar, does not contain palm or sunflower oil, does not contain synthetic additives that can cause adverse reactions or interactions with medications. The muffins prepared with these premixes can also be consumed by people who have prediabetes or type 2 diabetes, or by children and adults who have gluten or lactose intolerance, or have irritable bowel disease. The premixes and/or muffins do not contain ammonium bicarbonate. The muffins manufactured/prepared with these premixes, according to the recommended technological indications, have a low acrylamide content. The ingredients are sustainable. They do not require special conditions (refrigeration/freezing) for storage. To obtain the muffins, chicken eggs can be added, and for people who follow a vegetarian/vegan diet, vegan egg powder can be added.

Class of Inventions: Healthcare, Medicine, and Cosmetics

"GHEORGHE ASACHI" TECHNICAL UNIVERSITY OF IASI

**BIOCOMPATIBLE TITANIUM-BASED ALLOY WITH THE ADDITION OF MOLYBDENUM,
ZIRCONIUM, AND TANTALUM**

Category: Patent application - 132/2024

Authors: Bălțatu Mădălina Simona, Vizureanu Petrică, Geantă Victoraș, Ștefănoiu Radu, Voiculescu Ionelia, Sandu Andrei Victor

Description: The invention is about making a new titanium-based alloy called TMZT, which comes from the Ti15Mo7ZrxTa system (where x can be 5, 10, or 15), designed for use in medicine, particularly for orthopedic implants. The controlled choice of alloying elements—molybdenum, zirconium, and

tantalum—gives the material a set of excellent properties: excellent biocompatibility, high mechanical strength, and a modulus of elasticity close to that of human bone (51.93–76.88 GPa), thus reducing the risk of stress and bone resorption.

Class of Inventions: Healthcare, Medicine, and Cosmetics

ARTIFICIAL MULTI-USE SELF-CONTROLLED HALOCHAMBER IN DYNAMIC REGIME

Category: Patent - RO134028

Authors: Sandu I.G., Sandu A.V., Sandu I., Earar K., Vasilache V., Știrbu C.M., Balan G., Crișan Dabija R.A., Chirazi M., Vladescu A., Cotrut M.C.

Description: The halochamber has a boiler that is provided with a blower and an closing/opening channel system produces water vapour. The optimal concentration of solions is reached in the halochamber controlled by a sensor that is connected to a microcomputer which allows modification of flow-rate of water vapours for bubbling and the other working parameters of the chamber. The volume of saturated solution in the bubbling device is higher than 1/10000 of the chamber volume. A bubbling device vessel is provided at top of a limewood grate with a mesh size to retain the bubbling splashes. The salt solutions are provided at the limit of the saturation level with a temperature ranging between 60 and 80 degrees C and the bubbling flow-rate is controlled to form fine drops which partially touch the grate.

Class of Inventions: Healthcare, Medicine, and Cosmetics

Individual person

MANDALA

Category: Research project

Author: Berghian Gabriela

Description: A mandala is a complex abstract design that usually has a circular form. In fact, “mandala” is a Sanskrit word meaning “circle.” Mandalas generally have an identifiable central point from which a variety of symbols, shapes, and figures radiate. They may contain both geometric and organic forms. Mandalas can also include recognizable images that hold meaning for the person creating them. Essentially, mandalas represent the connection between our inner world and external reality. Creating your own mandalas can be both inspirational and therapeutic. Mandalas, painted in the dot technique with acrylic paints. Hand-painted artworks on wood, glass, and ceramics.

Class of Inventions: Arts, Musical Instruments, and Educational Materials

INSTITUTUL NAȚIONAL DE CERCETARE – DEZVOLTARE PENTRU CHIMIE ȘI PETROCHIMIE- ICECHIM BUCHAREST

COMPOSITE BASED ON RAW MATERIALS OF NATURAL ORIGIN FOR THE ADSORPTION OF HEAVY METALS AND PROCESS FOR OBTAINING IT

Category: Patent application - A000334/30.07.2025

Authors: Radu Claudiu Fierascu, Irina Fierascu, Toma Fistos, Anda Maria Baroi, Ioana Silvia Hosu, Roxana Ioana Matei, Irina-Elena Chican

Description: The present invention relates to a composite material and a process for its production, intended for the removal of heavy metals from aqueous media, especially at low concentrations and

under real conditions of use. The proposed material consists of an active layer obtained by combining materials of natural origin – hydroxyapatite, vermiculite and perlite – each bringing specific functional contributions to the overall performance of the adsorption system. Through the synergy of these natural components, a superior efficiency of heavy metal removal is provided under real contamination conditions (variable pH, presence of other competing ions, ambient temperature, etc.). The process is suitable for industrial and/or municipal applications. Acknowledgment: The authors gratefully acknowledge the support of the Ministry of Research, Innovation and Digitization (Ministry of Education and Research, National Authority for Research) through the PN 23.06 Core Program – ChemNewDeal, project no. PN 23.06.01.01 – AquaMat, within PN IV.

Class of Inventions: Environmental Protection and Energy

TRANSDISCIPLINARY APPROACH FOR THE MODERN FORMULATION OF CONSTRUCTION MATERIALS, A PARADIGM SHIFT IN THE PROTECTION OF IMMOVABLE CULTURAL HERITAGE

Category: Research project - 77PED/2025, PN-IV-P7-7.1-PED-2024-0286

Authors: Irina Fierascu, Adriana Moanta, Radu Claudiu Fierascu, Toma Fistos, Ionela Petre, Jenica Paceagiu

Description: The main scientific objective of the project ConstructHer is to propose a promising, cost-effective and environmentally friendly alternative to the currently used solutions, with multi-valent use (both for cultural heritage protection and for civil constructions with special requirements, such as hospitals, etc.) based on development of technologies for obtaining constructions materials (plastering mortars, cement, plaster) with biocidal and photocatalytic properties, due to its enrichment with natural compounds and metallic nanoparticles obtained via “green chemistry routes” from natural resources (plant extracts). This work was supported by the Ministry of Research, Innovation and Digitization (Ministry of Education and Research, National Authority for Research), CCCDI - UEFISCDI, project number PN-IV-P7-7.1-PED-2024-0286, contract 77 PED/2025, within PNCDI IV.

Class of Inventions: Laboratory and Chemical Industry

INNOVATIVE APPROACH FOR THE PROTECTION OF MEDICINAL AND AROMATIC PLANT CROPS – BETWEEN CIRCULAR BIOECONOMY AND NANOTECHNOLOGY

Category: Research project - 85 PED/2025, PN-IV-P7-7.1-PED-2024-0318

Authors: Radu Claudiu Fierascu, Daniela Ionescu, Irina Fierascu, Anda Maria Baroi, Irina Elena Chican, Justinian-Andrei Tomescu, Stefan Buhaev, Cristina Mihaela Luntraru

Description: Combining natural extracts and nanomaterials can result in synergistic effects (where the antimicrobial properties of metals complement the biostimulant activities of plant-derived compounds), amplifying the benefits of both approaches. Thus, incorporating plant-derived compounds into nanocarriers can enhance their stability and bioavailability, ensuring a more sustained and effective delivery to plants. This integrated approach holds great potential for sustainable and efficient agriculture. This synergy creates a balanced formulation that not only protects plants from pathogens, but also enhances their overall growth and resilience. The project BioEcoNan proposes a circular approach for the protection and enhancement of medicinal and aromatic plant crops, in which the vegetal wastes of a plant are used to develop modern tools for its own protection. This work was supported by the Ministry of Research, Innovation and Digitization (Ministry of Education and Research, National Authority for Research), CCCDI - UEFISCDI, project number PN-IV-P7-7.1-PED-2024-0318, contract 85 PED/2025, within PNCDI IV.

Class of Inventions: Agriculture and Horticulture

**BEE-HIVE BASED ACTIVE PRINCIPLES INTENSIFIED EXTRACTION AND SMART
ENCAPSULATION FOR CONTROLLED RELEASE: A SYNERGISTIC BIOECONOMY AND
BIOENGINEERING APPROACH - BeeProdCaps**

Category: Research project - 86PED/2025, PN-IV-P7-7.1-PED-2024-0973

Authors: Cristina Emanuela Enăscuță, Manuel Drugulescu, Irina Fierascu, Elena-Emilia Sîrbu, Radu Claudiu Fierascu, Vasile Lavric

Description: The project goal is represented by the development and validation of an efficient laboratory technology for the extraction and encapsulation of active principles from bee products. The capsules, containing active compounds with a time-controlled release profile, should also have appropriate qualities for human consumption as nutraceuticals. Also, through this project proposal, a new direction of research in terms of obtaining new nutraceutical products will be opened, by developing new innovative methods of extraction, separation and microencapsulation of bioactive compounds. This work was supported by the Ministry of Research, Innovation and Digitization (Ministry of Education and Research, National Authority for Research), CCCDI - UEFISCDI, project number PN-IV-P7-7.1-PED-2024-0973, contract 86 PED/2025, within PNCDI IV.

Class of Inventions: Healthcare, Medicine, and Cosmetics

**BIMODAL SENSORS: NEXT GENERATION METHOD FOR STUDYING REDOX SIGNALING IN
PLANTS AND SCREENING BIOSTIMULANT POTENTIAL FORMULATIONS APPLIED TO
PLANTS - EC-SER(o)S**

Category: Research project - 66PED/2025, PN-IV-P7-7.1-PED-2024-1966

Authors: Ioana Silvia Hosu, Anda Maria Baroi, Irina Fierăscu, Radu-Claudiu Fierăscu, Ionuț Coca

Description: In the context of increasing food demand and population, the EC-SER(o)S project aims to create a low-cost analytical method, using bimodal sensors for powerful reactive oxygen/nitrogen species (ROS/RNS), for studying redox signaling, in plant-related samples (untreated vs. treated, absence vs. presence of abiotic stress). The tools are electrochemistry (EC) and Surface Enhanced Raman Spectroscopy (SERS), using metal phthalocyanine-based materials.

This work was supported by the Ministry of Research, Innovation and Digitization (Ministry of Education and Research, National Authority for Research), CCCDI - UEFISCDI, project number PN-IV-P7-7.1-PED-2024-1966, contract number 66PED/2025, within PNCDI IV.

Class of Inventions: Agriculture and Horticulture

**BIO-INSPIRED SYSTEMS BASE ON INTERFERENCE PIGMENTS USED AS EXTENDED UV-
LIGHT SHIELDING MATERIALS, BISUVSHIELD**

Category: Research project - 117PED/2025, PN-IV-P7-7.1-PED-2024-0838

Authors: Florentina Monica Raduly, Teodor Panait

Description: Chronic over exposure to ultraviolet (UV) radiation and high-energy visible (HEV) light, including blue light, leads to potential degenerative changes such as various types of skin cancer and eyes damage. The BISUVSHIELD project aims to develop hybrid materials functioning as UV and HEV radiation blockers, by exploiting the synergy between the antioxidant and absorbing properties of natural extracts and the reflective properties of inorganic materials. These new materials derived from *Taraxacum officinale* / *Trifolium pratense* L. extracts and mica mineral can be incorporated into multicomponent matrices (emulsion systems or polymer composites), with potential applications in fields such as cosmetics, optics, coatings, packaging, and textiles. The final products containing such hybrid materials will have a direct impact on the fields of health and environmental protection. This work was supported by the Ministry of Research, Innovation and Digitization (Ministry of Education and Research, National Authority for Research), CCCDI - UEFISCDI, project number PN-IV-P7-7.1-PED-2024-0838, within PNCDI IV.

Class of Inventions: Healthcare, Medicine, and Cosmetics

DEVELOPMENT OF ECO-FRIENDLY SOLUTIONS BASED ON SILANES AND NANOPARTICLES FOR BUILDINGS AND HERITAGE CONSOLIDATION

Category: Research project - 47 PTE/2025, PN-IV-P7-7.1-PTE-2024-0522

Authors: Madalin Vasile Coman, Radu Claudiu Fierascu, Denisa Ficai, Ionel Claudiu Badea, Andrei Dragos Marcu, Roxana Ioana Matei, Irina Fierascu, Irina Elena Chican, Cristian-Andi Nicolae, Ludmila Motelica, Roxana Doina Trusca, Ovidiu Cristian Oprea, Anton Ficai

Description: The structures of buildings and monuments (those belonging to cultural heritage being a particular case of interest) are susceptible to deterioration caused by natural forces (such as weather, earthquakes and erosion), but also those resulting from anthropogenic actions. Climate change amplifies these risks, underlining the urgency of implementing strengthening measures to mitigate the impact on the environment. The goal of the project NanoConsol is the transfer and development of a consolidation technology (based on innovative nanomaterials with self-repairing properties and antimicrobial effect), dedicated to different types of materials in the composition of buildings and monuments (especially immovable heritage objects), to an economic agent with experience in creating and applying solutions for the consolidation of such objects, in order to increase its economic competitiveness, as well as its implementation in target sites, in an integrated monitoring/consolidation technology, with the ultimate goal of achieving a viable technology for the consolidation of heritage buildings. This work was supported by the Ministry of Research, Innovation and Digitization (Ministry of Education and Research, National Authority for Research), CCCDI - UEFISCDI, project number PN-IV-P7-7.1-PTE-2024-0522, contract 47 PTE/2025, within PNCDI IV.

Class of Inventions: Architecture and Construction

MULTIFUNCTIONAL MATERIAL BASED ON DIATOMITE, PROCESS FOR OBTAINING IT AND PRODUCTS MADE FROM IT

Category: Patent application - RO138010 A2

Authors: Oancea Florin, Badju Stere, Constantinescu-Aruxandei Diana, Tritean Naomi, Deșliu-Avram Mălina, Lupu Carmen, Trică Bogdan

Description: The invention relates to a multifunctional material based on diatomite and to a process for obtaining it, for the production of filtering additives, NPK fertilizers for soil treatment or foliar treatments, for conditioning different microorganisms, or for obtaining phase-change materials for active thermal insulation. The material according to the invention is in the form of granules with sizes ranging between 2.2...8.4 mm, with permeability between 0.25...2 darcy, and consists of the following components expressed in weight percentages: 84.7...91.7% diatomite, 4.3...10.8% eggshells, 3.2...3.6% sodium alginate, 0.8...0.9% polyvinyl alcohol, and has a content of < 500 mg/kg soluble calcium ions and < 80 mg/kg soluble iron ions.

Class of Inventions: Agriculture and Horticulture

FILM-FORMING COMPOSITION WITH FOLIAR APPLICATION BASED ON NATURAL SILICON NANOMATERIALS AND METHOD OF APPLICATION

Category: Patent - RO135626 B1

Authors: Oancea Florin, Constantinescu-Aruxandei Diana, Dimitriu Luminița, Lupu Carmen, Șomoghi Raluca, Ghiurea Marius

Description: The invention relates to a film-forming composition with foliar application based on natural silicon nanomaterials and to a method of applying it. The composition, according to the invention, comprises 82...84 g of natural silicon nanomaterial ground to a size of 10 μm , 12...15 g of chitosan nanoparticles grafted with 120...150 mg of ferulic acid, 2...3 g of lecithin, 11...12 mg of selenium nanoparticles, the remainder up to 100 g being residual water. The method, according to the invention, consists in applying a 1% suspension of the composition according to the invention, in a spraying form

that varies between 400 and 600 l/ha, by using electrostatic spraying devices that generate droplets of 80...120 µm in diameter, charged by applying a pulsating electric field of 4 kV.

Class of Inventions: Agriculture and Horticulture

PLANT BIOSTIMULANT COMPOSITION BASED ON WOOL, AND METHOD OF OBTAINING IT

Category: Patent - RO133240 B1

Authors: Oancea Florin, Călin Mariana, Constantinescu-Aruxandei Diana, Răut Iuliana, Doni Mihaela, Arsene Melania Liliana, Jecu Maria-Luiza

Description: The invention relates to a plant biostimulant composition and to a method of obtaining it. The composition according to the invention consists, in weight percentages, of 36...38% wool, 40% wheat straw, 9.75...11.7% concentrated vinasse, 0.9% lactic acid, and the remainder residual water. The method according to the invention consists of chopping and drying the wheat straw and wool to a maximum moisture content of 10%, mixing them with a mixture of vinasse and 80% lactic acid at 45...60°C for 4...6 hours, followed by granulation by drying the mixture at 90°C for 2 hours under a vacuum of 0.5 bar, and compacting by pressing, resulting in pellets with a density of at least 750 kg/m³.

Class of Inventions: Agriculture and Horticulture

"ION MINCU" UNIVERSITY OF ARCHITECTURE AND URBAN PLANNING

RESILIENT ARCHITECTURE: CONSTRUCTIVE SOLUTIONS FOR AREAS WITH FLOODING OR EXTREME TEMPERATURES

Category: Research project

Author: Vlădescu Maria Sarah

Description: This project explores architectural strategies that respond to the accelerating impacts of climate change—rising floods, intensifying storms, and extreme heat. It investigates floating and adjustable foundations that allow buildings to remain operable during floods, thermo-reflective materials and phase-change systems that passively regulate indoor temperatures, and storm- and impact-resistant envelopes capable of withstanding winds exceeding 200 km/h. Beyond the building scale, the research emphasizes urban integration, proposing relocatable modular housing, reflective energy-efficient roofs with solar panels, and green buffer zones that absorb excess water. Case studies from the Netherlands, Singapore, and Florida demonstrate that these technologies are already feasible and scalable. The project ultimately argues that resilient architecture must combine structural engineering, materials science, and adaptive urban design, offering a pathway toward safer, more sustainable cities under future climate scenarios.

Class of Inventions: Architecture and Construction

"IULIU HAȚIEGANU" UNIVERSITY OF MEDICINE AND PHARMACY CLUJ NAPOCA

PHOTOCHEMOPROTECTIVE CREAM AND ITS OBTAINING PROCEDURE

Category: Patent - 127719 / 2016

Authors: Gabriela Adriana Filip, Postescu Ion Dan, Maria Perde-Schrepler, Marcela Achim, Simona Clichici, Șoimita Suci, Pirooska Virag, Eva Fischer Fodor, Corina Tatomir, Gabriela Cherecheș, Olga Sorișău, Doina Daicoviciu, Ioana Brie, Otilia Barbos, Remus Moldovan, Tiberiu Dicu, Adriana Mureșan

Description: The inventions refer to the content of a cream, oil-in water emulsion for topical application with photochemoprotective properties, in the cosmetic field, designed to protect the skin against the noxious effects of ultraviolet radiation and also to two procedures of their obtaining. The inventions combine a natural extract obtained from Vitis Vinifera grape seeds, the Burgund Mare variety, and

simple and cheap ingredients for the cream, which assure a good penetration of the extract in the skin and also improve the texture of dry/normal skin, are noncomedogenic and maintain their moisturisation.

Class of Inventions: Healthcare, Medicine, and Cosmetics

EQUIPMENT AND PROCEDURE FOR PROCESSING AQUEOUS SOLUTIONS WITH APPLICATIONS IN SEVERE INTRA-ABDOMINAL INFECTIONS

Category: Patent - 128343 / 2017

Authors: Al Hajjar Nadim, Pițu Flaviu, Ceclan Cornel, Suarășan Radu Emil, Suarășan Ilie

Description: The invention relates to equipment and a method for processing aqueous solutions for medical use, in intense electric fields, with ozone generation, aimed at treating severe intra-abdominal infections caused by gram-negative and gram-positive bacteria and yeasts that are refractory to conventional drug treatment, and which uses distilled water or a 0.9% sodium chloride infusion solution. With the equipment and method presented in this invention, ozonated aqueous solutions can be processed, which may also have other medical or industrial applications.

Class of Inventions: Healthcare, Medicine, and Cosmetics

MULTIFUNCTIONAL BIOCOMPATIBLE CREAM CONTAINING [2-AMINO-2-DEOXY-(1-4)- β -D-GLUCOPYRANOSE]

Category: Patent - 129058 / 2018

Authors: Crișan Maria, Dreve Simina-Virginia, Mos Elena, Crișan Diana, Olenic Liliana

Description: The invention relates to a multifunctional, biocompatible cream of the oil-in-water type, containing [2-amino-2-deoxy-(1-4)- β -D-glucopyranose], with emollient, cytoprotective, cytostimulatory, and antibacterial properties, which is quickly absorbed into the skin, does not leave a greasy residue, is well tolerated, hydrates, protects, stimulates collagen synthesis, has few ingredients, and a simple preparation process. The areas of applicability are dermatology, cosmetology, pharmacy (anti-aging therapies, pruritic dermatoses, scaling, xerosis cutis, etc.).

Class of Inventions: Healthcare, Medicine, and Cosmetics

PROCESS FOR DETERMINING PHYSICAL PROPERTIES OF PHARMACEUTICAL TABLETS BY NIR-CHEMOMETRIC METHODS

Category: Patent - 129675 / 2019

Authors: Ioan Tomuta, Rareș Iovanov, Sorin E. Leucuta

Description: The invention relates to how the NIR-chemometric methods are developed, validated, and used on tablets obtained from a tablet press for determining the physical (pharmaceutical) properties of the tablets (mechanical strength, friability, disintegration time).

Class of Inventions: Healthcare, Medicine, and Cosmetics

DENTAL IMPLANT THAT REPRODUCES THE PHYSIOLOGICAL MOBILITY OF NATURAL TEETH

Category: Patent - 129820 / 2020

Authors: Manea Avram, Pop Dumitru-Ovidiu

Description: The invention refers to a device used in dentistry, intended to be applied in dento-alveolar and maxillo-facial surgery, being a dental implant that reproduces the physiological mobility of the teeth through its complex structure due to the component elements.

Class of Inventions: Healthcare, Medicine, and Cosmetics

PROCESS FOR DETERMINING PHYSICAL PROPERTIES OF PHARMACEUTICAL TABLETS BY NIR-CHEMOMETRIC METHODS

Category: Patent - 130737 / 2019

Authors: Mocan Lucian-Constantin, Iancu Cornel, Matea Cristian-Tudor, Ilie Ioana-Rada, Mocan Teodora

Description: 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.

Class of Inventions: Healthcare, Medicine, and Cosmetics

WHITENING DENTAL GEL COMPOSITION BASED ON NATURAL AGENTS

Category: Patent - 131614 / 2021

Authors: Moldovan Marioara, Prejmerean Cristina, Prodan Doina, Silaghi-Dumitrescu Laura, Saroși Codruța, Cuc Stanca, Dudea Diana

Description: The patent concerns two gel formulas intended to improve tooth color, in the case of extrinsically caused dental dischromia, (determined by dyes in food, colored drinks, oral rinse solutions) or internalized in the dental structure, dischromia caused by age. The two gels contain: Gel 1: plant extracts + nanohydroxyapatite; Gel 2-plant extracts and HA-ZnO, HA-TiO₂, HA-SiO₂, HA-F. Gels can be applied by brushing or kept in individualized thermoformed trays. Whitening systems based on natural agents have the following advantages: efficiency, through a detectable whitening effect, experimented on extracted teeth and samples of composite materials, and biocompatibility; they do not alter the surface roughness.

Class of Inventions: Healthcare, Medicine, and Cosmetics

COMPOSITION OF PHOTOPOLYMERIZABLE GIOMER

Category: Patent - 132534 / 2019

Authors: Prejmerean Cristina, Moldovan Marioara, Prodan Doina, Buruiana Tinca, Silaghi-Dumitrescu Laura, Sarosi Codruța Liana, Vlăssă Mihaela, Colceriu Burtea Loredana, Hodisan Ioana, Boboia Stanca, Dadarlat Dorin Nicolae, Streza Mihaela, Agapescu Camelia

Description: Giomer technology is a new concept of adhesive dental biomaterial based on pre-reacted glass. The pre-reacted glass is able to release fluoride ions over time that penetrates the polymer matrix reaching the material enamel interface. This happens when the pH of the environment drops to values lower than 4.5-5.5 during the bacterial attack on the enamel. The fluoride ions released by giomer lead to the formation of fluorapatite in the presence of calcium and phosphate ions resulted after enamel demineralization. Through the formation of fluorapatite the demineralization process is stopped and the caries remineralization process begins.

Class of Inventions: Healthcare, Medicine, and Cosmetics

CHEWABLE TABLETS WITH POLLEN AND NATURAL VITAMIN C

Category: Patent application - A 00362 / 2020

Authors: Tomuță Ioan, Hales Dana

Description: The invention represents a process for obtaining chewable tablets with pollen and natural vitamin C. The process, according to the invention, consists in the steps of grinding bee pollen,

preparing dried extracts of rosehip, sea buckthorn, acerola, cranberries or currants and standardizing them in the content of ascorbic acid, or ascorbic acid and beta-carotene respectively, followed by the preparation of chewable tablets by mixing 100...500 parts pollen, 45...100 parts standardized extract, 25...50 parts honey as binder and 75...150 parts glucose, possibly a flavoring, and finalizing with the wet and dry calibration of the granulate and its compression.

Class of Inventions: Healthcare, Medicine, and Cosmetics

BIOLOGICAL DELIVERY SYSTEM BASED ON A HYBRID TUMOR-TARGETED VIRAL HYBRID VECTOR FOR RESTORING THE NORMAL PHENOTYPE OF TP53 TUMOR SUPPRESSOR GENE IN MALIGNANT CELLS

Category: Patent application - A 00642 / 2019

Authors: Chira Sergiu, Neagoe Ioana-Cornelia Stanca, Gulei Diana

Description: The patent-pending work presents a bacteriophage-derived therapeutic system whose functionality is restricted to cancer cells. The bacteriophage is genetically modified at the level of the viral capsid with a tumor-specific peptide, which also mediates internalization of the vector. The molecular mechanism is focused on the CRISPR/Cas9 genome editing technology to replace the mutated TP53 gene in the tumor genome and induce apoptosis in malignant cells. In addition, the expression of the functional copy of TP53 can be regulated by the administration of doxycycline, therefore the therapeutic effect can be controlled ON/OFF depending on its concentration and the time of administration.

Class of Inventions: Healthcare, Medicine, and Cosmetics

NATURAL ANTIPLATELET AGENTS BASED ON ALLIUM CEPA L. EXTRACT USED IN PRIMARY CARDIOVASCULAR PREVENTION

Category: Patent application - A 00677 / 2017

Authors: Moldovan Marioara, Oprean Radu, Saplonțai-Pop Aniela Cristina, Prodan Doina, Saroși Liana Codruța, Silaghi-Dumitrescu Laura, Cuc Stanca, Agapescu Camelia

Description: The present invention relates to the composition of the solid, lyophilized formulation, presented in encapsulated form, obtained on the basis of Allium cepa L. extract. The presented formulation is intended for primary cardiovascular prevention, for the antiplatelet effect demonstrated. According to this patent, the encapsulated formulation consists of a liquid extract obtained from the white variety of Allium cepa L. stabilized with excipients to decrease the degree of hygroscopicity and increase the stability in lyophilized form.

Class of Inventions: Healthcare, Medicine, and Cosmetics

"Justin Capră" Association of Inventors

LOGISTIC SUPPORT CONTAINER MOBILE POWER PLANT FOR EMERGENCY

Category: Patent application - RO U 2020 00052

Authors: Popescu Emil, Stroe Danut, Guiman Daniela, Jurba Mihai

Description: MOBILE POWER PLANT FOR EMERGENCY with a power of 500 kVA is designed to be used in emergency situations. The product is designed in a versatile, independent version with a whole range of distinct applications from: industry, telecom, oil & gas, emergency situations and can work as island power plant, backup, peak load for national grid etc. Logistic Support Container allows the installation of a wide range of generator groups chosen and sized according to the energy supply needs of the various facilities. It contains the fuel tank for long-term operation, command and control panel, cables and distribution boxes which can be used in various configurations.

Class of Inventions: Environmental Protection and Energy

CAPSULE, INSTALLATION AND PROCESS FOR OBTAINING PRODUCTS AND EXTRACTS FROM COMPLEX PREPARATIONS

Category: Patent application - PCT/RO2021/050008

Author: Daniel Tatar

Description: The invention relates to an extraction capsule (C), for the extraction of active principles, from raw materials (MP), formed by a body (1) comprising a wall (6), the body further comprising: inside, an enclosure raw material storage (MP), delimited by the wall (6) and a perforated lid (5), located above the enclosure, removable, sliding on the height of the enclosure, and at the bottom a drain orifice, covered by a removable sieve, characterized in that it further comprises a floating element (4) which is made of a material with a lower density than a solvent, preferably less than 0.75 grams/cm. cube, and in that it also comprises fixing elements of the floating element (4) to the body wall (1), elements which allow the adjustment of the floating element (4) at different heights on the wall (6) of the body (1).

Class of Inventions: Healthcare, Medicine, and Cosmetics

MOBILE INTEGRATED SURVEILLANCE SYSTEM

Category: Patent application - A/2023/ 00039

Authors: Cojocaru Sorin, Jurba Mihai, Popescu Emil, Stroe Danut, Guiman Daniela, Jurba Andrei

Description: The product is a multispectral surveillance system which allows to detect recognize and identify different type of threats in various atmospheric conditions using visible, short wave infrared and medium wave infrared cameras.

The product performs the following tasks:

- Gathering information from different type of sensors: optical, distance measurement, positioning, recognition;
- Processing and integrating obtained information into the GIS application running on a ruggedized PC;
- Transmitting and receiving information to / from other structures;
- Monitoring the response activities and their results.
- Storing the data and images needed to prove the identified activities

State of development: In production.

Class of Inventions: Environmental Protection and Energy

BIORESONANT ORTHOSIS FOR FUNCTIONAL RECOVERY OF THE RADIOCARPAL JOINT

Category: Patent application - RO 132423 A2

Authors: Velcea Marian, Mandrea Lucian, Moldovan Corneliu, Velcea Ion Alexandru, Plotog Ioan, Hideg Catalin, Curta Ioan, Caracas Eugen, Chetan Mihai, Ene Ciprian, Gherman Beatricea, Radu Ana-Maria

Description: A medical device designed to protect the radiocarpal joint through an outer shell for functional recovery. It provides the following functions: stabilization and support of the radiocarpal joint, reduction of pain and inflammation; prevention of excessive or sudden movements, protection during physical activities or following an injury. The bioresonant wrist brace is a flexible model for light physical support, intended for functional recovery of the wrist joint and consists of an elastic support surrounding the radiocarpal joint, on which a group of EMCOPAD Doctor Tech bioresonant devices is linearly assembled. The group of electronic devices consists of ten devices that are positioned inside the elastic support for direct contact with the wrist joint – along its entire contour, exposing it to a harmonic and polarized electromagnetic field. Regular use of the device as part of a supervised recovery procedure ensures a faster return to previous performance. Energy measurements performed with specialized equipment confirm the improvement of the condition of the wrist joint and the patient's general condition, through the use of the bioresonant wrist orthosis. DETERMINARI DE CAMP- BioWell_Quantum Therapy- RO 132423 A2, Healthcare.

Class of Inventions: Healthcare, Medicine, and Cosmetics

BIORESONANT CERVICAL BELT FOR RECOVERY

Category: Patent application - RO 132423 A2

Authors: Velcea Marian, Mandrea Lucian, Moldovan Ion Corneliu, Velcea Ion Alexandru, Plotog Ioan, Hideg Catalin, Curta Ioan, Caracas Eugen, Chetan Mihai, Ene Ciprian, Gherman Beatricea, Radu Ana-Maria

Description: The device consists of a medical support dedicated to the cervical area on which Qi-Polino Doctor Tech passive resonant devices (EMCOPAD) have been assembled in the positions corresponding to the C7 vertebra and acupuncture points BL-10, VB-20, VG-15 and VG-16. These points are activated independently or simultaneously in groups formed by the therapist, depending on the patient's condition and his immediate needs. The interaction at the energy level takes place through the acupuncture points placed in electromagnetic contact with the Qi-Polino device, which transmits impulses with a harmonic frequency of the note LA, located in the radio band. This interaction is only possible during the period when paired acupuncture points are in relative imbalance (one to the other), characterized by the presence of a local electric potential, with an effect on the power supply of the electronic circuit; once the energetic balancing of the corresponding points is achieved, the electronic device cuts off its power supply for the entire balance period, resuming the operating cycle when a new imbalance between the corresponding acupuncture points occurs.

Class of Inventions: Healthcare, Medicine, and Cosmetics

ENERGY SCANNER SU-JOK MODEL 1K

Category: Research project - Internal Project Financed by Justin Capra Association

Authors: Velcea Marian, Scarlat Marlen, Visalom Gelu, Mandrea Lucian, Moldovan Ion Corneliu, Velcea Ion Alexandru, Plotog Ioan, Hideg Catalin, Curta Ioan, Caracas Eugen, Chetan Mihai, Ene Ciprian

Description: The electronic device is based on the modern theory of interpreting ancient acupuncture techniques, developed by academician Park Jae Woo and known as "Su-Jok" ("Palm-Sole" in Korean). The device highlights the relative value of an electrical voltage measured at specific points of each meridian. Before starting the measurement session, the calibration of the device is checked by touching the two electrodes to each other; calibration is performed if the device indicates 100%. The device is equipped with a digital and analog display and allows the evaluation of the characteristic values of each meridian with an accuracy of 1%. The use is simple and involves going through all the acupuncture meridians, by choosing the contact point specific to each meridian and touching it with the specific mobile electrode, while the reference electrode remains fixed on the finger or arm. The measured values are noted and organized in a specific matrix for interpreting the Yn-Yang ratio and Qi circulation.

Class of Inventions: Information Technology, Communication, and Security

MUCOADHESIVE COMPOSITION FOR MAINTAINING AND/OR RE-BALIZING VAGINAL MICROFLORA

Category: Patent - RO 132749 B

Authors: Oprița Elena Iulia, Oancea Anca Olguța, Crăciunescu Oana, Moraru Angela, Moraru Ionuț

Description: The invention relates to a mucoadhesive composition for maintaining and/or rebalancing the vaginal microflora. According to the invention, the composition consists by weight of 50...80 parts aqueous solution containing 20...60% copolymer of the Poloxamer P407 type, 1...5% bacterial nanocellulose, optionally 5...10% chitosan, 0.1...5% cactus powder, 5...20 parts by weight of postbiotic compounds such as lactic acid and citric acid, optionally 2...6 parts by weight of essential oils selected from thyme oil and tea tree oil, 5...10 parts by weight of prebiotic oligosaccharides selected from inulin and fructo-oligosaccharides, and 4...10 parts by weight of hydro-glycero-alcoholic extracts at 50% concentration selected from cranberry and grape seed.

Class of Inventions: Healthcare, Medicine, and Cosmetics

**LABORATORY STAND FOR MEASURING FORCES IN DEVICES FOR ORIENTATION AND
FIXING OF PARTS WITH FLAT AND REVOLVING SURFACES**

Category: Research Project No 1213/2025 ULBS

Authors: Nanulescu Andrei Dumitru, Lotreanu Cristian Andrei, Coordinator: Professor Aurel Mihail Titu

Description: The laboratory stand for measuring the forces in the device for orientting and fixing parts with flat surfaces but also parts of revolution is an innovative project to be able to do research on the forces to which the device is required to be sure that unpleasant accidents do not happen in companies such as: the part jumping out of the device during processing and all kinds of such unpleasant accidents. For this reason, we thought of such a stand to avoid unwanted accidents as much as possible. Advantages: Avoiding accidents; We see the weaknesses of the device; Finding concrete and exact values. This laboratory stand for measuring forces in devices plays an essential role in avoiding accidents and ensuring that machine tool operators feel safe and comfortable at work. The device is very simple: we have attached to a plate with T-channels made of high alloy steel two prisms on which we place the parts of revolution and on another part of the plate we have pins and lateral supports for orientation and fixation of the parts with mostly flat surfaces. In the middle of the plate we have attached a support with an arm on which we have placed a dynamometer and comparator clock to measure the forces in the device.

Class of Inventions: Mechanics, Industrial Processes, and Metallurgy

**MODULAR MECANUM WHEEL ASSEMBLY OPTIMIZED FOR TRACTION ON SANDY AND
UNSTABLE SURFACES**

Category: Patent application - Request in Progress, No in Progress

Authors: Aurel Mihail Titu, Daniel Balc, Emanuel Balc, Stefan Titu

Description: In practice, we encounter the following problems, Difficulties in moving on unstable surfaces: Vehicles equipped with Mecanum wheels face significant challenges on surfaces such as sand, gravel, or soft soil; These terrains do not provide firm support, leading to traction loss and difficulties in maintaining the desired direction; Omnidirectional mobility, a major advantage of Mecanum wheels on hard surfaces, becomes inefficient when ground contact is unstable. This modular Mecanum wheel is specifically designed to ensure advanced mobility on low-traction surfaces or terrains that are traditionally challenging for this type of wheels, such as sand, gravel, or soft surfaces. Conclusions: Improved Traction, Reduced Sinking, Energy Efficiency, Adaptability & Durability.

Class of Inventions: Mechanics, Industrial Processes, and Metallurgy

**MECANUM WHEEL WITH INDIVIDUAL FLEXRING-EQUIPPED ROLLERS FOR VIBRATION
DAMPING AND ENHANCED STABILITY**

Category: Patent application - Request in Progress, No in Progress

Authors: Daniel Balc, Aurel Mihail Titu, Emanuel Balc, Stefan Titu

Description: In practice, we encounter the following problems, Excessive Vibrations During Movement:

- On hard surfaces (such as concrete or metal) and uneven terrain, Mecanum wheels make intermittent contact with the ground, as each roller touches the surface one at a time. This discontinuous interaction generates constant vibrations that propagate throughout the entire mobile platform. In applications that require smooth motion;
- Direct Transmission of Shocks to the Structure and Electronics;
- Without a damping system at the roller level, mechanical shocks and vibrations caused by ground contact are transmitted directly to the vehicle's supporting structure. This can negatively impact the lifespan of electronic components (such as motherboards, microcontrollers, or sensors) and may lead to malfunctions caused by high-frequency vibrations. In autonomous systems, these shocks can

destabilize control and navigation algorithms. This Mecanum wheel incorporates a damping component, based on the use of flexrings mounted on each individual roller. Flexrings are flexible structures that absorb vibrations generated by the rollers' contact with the rolling surface. This adaptation brings multiple benefits, especially for precision applications such as industrial robots or autonomous vehicles operating in vibration-prone environments or on uneven surfaces.

Conclusions: Significant Vibration Reduction; Extended Lifespan of Wheels and Components; Reduced Operational Noise.

Class of Inventions: Mechanics, Industrial Processes, and Metallurgy

HYBRID-ARCHITECTURE MECANUM WHEEL WITH INDEPENDENTLY ACTUATED ROLLERS

Category: Patent application - Request in Progress, No in Progress

Authors: Emanuel Balc, Aurel Mihail Titu, Daniel Balc, Stefan Titu

Description: In practice, we encounter the following problems, Lack of Active Traction Control at Roller Level:

- Conventional Mecanum wheels rely on passive rollers that rotate freely without any independent actuation. While this allows for omnidirectional movement, it also limits the ability to manage traction dynamically at each contact point with the ground. In environments with uneven grip — such as mixed surfaces (e.g., one wheel on asphalt, another on sand or wet tiles) — the inability to modulate traction per roller leads to inconsistent motion, slippage, or loss of directional control. Active control at the roller level would allow the system to respond more intelligently to such variations, improving overall traction and stability;

- Limitations in Precision Maneuvers and Active Stabilization;

- Without active roller control, Mecanum wheels cannot perform complex maneuvers such as automatic slip compensation, platform stabilization, or dynamic adaptation to local obstacles.

This Mecanum wheel represents a significant technological advancement by integrating an independent actuation system for the peripheral rollers. In traditional configurations, Mecanum wheel rollers are passive, rotating freely as the main wheel spins. In this hybrid wheel, each roller is equipped with its own actuation system, powered by a dedicated DC micro-motor capable of independently controlling the roller's speed and direction of rotation.

Conclusions:

- Active Traction Control at Each Roller;

- Advanced Maneuverability and Increased Precision;

- Improved Energy Efficiency.

Class of Inventions: Mechanics, Industrial Processes, and Metallurgy

PROCEDURE FOR OBTAINING A LACTIC FERMENTED FUNCTIONAL BEVERAGE BASED ON BUCKWHEAT WITH ADDED BOLETUS EDULIS POWDER

Category: Patent application - A100318/12/06/2024

Authors: Păcală Mariana Liliana, Oancea Rodica Simona, Popa Miruna Florentina, Mironescu Ion

Description: The invention relates to a non-alcoholic functional beverage, obtained from natural ingredients, buckwheat and Boletus edulis mushrooms, fermented with lactic acid Bifidus bacteria. The procedure consists of successive technological operations: mixing and homogenization of raw buckwheat flour with distilled water (1:18), kneading at 80°C, cooling at 60°C, addition of 1.5% mushroom, cooling at 38°C, inoculation with 0.75% (m/m) lactic bacteria, fermentation, resulting in a matured beverage, which presents the advantage of stability and enhanced sensory qualities, e.g. specific mushroom taste, taste of a lactic fermented product, pleasant aroma, improved color and texture compared to a similar drink without mushrooms, with beneficial effects on human health through the chemical compounds from buckwheat and mushroom, a finished product that can also be included in the diet of people with celiac disease, being classified as a gluten-free product.

Class of Inventions: Food industry

**NATIONAL INSTITUTE FOR RESEARCH AND DEVELOPMENT IN CHEMISTRY AND
PETROCHEMISTRY**

**ANTIFUNGAL, WEAR-RESISTANT, ANTI-SLIP, PHOTOCHEMICALLY STABLE POLYMERIC
COMPOSITE, USED IN MUSEUMS AND IN STORAGE/CONSERVATION SPACES OF CULTURAL
HERITAGE ITEMS, AND THE METHOD OF OBTAINING IT**

Category: Patent - 134356

Author: Ion Rodica Mariana, Marin Laurentiu, Ion Nelu

Description: The invention relates to the production of a carpet based on a polyurethane polymer. This carpet is obtained on site by spraying or brushing. The curing is done under the influence of a diisocyanate hardener. A series of additives were conditioned in the base polymer mass, which gave it antifungal and photo-active properties. Before crosslinking, silicon carbide granules are spread over the laid carpet.

Class of Inventions: Laboratory and Chemical Industry

**NATIONAL INSTITUTE FOR RESEARCH AND DEVELOPMENT IN CONSTRUCTION, URBAN
PLANNING AND SUSTAINABLE SPATIAL DEVELOPMENT URBAN-INCERC, BUCHAREST,
ROMANIA**

**AN ALGORITHM FOR AUTOMATIC ESTIMATION OF A BUILDING'S STRUCTURAL SEISMIC
RESPONSE AND DAMAGE ASSESSMENT FOR SEISMICALLY INSTRUMENTED BUILDINGS**

Category: Research project - PN23 35 01 01

Authors: Daniela Dobre, Claudiu-Sorin Dragomir, Iolanda-Gabriela Craifaleanu, Emil-Sever Georgescu, Cornelia-Florentina Dobrescu

Description: The algorithm presented offers a method for estimating the structural dynamic behavior of buildings equipped with seismic instrumentation, particularly when finite element modeling is not feasible due to a lack of data, such as architectural plans or technical specifications. It also addresses challenges arising from software applications like ARTEMIS, which may have incompatible file formats for recorded data. Using equivalent or empirical models, the estimates cover various parameters, including the natural period of vibration, the maximum dynamic amplification factor of horizontal acceleration, spectral acceleration (the maximum acceleration experienced during an earthquake), and linear and bi-linear spectral seismic responses. Based on the calculated inter-storey drift (a key indicator of structural performance under lateral loads), a degree of damage is assessed. To effectively and promptly assess the destructive potential of an earthquake, both extended and simplified analyses can be conducted in real-time or shortly after the event. This approach provides crucial information to support post-disaster interventions.

Class of Inventions: Architecture and Construction

**COMPARATIVE ANALYSIS OF ACOUSTICS AND OUTDOOR CLIMATE PARAMETERS IN SOME
URBAN AREAS**

Category: Research project - PN 23 35 02 01

Authors: Marta-Cristina Zaharia, Vasilica Vasile, Irina Popa, Ștefania-Cristina Pană

Description: The pollution level of urban areas is high, due to the traffic, an important source of noise and air pollution, especially in large cities. Acoustic and atmospheric researches were carried out on two types of street profiles in Bucharest. After determining their noisiest areas, measurement points were located, based on: the traffic intensity; noise from vehicle acceleration, between two stoplights; complex traffic composition; noise that depends on the conformation and finishing of the nearest buildings; noise received by pedestrians; time period of the day, with very intense traffic. Even the number of vehicles is different, the acoustic results indicate that the measured noise level values, respectively LAeq = 76.3 dB, are the same. The monitored levels of carbon dioxide and nitrogen oxide,

once again highlighted the importance of green areas on urban air quality, an important aspect that must be taken into account with the utmost seriousness in future urban planning.

Class of Inventions: Architecture and Construction

BIOMATERIALS – BASED COATINGS WITH THERMAL INSULATION CHARACTERISTICS AND LOW IMPACT ON INDOOR AIR QUALITY

Category: Research project - PN 23 35 02 01

Authors: Irina Popa, Cristian Petcu, Vasilica Vasile

Description: Globally, agriculture and the food industry are two important sectors that generate significant amounts of natural vegetable waste, such as husks, yarns, straws etc. In the spirit of circular economy and sustainable development of the built environment, the paper presents a series of experimental research that aimed at a new possibility of superior exploitation of rice husks in construction, as coatings for the indoor environment. In this respect, the obtained products were tested in terms of adhesion to the surface-support of concrete, respectively the thermal insulation properties. Given the negative impact of Volatile Organic Compounds on human health, biomaterial coatings have also been tested for total VOCs emissions. The results regarding the adhesion and the thermal conductivity recommend the use of this type of products in construction sector as interior coatings. Further research on monitoring TVOC emissions could improve the potential for use of biomaterial coatings in construction.

Class of Inventions: Architecture and Construction

INFLUENCE OF THE HEIGHT TO WIDTH RATIO ON THE COMPRESSIVE STRENGTH OF CLAY ELEMENTS WITH ADDED STRAW

Category: Research project

Authors: Alexandrina-Elena Andon, Mihai Alexandru Bucălău, Adrian - Alexandru Ciobanu

Description: The study investigates the influence of the height-to-width ratio on the compressive strength of clay elements with straw additives, inspired by the durability of traditional constructions. Tests were carried out on samples measuring 250 × 125 × 75 mm, both individually and in configurations of two and three stacked elements. The results show that, although reducing friction with the metal plates limits the confinement effect, the strength values obtained remain influenced, with the decisive factor being the dimensional ratio between height and width. Testing on a single element tends to overestimate strength due to the plastic deformation caused by confinement. In the case of two stacked elements, the behavior is closer to reality, as the confinement effect is reduced. With three elements, interface effects multiply, leading to lower values than the actual strength. The main conclusion is that the height-to-width ratio controls the stress distribution and failure mode, and the testing method must be chosen according to this parameter.

Class of Inventions: Architecture and Construction

NATIONAL INSTITUTE FOR RESEARCH AND DEVELOPMENT IN MICROTECHNOLOGIES -IMT BUCHAREST

CHEMIREISISTIVE ETHANOL SENSOR BASED ON GRAPHENE AND METAL OXIDE NANOCOMPOSITES AND PROCESS FOR OBTAINING IT

Category: Patent Application 134143 RO/ 30.01.2025

Authors: Cornel Cobianu, Bogdan- Catalin Serban, Octavian Buiu, Nicolae Dumbravescu, Maria Roxana Marinescu, Narcis-Octavian Ionescu, Viorel Avramescu

Description: The invention presents a chemiresistive ethanol sensor and the new process for its manufacturing based on sensitive layers synthesized from zinc oxide (ZnO) and graphene nanocomposite. The nanocomposite was prepared by aqueous sonochemical synthesis of high acoustic radiation density. An original element of the method is the use of sodium hydroxide (NaOH), both as a reducing agent in the formation of ZnO from zinc nitrate $\text{Zn}(\text{NO}_3)_2$ and as an initiator of nanostructuring, thus obtaining hierarchically organized ZnO-graphene powders of nano-flower type (high porosity powders) for pH values equal to 14. The method of manufacturing the sensitive layer consists of depositing the ZnO-graphene paste on a dielectric substrate by drop casting, followed by the subsequent heat treatment of the paste necessary for the thermal consolidation of the sensitive layer. On the opposite side, there is an electrical heating resistor of the sensitive structure. Functionalization of ZnO with graphene allows for increasing the sensitivity and reducing the electrical resistance of the sensitive layer and thus easier measurability of the ethanol sensor. The sensor substrate is made of Si/SiO₂ and has a size of 5 mm, the electrodes being made of gold. They can be linear or have an interdigitated configuration. The monitoring capacity of ethanol is investigated by applying a constant current between the two electrodes and measuring the voltage at different values of the ethanol concentration to which the sensitive layer is exposed.

Class of Inventions: Environmental Protection and Energy

QUATERNARY OXIDIZED CARBON NANOHORNS - BASED NANOHYBRID FOR RESISTIVE HUMIDITY SENSOR

Category: Patent Application - ES2958943T3, Spain, 16. 02. 2024

Authors: Bogdan-Cătălin Serban, Octavian Buiu, Cornel Cobianu, Viorel Avramescu, Nicolae Dumbravescu

Description: The present invention relates to the RH sensing response of a resistive sensor employing a sensing layer based on quaternary nanohybrid composition comprising or consisting of CNHOX/SnO₂/ZnO/PVP at 1.5/1/1/1 w/w ratio to 3/1/1/1 w/w ratio. When employed as RH sensing layers, these quaternary nanohybrid compositions exhibit several significant advantages:

- Oxidized carbon nanohorns (CNHOX) (Figure 1) have high specific surface area/volume ratio, water molecules affinity and show rapid electrical resistance variation when RH varies from 0% to 90%.
- The nanometric tin (IV) oxide (SnO₂) nanopowder exhibits good RH sensitivity. CNHOX have p-type electrical conduction (through holes), while SnO₂ is a n-type metallic oxide semiconductor (through electrons). By adding SnO₂ to CNHOX, one will obtain islands of p-n semiconductor heterojunctions embedded in PVP (a dielectric material) that increase the sensitivity of the sensitive layer.
- Zinc oxide (ZnO) nanopowder exhibits good RH sensitivity. Both ZnO and SnO₂ are n-type electrical conductors. The ZnO – SnO₂ nanocomposite has sensing properties superior to each of the single oxides, because each of the oxides interacts differently with the oxidized carbon nanohorn material, leading to alterations in the pore distribution, which increase the specific surface area;
- Polyvinylpyrrolidone (PVP) is a hydrophilic polymer with excellent binding properties, which enables its employment in sensing structures with either flexible or rigid substrates;
- Detection at room temperature, low response time, low cost, small size, simplicity in manufacture.

Class of Inventions: Environmental Protection and Energy

SURFACE ACOUSTIC WAVE SENSOR FOR RELATIVE HUMIDITY MONITORING

Category: Patent Application A00623, RO/ 21.10.2024

Authors: Bogdan-Cătălin Serban, Octavian Buiu, Marius Bumbac, Cristina Mihaela Nicolescu

Description: The present invention relates to the RH sensing response of a surface acoustic wave sensor employing a sensing layer based on new ternary nanocomposite matrices of the polyvinylpyrrolidone type / oxy sulfonated onion-type nanocarbon materials (ox-CNOs-SO₃H)-carbon black. The oxy sulfonated onion-type nanocarbon materials used are found in the ternary nanocomposite in a mass percentage ranging between 60 - 70%, while carbon black is found in a mass percentage ranging between 5-10%. The sensor used is of the "delay line" type, dual, made on a piezoelectric quartz substrate. The sensor has a double delay line to compensate for thermal drift. Thus,

one delay line is covered with the ternary nanocomposite sensitive to RH variation, the second delay line being the piezoelectric substrate without a sensitive layer. The sensitive films are deposited on the piezoelectric quartz substrate by the "spin coating" method.

Class of Inventions: Environmental Protection and Energy

CHEMIREISTIVE ETHANOL SENSOR

Category: Patent Application A00644, RO/ 21.10.2024

Authors: Bogdan-Cătălin Serban, Octavian Buiu, Marius Bumbac, Cristina Mihaela Nicolescu

Description: The sensitive films described in this invention, which are used to obtain resistive ethanol sensors, are binary nanohybrids of the type of onion-type nanocarbon materials functionalized with trifluoromethyl groups (CNO-CF₃- Fig.1) - Ni oxide (NiO) and carbon nanohorns functionalized with trifluoromethyl groups (CNH-CF₃) – NiO. From the point of view of the detection principle, the conductivity of the sensitive layer decreases with the level of ethanol concentration. The increase in the resistance of the film sensitive to ethanol vapors can be explained taking into account the physicochemical properties of the two components and their mutual interaction. The sensor substrate is made of polyimide (Kapton) and has a size of 5 mm, the electrodes being made of gold. The width of the electrodes is approximately 200 microns, with a separation of 5 mm between them (Fig.3). The ethanol monitoring capacity is investigated by applying a constant current between the two electrodes and measuring the voltage at different values of the ethanol concentration to which the sensitive layer of the type CNO-CF₃ / NiO, CNH-CF₃ / NiO, CNO-CF₃ / CNH-CF₃ / NiO is exposed.

Class of Inventions: Environmental Protection and Energy

SURFACE ACOUSTIC WAVE SENSOR FOR RELATIVE HUMIDITY MONITORING

Category: Patent Application A00645, RO/ 21.10.2024

Authors: Bogdan-Cătălin Serban, Octavian Buiu, Marius Bumbac, Cristina Mihaela Nicolescu

Description: The sensitive film described in this invention, which is used to obtain resistive trimethylamine sensors, is a binary nanohybrid of the type of oxidized onion-type nanocarbon materials functionalized with trifluoromethyl groups (Figure1) / CuO. From the detection principle's point of view, the sensitivity film's resistance increases with the trimethylamine concentration level. The increase in resistance is explained by the fact that trimethylamine donates electrons to the sensitive layer, decreasing the concentration of holes. The sensor substrate is made of Si/SiO₂ and has a size of 5 mm, the electrodes being made of gold. They can be linear (Figure 2) or have an interdigitated configuration. The monitoring capacity of trimethylamine is investigated by applying a constant current between the two electrodes and measuring the voltage at different values of the trimethylamine concentration to which the sensitive layer is exposed.

Class of Inventions: Environmental Protection and Energy

NATIONAL INSTITUTE FOR RESEARCH AND DEVELOPMENT IN MINE SAFETY AND PROTECTION TO EXPLOSION - INSEMEX PETROȘANI

REPLACEMENT OF CRITICAL VENTILATION STRUCTURES METHOD

Category: Patent application - A 2021 00359

Author: Cioclea Doru, Găman George Artur, Ghicioi Emilian, Gherghe Ion, Ianc Nicolae, Rădoi Gheorghe Florin, Boantă Corneliu Dănuț, Chiuzean Emeric, Tomescu Cristian, Matei Adrian, Drăgoescu Răzvan, Cămărășescu Alexandru

Description: The method of replacing the critical ventilation constructions is based on the solution of the ventilation network and the establishment of the functional parameters, under normal working conditions, the establishment of the degree of instability induced at the level of the active fans by the

critical ventilation constructions and the elimination of the critical character associated with the ventilation constructions at the level of a complex ventilation network.

Class of Inventions: Environmental Protection and Energy

STAND FOR DETERMINING PRESSURE VARIATIONS WHEN CHANGING THE DIRECTION OF PROPAGATION OF GASEOUS EXPLOSIONS IN INTERCONNECTED SPACES

Category: Patent application - A 2022 00705

Author: Vlasin Nicolae Ioan, Găman George Artur, Ghicioi Emilian, Pupăzan Gheorghe Daniel, Găman Angelica Nicoleta, Păsculescu Vlad Mihai, Simon-Marinică Adrian Bogdan, Florea Gheorghe Daniel, Tuhuț Ioan Ligia, Prodan Maria, Șuvar Marius Cornel, Vass Zoltan, Munteanu Laurentiu, Chiuza Emeric, Nicolescu Cristian, Manea Florin

Description: The invention provides the possibility of recording and complex analysis of gas explosion phenomena on geometries with interconnected and volumetrically individualized spaces through different configurations of obstacle arrangements with membrane openings, the analysis of pressure and velocity variations with the modification of the direction of gas explosion propagation, and the study of chain explosions in atmospheres containing the same combustible gas or different combustible gases at different concentrations. The obtained data are useful both for explaining the phenomenon of rapid combustion in interconnected spaces and as a basis for validating computer simulations conducted on the same topic.

Class of Inventions: Environmental Protection and Energy

STAND FOR STUDYING THE IGNITION OF EXPLOSIVE GASEOUS MIXTURES BY THE CORONA EFFECT

Category: Patent application - A 2022 00706

Author: Emilian Ghicioi, Irina Nalboc, Artur George Gaman, Daniel Pupazan, Maria Prodan, Nicolae Vlasin, Doru Cioclea, Sorin Burian, Robert Laszlo, Cristian Nicolescu, Daniel Florea, Adrian Jurca, Adrian Simon-Marinica, Dan Gabor, Vlad Pasculescu, Sonia Suvar, Andrei Szollosi, Florin Manea, Ligia Tuhuț, Cosmin Colda, Marius Suvar, Emeric Chiuza, Zoltan Vass

Description: This invention presents a stand for investigating the ignition of explosive gas mixtures using the corona effect. It features a transparent explosion chamber with a single sharp electrode, connected to a solid-state Tesla coil, for generating the corona effect. Equipped with gas inlet/outlet nozzles, a pressure relief membrane, and a high-speed camera, the stand captures critical data such as ION channel formation, ignition induction time, and flame front propagation. The results are vital for assessing explosion risks in industries handling flammable gases.

Class of Inventions: Environmental Protection and Energy

SMALL-SCALE EXPERIMENTAL STAND FOR RESEARCHING EXPLOSIONS OF FLAMMABLE GAS-IN-AIR MIXTURES

Category: Patent application - A 2022 00731

Author: Păsculescu Vlad Mihai, Ghicioi Emilian, Găman George Artur, Pupăzan Gheorghe Daniel, Vlasin Nicolae Ioan, Șuvar Marius Cornel, Prodan Maria, Șuvar Niculina Sonia, Florea Gheorghe Daniel, Tuhuț Ligia Ioana, Șimon – Marinică Adrian Bogdan, Vass Zoltan

Description: The invention refers to a small-scale experimental stand for researching explosions of flammable gas-in-air mixtures, consisting of a transparent, inflatable explosion chamber equipped with an intake valve for volumes of flammable gas-in-air mixtures at pre-established concentrations within the explosive range of the substance. It includes a spark ignition system, with the chamber enclosed inside a transparent case for studying explosion pressures and their propagation using shadowgraph techniques with a light source. An obturator disc with a central orifice allows the divergent conical light

beam to pass through the transparent chamber for study, and the resulting projection is captured on a projection screen. The system is equipped with a recording system for the generated explosion pressure values.

Class of Inventions: Environmental Protection and Energy

NEUTRALIZATION DEVICE WITH LIQUID JET OF IMPROVISED EXPLOSIVE DEVICE (DNJLDEI)

Category: Patent application - A 2023 00178

Author: Ghicioi Emilian, Artur George Găman, Daniel Pupăzan, Robert Laszlo, Sorin Burian, Adrian Jurca, Dan Gabor, Angelica Nicoleta Găman, Alexandru Simion, Alin Irimia, Doru Cioclea, Maria Prodan Emeric Chiuzan, Irina Vasilica Nalboc, Andrei Szollosi, Sonia Șuvar, Edward Jan Gheorghiosu, Gabriel Dragoș Vasilescu, Attila Kovacs, Daniela Carmen Rus, Cristian Rădeanu, Ilie- Ciprian Jitea, Vlad Păsculescu, Marius Șuvar, Nicolae Vlasin, Bușoi Bogdan Garaliu, Daniel Florea, Adrian Șimon Bogdan, Ligia Tuhuț

Description: The invention relates to a neutralization device with liquid jet of improvised explosive device (DNJLDEI), by propelling a quantity of liquid at high speeds, over 500 m/s, in the direction of the target, DEI explosive device with the help of low-explosive charges, detonated remotely.

Class of Inventions: Mechanics, Industrial Processes, and Metallurgy

SYSTEM FOR DETERMINING THE DYNAMICS OF EXPLOSIVE ATMOSPHERE FORMATION

Category: Patent application - A 2023 00336

Author: Cioclea Doru, George Artur Găman, Ghicioi Emilian, Gherghe Ion, Ianc Nicolae, Rădoi Florin, Boantă Corneliu, Chiuzan Emeric, Tomescu Cristian, Matei Adrian, Drăgoescu Răzvan, Cămărășescu Alexandru, Vlasin Nicolae-Ioan, Șimon Marinică Adrian

Description: The invention is based on a system that allows the determination of the dynamics of the formation of explosive atmospheres, respectively that takes into account the variation of gas concentrations in relation to time, by choosing a closed enclosure that meets the safety conditions, several pulleys with supporting role, more equipment for measuring gas concentrations, an explosive gas source, a pressure reducer, a rotameter-type explosive gas flow control system, a hose for introducing explosive gas into the enclosure closed, a directed gas purge system, a ventilation system for the evacuation of the created atmosphere, the data resulting from the measurements are collected, finally the dynamics of the formation of explosive atmospheres are determined graphically and numerically.

Class of Inventions: Environmental Protection and Energy

NATIONAL INSTITUTE FOR RESEARCH AND DEVELOPMENT ON NON-FERROUS AND RARE METALS, INCDMNR – IMNR

ORGANIC / CERAMIC HYBRID ELECTROLYTE FOR LITHIUM SOLID STATE BATTERIES

Category: Research project - PN 23250104

Authors: Alexandru Okos*, Marian Burada, Laura Mădălina Cursaru, Adrian Mihail Motoc, Roxana Mioara Piticescu, Radu-Robert Piticescu

Description: Hybrid electrolytes consisting of a ceramic ionic conductor dispersed through a polymer matrix could represent the next technological leap for the development of solid-state lithium batteries. Hybrid electrolytes promise to combine the high ionic conductivity of ceramic electrolytes with the superior contact interface of polymer electrolytes. We report two new hydrothermal-based methods of synthesis for the ceramic component. We also describe a home-made setup which enables the characterization of ionic conduction properties of hybrid or polymer electrolytes.

Synthesis: $\text{Li}_{0.35}\text{La}_{0.55}\text{TiO}_3$ (LLTO) perovskite samples were prepared through two hydrothermal-based processes. Control samples were prepared through solid-state reaction. LLTO is a known super ionic conductor. It serves as the ceramic component of the hybrid electrolyte. The polymer matrix is formed from a mixture of polyethylene glycol (PEG) and lithium bis(trifluoromethanesulfonyl)imide (Li-TFSI).

Class of Inventions: Environmental Protection and Energy

METHOD FOR OBTAINING CERAMIC SCAFFOLDS BASED ON SILICATE COMPOUNDS

Category: Patent application - A/00440/26.07.2024

Authors: Caramarin Ștefania, Cursaru Laura Mădălina, Piticescu Roxana Mioara

Description: This invention presents a novel method for fabricating ceramic scaffolds based on silicate compounds using the robocasting technique. The approach combines sol–gel synthesis of a calcium–barium silicate ($\text{BaCa}_2\text{Si}_3\text{O}_9$) powder with the formulation of a printable ceramic paste incorporating biocompatible organic additives. The paste is processed via extrusion-based 3D printing to obtain customized scaffold architectures with controlled geometry and porosity. Compared to conventional stereolithography, the proposed method avoids toxic photopolymerizable resins and high-cost equipment, while enabling room-temperature printing of mechanically stable and compositionally homogeneous structures. The resulting scaffolds exhibit potential for applications in bone tissue engineering by providing a biomimetic environment that supports bone regeneration.

Class of Inventions: Environmental Protection and Energy

NATIONAL INSTITUTE OF RESEARCH - DEVELOPMENT FOR MACHINES AND INSTALLATIONS DESIGNED FOR AGRICULTURE AND FOOD INDUSTRY – INMA BUCHAREST

HIGH-EFFICIENCY MULTILAYER FILTRATION SYSTEM WITH AUTOMATIC CLEANING AND BACKWASHING FOR AQUAPONICS

Category: Patent application A-00140 / 2025

Authors: Voicea Iulian, Olan Mihai, Vlăduț Valentin, Nenciu Florin, Oprescu Remus

Description: The invention refers to an aquaponics system and, in particular, to an integrated filtration equipment that purifies water, efficiently circulates nutrients, and minimizes maintenance through an automation system for fish culture and farming. The invention solves the problems of existing aquaponics systems, such as poor filtration, clogging, maintenance difficulties, and excessive energy consumption, and contributes to building a more stable and efficient aquaponics system.

Class of Inventions: Mechanics, Industrial Processes, and Metallurgy

BIOCOMPOSITE BASED ON AMINOCIDS FROM KERATINOUS PROTEIN MATERIALS AND THE PROCESS FOR ITS PRODUCTION

Category: Patent application A-00754 / 2024

Authors: Fodorean Teodor Gabriel, Nagy Elena-Mihaela, Boeru Adrian Iosif, Luca Leontina, Marica Mircea

Description: The invention refers to a process for the preparation by alkaline hydrolysis of keratinous protein materials in order to obtain amino acids, intended for agriculture as plant biostimulants. The reducing agents, the ways and working parameters in the reduction process, the conditions that create the possibility of increasing the yield in amino acids and the final quality of the product are indicated.

Class of Inventions: Mechanics, Industrial Processes, and Metallurgy

MOBILE ROBOT FOR TOMATO LEAF PRUNING

Category: Patent application A-00627 / 2024

Authors: Matache Mihai, Cristea Robert, Chirișescu Marian, Gheorghe Gabriel, Voicea Iulian, Cujbescu Dan, Găgeanu Iuliana, Persu Cătălin

Description: The invention refers to a mobile robot intended for the shaping and maintenance of tomato crops, being composed of a robotic arm equipped with a specialized gripper for cutting leaves and a mobile platform on rails for moving between rows of tomatoes. The gripper is equipped with scissors for precise cuts and has an advanced mechanism to retain the tail of the leaves so that they are efficiently collected in a collection container.

Class of Inventions: Mechanics, Industrial Processes, and Metallurgy

ACTIVE SOLAR DRYER FOR FRUITS AND VEGETABLES, INTELLIGENTLY CONTROLLED

Category: Patent application A-00447 / 2024

Authors: Vlăduț Valentin, Matache Mihai, Olan Mihai, Voicea Iulian, Constantinescu Mihai, Cioca Lucian-Ionel (Univ. Lucian Blaga - Sibiu), Ivașcu Victoria-Larisa (Univ. Politehnica Timișoara), Cuciureanu Dumitru (sc Q srl - Iași), Băbuțanu Corina-Alice (INCD IE ICPE-CA - București)

Description: The invention refers to a high-performance, ecological, energy-independent solution for drying food products (vegetables, fruits, pasta) to a higher level of quality and treating them against microbial load, ensuring sanitary safety.

Class of Inventions: Mechanics, Industrial Processes, and Metallurgy

MIXED INTELLIGENT SYSTEM FOR CROPS PROTECTION

Category: Patent application A-00422 / 2024

Authors: Pruteanu Augustina, Matache Mihai, Sorică Cristian, Voicea Iulian, Cristea Mario, Ionescu Alexandru

Description: The invention refers to a mixed intelligent system for the protection of crops that integrates light, sound and ultrasound with the role of protecting agricultural crops, horticulture, vineyards and orchards against the invasion of harmful birds that destroy crops by eating fruits, vegetables, seeds or grains.

Class of Inventions: Mechanics, Industrial Processes, and Metallurgy

ROBOTIC ARM FOR UNDERWATER DRONES

Category: Patent application A-00420 / 2024

Authors: Cujbescu Dan, Voicea Iulian, Olan Mihai, Persu Cătălin, Vlăduț Valentin, Matache Mihai

Description: The invention presents an innovative high-performance solution used for researching the environment for the development of aquatic resources and carrying out operations such as taking samples from the bottom of the water or removing toxic waste.

Class of Inventions: Mechanics, Industrial Processes, and Metallurgy

EQUIPMENT AND METHOD FOR SOIL TILLAGE AND GRASS SEEDING

Category: Patent application A-00313 / 2024

Authors: Marin Eugen, Anghelache Dragoș, Dumitru Dragoș, Manea Dragoș, Prisacariu Elisabeta, Harabagiu Alin

Description: The invention refers to an equipment and method for tilling the soil and sowing herbs, intended for fertilizing the intervals between rows in orchards, vineyards, nurseries and hop plantations in a single pass, or successive passes, depending on the agrotechnical requirements and the conditions pedoclimatic.

Class of Inventions: Mechanics, Industrial Processes, and Metallurgy

INNOVATIVE EQUIPMENT FOR CUTTING TREE ROOTS

Category: Patent application A-00251 / 2024

Authors: Zaica Ana, Ciupercă Radu, Ștefan Vasilica

Description: The invention refers to an innovative equipment for cutting the tree roots, provided with a system for monitoring and regulating the cutting resistance force.

Class of Inventions: Mechanics, Industrial Processes, and Metallurgy

PLANT GROWTH SIMULATION SYSTEM

Category: Patent application A-00252 / 2024

Authors: Găgeanu Iuliana, Persu Cătălin, Cujbescu Dan, Gheorghe Gabriel, Ionescu Alexandru, Tăbărașu Ana-Maria

Description: The invention relates to a plant growth simulation system, intended to simulate the growth of crop plants (vegetables, leafy plants, bulbous vegetables) under different conditions, from optimal to extreme, in order to open up new ways of crop management and growth of plants in the current and predicted climate conditions for the near future, taking into account the increase in the resilience of agriculture to climate change.

Class of Inventions: Mechanics, Industrial Processes, and Metallurgy

INTELLIGENT SYSTEM FOR HIGH PRECISION APPLICATION OF SOLID FERTILIZERS

Category: Patent application A-00211 / 2024

Authors: Gheorghe Gabriel, Mateescu Marinela, Dumitru Dragoș, Cismaru Melania, Cristea Oana-Diana

Description: The invention refers to a system for high precision application of solid fertilizers mounted on an agricultural drone for carrying out treatments with plant protection products in field crops, in order to apply them with precision and reduce the amount of solid fertilizers.

Class of Inventions: Mechanics, Industrial Processes, and Metallurgy

NATIONAL INSTITUTE OF RESEARCH AND DEVELOPMENT FOR OPTOELECTRONICS, INOE 2000

NEAR FIELD TELESCOPE FOR OPTIMISATION OF SOUNDING DISTANCE OF LIDAR SYSTEMS

Category: Patent application - A00542/19.09.2024

Authors: Belegante Livio; Vasilescu Georgeta-Jeni; Nicolae Doina Nicoleta; Nemuc Anca Viorica; Dandocsi Alexandru Marius

Description: This invention presents a new optical configuration for near-field telescopes used in lidar (Light Detection And Ranging) systems, designed to measure turbulent phenomena in the Planetary Boundary Layer and the lower troposphere. The optical configuration of the telescope varies depending on the application for which the lidar system is used. This configuration optimizes the sounding range

of lidar systems by reducing the incomplete overlap distance in bistatic systems. The advantages of the invention include: reduced the minimum detection range to 150 meters (while maintaining a maximum detection range of 13 km), low weight and compact size (facilitating integration, including in airborne systems), and enhanced optical stability.

Class of Inventions: Environmental Protection and Energy

LASER EMISSION STABILIZATION TECHNIQUE FOR DETECTION BY HIGH SPECTRAL RESOLUTION LIDAR

Category: Patent application - A00543/19.09.2024

Authors: Belegante Livio; Vasilescu Georgeta-Jeni; Nicolae Doina Nicoleta; Nemuc Anca Viorica; Dandocsi Alexandru Marius; Tilea Alexandru; Radu Cristian Marian

Description: This patent proposal presents an innovative approach to laser emission stabilization designed for high spectral resolution lidar (Light Detection And Ranging) systems. The method involves a novel integration of optical and electronic components to ensure real-time frequency control of the laser source, thus enhancing measurement accuracy and system reliability. The proposed system relies on an acousto-optic modulator (AOM) to split the laser emission into multiple diffraction orders. This technique stands out for its simplicity, low cost, and ease of implementation. Using off-the-shelf hardware like Raspberry Pi modules enables automatic feedback control without the need for expensive or complex instrumentation. The device monitors the emission in real time and applies adjustments instantly, ensuring optimal performance of the lidar system used in atmospheric sensing, environmental monitoring, and remote detection.

Class of Inventions: Environmental Protection and Energy

SYNTHESIS METHOD OF COMPOSITE POWDER MATERIALS WITH A (COCRNIVCU) HIGH-ENTROPY ALLOY (HEA) MATRIX REINFORCED WITH CARBIDE CERAMIC PARTICLES FOR PLASMA SPRAYING AND THE RESULTING POWDERS

Category: Patent application - A00052/15.02.2024

Authors: Nicolae Catalin Zoita, Cristiana Eugenia Ana Grigorescu, Mihaela Dinu, Ana Maria Iordache, Anca Constantina Parau, Adrian Emil Kiss, Lidia Ruxandra Constantin

Description: The invention relates to a synthesis method for composite powder materials with a (CoCrNiVCu) high-entropy alloy (HEA) matrix of a single FCC phase, reinforced with carbide ceramic particles (e.g., TiC, SiC, VC, WC, Co-WC). The synthesis process is based on controlled-atmosphere mechanical alloying, vacuum sintering and final milling to produce composite powders with particle sizes of 20–100 μm . The method is simple, efficient, scalable, and environmentally friendly. The patent claims both the synthesis method and specific (CrCoNiVCu)-(TiC/WC) x compositions. The composite powders are designed for thermal-sprayed coatings with superior mechanical and tribological performance for friction and wear-resistant applications, particularly in the automotive and aerospace industries. Examples of plasma-sprayed coatings using (CrCoNiVCu)-(TiC) x ($0.2 < x < 1$) composite powders demonstrated friction coefficients of 0.6–0.8 and wear rates of 2.0×10^{-6} to $40 \times 10^{-6} \text{ mm}^3/\text{N}\cdot\text{m}$, suitable for high-performance friction applications.

Class of Inventions: Mechanics, Industrial Processes, and Metallurgy

ULTRASENSITIVE GAS SENSOR ARRAY FOR GREENHOUSE ENVIRONMENT ASSESSMENT (GREHSEN)

Category: Research project - PED393/2020

Authors: S.M. Iordache, A.M. Iordache, S. Caramizoiu, A.M. Florea, B.I. Bită

Description: The project – Ultrasensitive gas sensor array for greenhouse environment assessment (GreHSEN) – developed a monitoring sensor array which can specifically evaluate the level of dangerous gases produced inside of greenhouses (CO_2 , NH_3). The demonstration model is an

experimental model consisting in an integrated gas sensors array and an appropriate data acquisition system. The integrated gas sensors array is based on functionalized graphene, which allows amplification of detected electrical signals. The detection mechanism is based on the variation of resistivity/conductivity and interfacial properties of the active semiconductor layer (in our case the semiconductive polymer-modified graphene layer) when exposed to different gases. The typical sensing mechanism is as follows: first, the target analyte comes into contact with the sensing layer; the analyte affects the semiconductor layer with various molecular interactions, changing the distribution of the charge carrier density; this change in the charge carrier density results in a change in the resistivity of the sensors.

Class of Inventions: Agriculture and Horticulture

FOUR-TERMINAL SOLAR CELL WITH HETEROJUNCTION STRUCTURE BASED ON NON-TOXIC METAL OXIDES AND PROCESS FOR OBTAINING

Category: Patent granted no. 134721, OSIM in the Official Bulletin of Industrial Property BOPI no. 1/2025, date of issue 30.01.2025

Authors: Chilibon Irinela, Vasiliu Ileana Cristina, Savastru Dan, Ørnulf Nordseth, Sean Erik Foss, Eduard Monakhov, Raj Kumar, Fara Laurențiu, Mitroi Mihai Răzvan, Ninulescu Valerica, Silvian Fara, Craciunescu Dan

Description: The invention relates to a four-terminal solar cell with a heterojunction structure based on non-toxic metal oxides and to a process for obtaining it, the cell being used for the production of advanced solar cells and photovoltaic panels. The solar cell according to the invention consists of two solar cells: a frontal subcell (SF) consisting of the layers (L2) as n-type emitter and the buffer layer (L3), over which is the quartz layer (L1), the p-type absorbent layer (L4) of Cu₂O, the layer (L5) of the p-type of Cu₂O doped with N and the layer (L6) of optically transparent material, and the posterior subcell (SP) formed by the layers (L9) as n-type emitter of c-Si, the layer (L10) as p-type base (c-Si) of Cu₂O absorbent material and the layer (L11) of c-Si material type p', the two subcells being separated by a layer (L7) of the encapsulation interface and a layer (L8) of SiNx, and the layer (L12) is a metallic contact layer of Al provided with four output terminals (T1 ... T4) which ensures the external contact connections. The process according to the invention is described by the following steps: making the cut plates type p, 1... 3 Ohm cm, 100 μm, 6 inches; printing (KOH) and texturing of the front surface; phosphorus emitter diffusion; elimination of phosphosilicate glass (PSG), SiNx deposition by plasma-based chemical vapor deposition (PECV); silkscreen of Ag front and Al rear; laser processing; heating contacts; welding of layers, making frontal contacts and laminating the subcell (SF) on the subcell (SP).

Class of Inventions: Information Technology, Communication, and Security

SYSTEM OF AUTOMATIC DISCHARGE OF CAPACITOR OF PUMP ENERGY OF LASERS TO PROTECT USERS

Category: Patent application - A/00162/2024

Authors: V. Savu, M.I. Rusu, D. Savastru

Description: The invention relates a system for automatically discharging the pump energy storage capacitor of a LASER, after the discharge from the power supply of the high voltage block (HV), in order to protect the user personnel, in the conditions in which he intervenes on the high voltage source and makes adjustments or measurements thereof. The technical problem solved by the invention consists in discharging the pump energy storage capacitor of lasers or for any application, where the working voltage is between $24 \div HV$ (4500Vcc max.) and which represents a danger of electric shock for the user personnel, when intervening on the high voltage source and makes adjustments or measurements thereof, characterized in that the discharge of the capacitor contributes to protecting the component elements as a load of this capacitor and also protects the user personnel of the system of which this capacitor is part.

Class of Inventions: Information Technology, Communication, and Security

PLANAR STRUCTURE WITH SURFACE PLASMON RESONANCE (SPR) WITH VOLUME DIFFRACTION

Category: Patent application - A/00401/2024

Authors: Aurelian Popescu, Dan Savastru

Description: The invention concerns optical sensors with surface plasmon resonance using resonance angle interrogation. The invention consists in generating surface plasmon-polaritons by coupling light with a wave confined at the interface of a metal film. In this method, the light falling on the structure formed in the described way is diffracted by a diffraction grating and directed at a certain angle corresponding to the resonance conditions. The value of this angle according to theoretical analyses exceeds the angle of total reflection. To simplify the technology, the diffraction grating is made in the volume of a film of amorphous chalcogen compounds, which are semiconductor materials. This class includes the compounds As₂S₃, As₂Se₃, As-S-Se, Ge₂S, etc. The proposed structure behaves in the same way as in the case of prism coupling, but retains planarity. Surface flatness is an important achievement as it reduces manufacturing costs, reduces the size of the sensors and allows the creation of several sensors integrated on a single substrate.

Class of Inventions: Information Technology, Communication, and Security

PLANAR SURFACE PLASMON RESONANT STRUCTURE HAVING A RELIEF DIFFRACTION GRATING AND METHOD FOR MAKING THIS STRUCTURE

Category: Patent application - A/00706/2024

Authors: Aurelian Popescu, Dan Savastru

Description: The invention relates to surface plasmon resonance (SPR) structures for optical sensors and consists in generating surface plasmon-polaritonic waves. The waves are confined at the interface between the metal film and the ambient medium, and the propagation constant depends on its refractive index. The method of making the structure according to the invention consists in making on a transparent support a transmission diffraction grating that directs the beam at the plasmon resonance angle. The grating is made in a photoresist layer on a transparent plane-parallel lamella (substrate) which, using immersion oil, is attached with the opposite side to the substrate containing on the outside a thin metal film. The SPR structure consists of a thin metal film deposited on one side of the substrate. The other side of the substrate contains a relief diffraction grating. The structure with the metal film in contact with the MA ambient environment acts as an optical sensor that reacts to changes in the refractive index of the MA.

Class of Inventions: Information Technology, Communication, and Security

NATIONAL INSTITUTE OF RESEARCH AND DEVELOPMENT FOR OPTOELECTRONICS, INOE 2000 DRUGON INTERNATIONAL SRL

COMPOSITIONAL GRADIENT STRUCTURES FOR PROTECTIVE COATINGS OF CUTTING TOOLS USED IN THE WOODWORKING INDUSTRY

Category: Patent application - A/00646/30.10.2024

Authors: Alina Dragomir, Catalin Vitelaru, Mihaela Dinu, Iulian Pana, Anca C. Parau, Lidia R. Constantin, Diana M. Vranceanu

Description: The invention relates to obtain the compositional gradient structures formed by alternating layers of metal, nitrides and carbonitrides of transition metals (Ti, Cr), to be used as protective coatings of cutting tools such as milling cutters, knives, circular cutting discs and other critical equipment for woodworking subjected to a severe wear regime.

Class of Inventions: Mechanics, Industrial Processes, and Metallurgy

**TECHNOLOGIES FOR THE DEPOSITION OF THIN CARBON-BASED PROTECTIVE LAYERS ON
COMPLEX PARTS THAT INCLUDE CAVITY GEOMETRIES FOR HYDRAULIC PUMPS**

Category: Research project - 37PTE/2025, PROCAPHID, PN-IV-P7-7.1-PTE-2024-0618

Authors: Catalin Vitelaru, Alina Dragomir (Vladescu), Mihaela Dinu, Anca Constantina Parau, Iulian Pana, Lidia Ruxandra Constantin, Catalin Dumitrescu, Arcadie Sobetskii, Alaa Abou Harb, Mohammed Alqasim Alsabti, Alexandru Anghel, Cornel Staicu, Corneliu-Constantin Porosnicu

Description: The project aims to develop and implement technologies for the deposition carbon based protective coatings on complex shape pieces with cavitory geometry. This can include: engine cylinders, tubes, shields for turbines, components of hydraulic pumps etc. The technology is implemented on both laboratory and industrial scale and is based on a combination of known techniques: high power impulse magnetron sputtering, chemical vapor deposition, thermionic vacuum arc. The cracking of reactive gas is ensured via few mechanisms: the high-power pulsed plasma, appropriate biasing on the substrate, cavitory cathode effect due to the specific shape of the substrates to be deposited. Multilayer structures based on carbides and nitrides are developed during the project, due to their known quality as hard protective coatings, aiming to ensure both good adherence to the substrate and good mechanical properties of the structure. A first application will be in hydraulics, where the coatings will be deposited and tested on components of hydraulic pumps that are prone to wear.

Class of Inventions: Mechanics, Industrial Processes, and Metallurgy

**NATIONAL INSTITUTE OF RESEARCH AND DEVELOPMENT IN MECHATRONICS AND
MEASUREMENT TECHNIQUE – INCDMTM BUCHAREST**

DEVICE FOR REAL-TIME MONITORING AND ACTIVE POSTURAL AUTOCORRECTION

Category: Patent - EP3760170A1/ 2021-01-06

Author: Badea Cristian Radu

Description: The invention refers to a device designed to help a user maintain correct posture, respecting the spine's physiological curvatures and shoulder alignment during torso movements, weight lifting, physical training, physiotherapy, work-related activities, household chores, or walking. It allows the user to perform active postural self-corrections and monitors the spine and shoulder positions in real time, signaling deviations from a pre-set standard posture. The device consists of a central electronic unit attached to an adjustable abdominal belt with two electrodes (left and right), a flexible, inextensible thoracic-lumbar wire that splits into left and right shoulder wires, each connected to shoulder strap-type supports. The thoracic-lumbar wire continues upwards as a cervical-thoracic wire, ending in a cervical strap-type support with a fastening system.

Class of Inventions: Other

ASSEMBLY ELEMENTS FOR HOUSING OR CONTAINERS

Category: Patent application - 134134/ 2024

Author: Mărgăritescu Mihai, Brișan Cornel Mircea, Dumitriu Dan

Description: The invention refers to a system of assembly elements produced through 3D rapid prototyping, designed for manufacturing housings or containers of various shapes and sizes. The system enables fast assembly and easy disassembly, allowing parts to be reused for creating new configurations. It consists of conjugate elements of plus and minus types, assembled by inserting collar pins from plus plate-type elements into the cutouts of minus-type elements (minus plate, minus L plate, minus corner, minus half plate, minus L half plate). While other materials are not excluded, these

elements are ideally made of plastics like polyamide or ABS. The main advantages are: (1) quick and low-cost production of housings or containers with diverse shapes and sizes, and (2) reuse of components from disassembled assemblies to build new structures, offering flexibility and cost-efficiency in manufacturing.

Class of Inventions: Other

PROCEDURE FOR MONITORING ROTATING MACHINES

Category: Patent - 133003 / 2024

Author: Popescu Theodor, Manolescu Mariane Veronica, Cioboată Daniela, Stanciu Dănuț-Iulian

Description: The invention describes a procedure for detecting changes in vibration signals, useful for monitoring rotating machines. It integrates three processing techniques: (1) blind separation of independent vibration sources, (2) measurement of time-frequency information using Rényi entropy, and (3) detection of changes in Rényi entropy through segmentation. This solution allows effective monitoring even in uncertain conditions regarding machine dynamics, work environment, or high-intensity noise. Compared to existing solutions, it offers key advantages: it simplifies detection by working with independent sources and analyzing one-dimensional signals; it applies segmentation directly on Rényi entropy for better understanding of non-stationary signals and more robust change detection; it fuses information from the three techniques to avoid false alarms and enhance diagnostics. The procedure includes both pre-processing (blind separation of sources to highlight operational changes) and post-processing (Rényi entropy calculation and detection of changes in model parameters and noise dispersion) for comprehensive machine condition monitoring.

Class of Inventions: Other

NATIONAL RESEARCH AND DEVELOPMENT INSTITUTE FOR GAS TURBINES COMOTI

ELECTRICAL POWER GENERATION PLANT FOR POWERING A HIGH-POWER LASER, WITH FAST NOMINAL REGIME

Category: Patent application - A 2025 00026

Authors: Bogdan Cătălin Năvligu, Răzvan Edmond Nicoară, Cosmin Petru Suci, Alexandru Hank, Iulian Vlăduță, Jeni Alina Vilag, Călin Porfir, Theodor Mihnea Sîrbu, Dan Glasberg

Description: The invention relates to a plant for converting energy stored in the form of compressed air into mechanical energy and subsequently into electrical energy, having as its main purpose the power supply of a high-power laser system of 100 kW, with activation in an extremely short time of maximum two seconds. The electrical energy generation plant for powering a high-power laser, with a fast regime, includes a compressor connected to a high-pressure vessel by an electric drive from which, through a pressure regulating valve, the air passes into a compressed air accumulation buffer vessel from which the high-flow air passes through the instantaneous regime turbine which operates exclusively by using compressed air without a combustion process, having the capacity to reach the nominal power of 100 kW, and which drives a reducer, coupled to an electric generator and transformed by a rectifier into direct current for powering the laser system.

Class of Inventions: Mechanics, Industrial Processes, and Metallurgy

CALIBRATION INSTALLATION FOR MICROPROBES, IN SUBSONIC REGIME, WITH OPTICAL VISUALIZATION WINDOWS

Category: Patent application - A 2025 00139

Authors: Emilia Georgiana Prisăcariu, Oana Dumitrescu, Iulian Vlăduță

Description: The invention relates to a calibration installation for microprobes, in subsonic regime, with optical visualization windows, of the wind tunnel type, intended for the verification and calibration of

total pressure microprobes used in subsonic flow regimes, specially designed for total pressure microprobes with diameters between 1 and 5 mm, ensuring a controlled and comparable testing environment with the one in which the probes will be used in real applications, with provided flow velocity ranges between 0-200 m/s. The total pressure microprobe calibration installation, in subsonic mode, by optical visualization methods is made of seven subassemblies (A, B, C, D, E, F and G) connected to each other, respectively, air stream is mixed with particles, injected from the outside, resulting in a gas mixture (g) analyzed by the PIV technique using the external subassembly (F), which has the role of generating and capturing images using a set of specific laser instruments.

Class of Inventions: Mechanics, Industrial Processes, and Metallurgy

ENERGY PRODUCTION AND STORAGE SYSTEM THROUGH CAES TECHNOLOGY USING CLOSED LIGNITE QUARRIES

Category: Patent application - A 2025 00051

Authors: Iulian Vlăducă, Răzvan Edmond Nicoară, Mirela Letiția Vasile, Bogdan Naviglu, Cosmin Petru Suciu, Alexandru Hank, Ramona Manuela Stanciuc, Ștefan Alexandru Șerban, Theodor Mihnea Sîrbu, Mihai Joavină, Adrian Săvescu, Claudia Irina Săvescu, Cristian Valentin Nechifor, Emilia Georgiana Prisăcariu, Sorinel Popescu, Stela Dinescu, Sorin Mihai Radu, Marius-Valentin Drăgoi

Description: The invention refers to an energy production and storage system made through CAES technology using closed lignite quarries, which are intended to restore the economic/touristic circuits or preserve flora and fauna. The energy production and storage system realized through CAES technology using closed lignite quarries comprises a concrete cavern with segmented lining (C) insulated by waterproofing techniques with various internal, external and intermediate layers, and insulation fillings, equipped with a drainage system, realized in the exploitation front (A) of the closed quarry (in conservation) into which pressurized air is introduced at high flow rates using the compressor at a maximum pressure of 50 bar (abs) which takes over the electrical energy necessary to drive it with the electric motor (12), from the photovoltaic panel park (D), created on the tailings dumps (B) and further, the discharge process in the turbine takes place, generating electrical energy by a driving generator.

Class of Inventions: Mechanics, Industrial Processes, and Metallurgy

MANUAL GEARBOX 1:360 WITH RESIN GEAR COMPONENTS

Category: Patent application - A 2025 00372

Authors: Iulian Vlăducă, Emilia Georgiana Prisăcariu

Description: The invention relates to a high-precision speed reduction system, by means of an assembly of gears and a worm made of resin, by 3D printing, using a crank, so that at a complete rotation of the crank, the indicator needle of the speed reduction system indicates 1 degree on the circular dial. The 1:360 (D) reducer is a compact system, which allows its coupling to various devices that require angular movements within the limit of 1...360 degrees, for fine adjustments and is based on the existence of 3 speed reduction stages, $i_{1-2} = z_1/z_2 = 1/30$, $i_{3-4} = z_3/z_4 = 1/3$ and $i_{5-6} = z_5/z_6 = 1/4$, with the total reduction ratio $T_{1-6} = 1:360$, the reduction stages being included in a housing in the form of an open frame through the subassembly within the system also including a position indicating subassembly, consisting of an indicator needle and a circular indicating dial 0...360°.

Class of Inventions: Mechanics, Industrial Processes, and Metallurgy

UNDERGROUND COAL GASIFICATION SYSTEM IN CLOSED LIGNITE QUARRIES (IN CONSERVATION)

Category: Patent application - A 2025 00249

Authors: Sorinel Popescu, Iulian Vlăducă, Stela Dinescu, Sorin Mihai Radu, Răzvan Edmond Nicoară, Mirela Letiția Vasile, Bogdan Năviglu, Cosmin Petru Suciu, Alexandru Hank, Ramona Manuela Stanciuc, Theodor Mihnea Sîrbu, Mihai Joavină, Adrian Săvescu, Claudia Irina Săvescu, Cristian

Valentin Nechifor, Emilia Georgiana Prisăcariu, Marius-Valentin Drăgoi, Jeni Alina Vilag, Roxana Nicolae

Description: The invention relates to an internal gasification system in closed surface lignite quarries (in conservation), which proposes to restore the economic circuit of closed lignite quarries (in conservation), through underground gasification, so that the external surface is not affected by the usual stripping methods, the ecological implications being minimized, which uses three pipes, in which pipe (1) represents the air intake pipe, pipe (2) represents the synthesis gas exhaust pipe, and pipe (3) represents the control pipe through which additional steam/air/oxygen is introduced for controlling the quality of the synthesis gas and the combustion front, and where the pipes (1) and (2) are arranged symmetrically in a "V" shape, with an exploitation width ~120m and an area affected by exploitation ~6ha, with an operating time of approximately 9 years, and a total thermal energy obtained of $E_t \sim 330...660$ GWh or, a daily thermal energy of $E_z \sim 100...200$ MWh/day.

Class of Inventions: Mechanics, Industrial Processes, and Metallurgy

COMPACT FLOW CONTROL SYSTEM FOR 1 (ONE) NEWTON THRUST THRUSTERS INTENDED FOR SMALL SATELLITES

Category: Patent application - A 2025 00250

Authors: Valeriu Alexandru Vilag, Jeni Alina Vilag, Iulian Vlăduță, Theodor Mihnea Sîrbu, Cosmin Petru Suciu, Răzvan Edmond Nicoară, Alexandru Hank, Călin Profir, Bogdan Năvligu, Mihai Joavină, Roxana Nicolae

Description: The invention relates to a compact flow control system for testing thrusters with a thrust of 1 (one) Newton intended for small satellites, powered by gaseous fuel (hydrogen) and gaseous oxidant (oxygen) in a stoichiometric ratio, obtained by internal adjustment, through the effect of pneumatic resistance, consisting of a compact body which includes two identical flow control systems and, for regulating the hydrogen and oxygen flows, and which has a combustion chamber built inside, which communicates, through two channels, through the gaps between the threaded pins and the threaded head rods, through which the oxygen and hydrogen circulate, and the flow rate adjustment is made by adjusting the position of the threaded head rods by using an Allen key and the two hydrogen and oxygen gases thus adjusted enter the combustion chamber, where by a spark, those are ignited, the resulting combustion gas being discharged through the nozzle.

Class of Inventions: Mechanics, Industrial Processes, and Metallurgy

UNIVERSAL TEST BENCH FOR GAS TURBINE ENGINES

Category: Patent application - RO 137713 A0

Authors: Catană Răzvan Marius, Dediu Gabriel, Șerbescu Horațiu Mihai

Description: The invention relates to a gas turbine test bench designed for testing various engine types, such as turboshaft and turboprop engines, with shaft power outputs of up to 3000 kW. The test bench uses an aerodynamic dynamometer, in the form of an aviation variable-pitch propeller. The technical solution allows for testing of experimental aviation propellers and turbojet engines without requiring structural modifications to the test bench only minor replacement of specific component assemblies, depending on the testing application.

Class of Inventions: Transportation (Automotive, Aviation, Marine)

AIRCRAFT ENGINE WITH MIXED COMBUSTION

Category: Patent application - RO 138385 A0

Authors: Panaitescu Costin, Burcioiu Ionuț - Răducu, Secăreanu Rareș - Andrei

Description: The invention relates to the construction of an aircraft engine with mixed combustion, equipped with a propeller reinforced with an aerodynamically designed ring, allowing the blades to

rotate at their extremities at relative supersonic speeds. The engine features a three-stage compressor, consisting of one low-pressure stage and two high-pressure stages operating at different rotational speeds.

Class of Inventions: Transportation (Automotive, Aviation, Marine)

NATIONAL RESEARCH AND DEVELOPMENT INSTITUTE FOR WELDING AND MATERIAL TESTING ISIM TIMISOARA

MODULAR TOOL FOR FRICTION STIR WELDING AND PROCESSING

Category: Patent application - RO 138013 A2 (A/00557/12.09.2022)

Author: Lia-Nicoleta Boțilă

Description: The invention relates to a modular tool for friction stir welding and processing (FSW/FSP) of metallic materials (light alloys, steels, copper alloys, etc.). Considering that a monoblock tool must be fully replaced in case of damage, the modular tool has a special construction with interchangeable and reusable elements, made of different materials, various geometries and dimensions, for many applications. This eliminates disadvantages related to the consumption of material, labor and time required to make monoblock tools. The invention allows faster and lower cost production of sets for the modular tool elements, whose diversity of combinations will generate many tool variants.

Class of Inventions: Mechanics, Industrial Processes and Metallurgy

HYDROPHOBIC ANTI-REFLECTIVE - ANTISTATIC DOUBLE LAYER DEPOSITION SYSTEM FOR ENERGY EFFICIENCY OPTIMIZATION

Category: Patent application - A/00239/12.06.2025

Author: Alin-Constantin Murariu

Description: The present system concerns a multifunctional coating with two sequentially deposited layers, designed for surfaces exposed to solar radiation (photovoltaic panels, heliostat mirrors, automotive glass, etc.). The first layer, produced using the sol-gel technique, is doped with ionic substances or conductive nanoparticles, providing antistatic properties that prevent the accumulation of electric charges and thereby reduce the attraction of dust particles. The subsequent upper layer is porous and hydrophobic, with a low refractive index, imparting anti-reflective and self-cleaning properties to the surface. Through this combination, the system ensures increased energy efficiency by reducing reflection and maintaining surface cleanliness, while also requiring minimal maintenance in arid environments or in conditions with a high risk of electrostatic charging. The manufacturing process employs accessible chemical methods (dip-coating, spray-coating, spin-coating) and moderate thermal treatments, enabling large-scale industrial implementation at reduced costs.

Class of Inventions: Mechanics, Industrial Processes and Metallurgy

ULTRASOUND ACTIVATION DEVICE FOR FLOWING OR LIMITED VOLUME LIQUID MEDIA

Category: Patent application - RO 138756 A0 (A/00455/01.08.2024)

Author: Nicușor-Alin Sîrbu

Description: The device for ultrasonic activation of continuously flowing or limited-volume liquid media according to the invention is a simple functional constructional assembly which is attached either to containers of limited volume containing the liquid to be activated or to a plant to which the device according to the invention is inserted along the path of a continuous flow pipe for the liquid, as a subassembly adjacent to the plant. It is also possible to connect the device to a plurality of containers containing liquids which are required to be mixed and activated together so that the mixture is then collected in a single container. The device according to the invention provides an efficient and rapid

activation of liquids by the simultaneous superposition of the ultrasonic activation effect, the mechanical activation effect and the heating effect. The field of the invention is that of the activation of liquids or mixtures flowing or stored in limited volume in various processing techniques used in particular in the agri-food industry, the chemical industry, the pharmaceutical industry, the textile and leather industry.

Class of Inventions: Mechanics, Industrial Processes and Metallurgy

NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY POLITEHNICA BUCHAREST

METHOD FOR OBTAINING HYDROXYAPATITE SCAFFOLDS WITH PREDETERMINED PHYSICO-CHEMICAL CHARACTERISTICS FOR MAJOR BONE RECONSTRUCTION

Category: Patent - RO 131943 B1

Authors: Florin Miculescu, Andreea Maidaniuc, Mihnea Costoiu, Augustin Semenescu, Marian Miculescu, Florentina Ionita-Radu, Marius Arghirescu

Description: The proposed method consists of the fabrication of scaffold structures for major bone defect repair, based on monophasic (hydroxyapatite – HAP) or biphasic (hydroxyapatite + tricalcium phosphate - α -TCP or β -TCP) ceramics, which fulfill the product requirements related to mechanical strength and biocompatibility.

Class of Inventions: Healthcare, Medicine, and Cosmetics

MECHANO-ELECTRIC LAUNDRY DRYER

Category: Patent - RO131500 B1

Authors: Miculescu Florin, Miculescu Marian, Costoiu Cosmin-Mihnea, Chivu Oana-Roxana, Barbu Catalin-Alexandru, Semenescu Augustin

Description: The invention relates to a clothes dryer, which can be used in homes or hotels, for large or small, colored or white laundry or towels.

Class of Inventions: Mechanics, Industrial Processes, and Metallurgy

NEW GREEN PROTOCOL S.R.L.

ECOLOGICAL SYSTEM FOR CLEANING, MAINTENANCE AUTOMATION, AND INCREASED ELECTRICITY PRODUCTION IN PHOTOVOLTAIC POWER PLANTS – "SMART ECO-PV"

Category: Research project - PCIDIF/155/PCIDIF_P1/OP1/RSO1.1/PCIDIF_A1

Authors: Gratian Mihai Fierascu, Radu Florin Porumb

Description: SMART ECO-PV introduces an ecological system designed to automate cleaning, streamline maintenance, and boost electricity generation in photovoltaic power plants. At its core is a hybrid film-forming material with anti-reflective and self-cleaning properties, which can be applied both during the manufacturing stage of solar panels and throughout their operational life. This extends panel durability and minimizes energy losses. The system is enhanced by drones equipped with multispectral sensors and intelligent software, capable of monitoring performance, detecting defects, and applying the cleaning solution only where needed—optimizing resource usage. This integrated approach increases energy output, reduces maintenance costs, and lowers water consumption by up to 80%, supporting the shift to a sustainable energy future. The project builds on patent application no. 2022-00316 and licensing contract no. 1800/03.09.2024 with ICECHIM. Its objective is to advance the technology from TRL 4 to TRL 8 through real-world application and commercialization. Funding is secured under PCIDIF/155/PCIDIF_P1/OP1/RSO1.1/PCIDIF_A1 – Support for newly established innovative enterprises, Action 1.1, Measure 1.1.1, Component 1-LDR, MySMIS 2021 Code 334933.

Class of Inventions: Environmental Protection and Energy

EXPERIMENTAL MODEL FOR BIOFUNCTIONALIZATION OF TI-MO-ZR-TA ALLOYS USED IN ORTHOPEDIC IMPLANTOLOGY (BIO-SIMTIT)

Category: Research project

Authors: Petrică Vizureanu, Ioana Corina Moga, Mădălina Simona Bălțatu, Nicoleta Raluca Jianu, Andrei Victor Sandu

Description: The BIO-SIMTIT project proposes the development and validation of new Ti-Mo-Zr-Ta titanium alloys for orthopedic implants, with the main objective of improving their bone integration and biocompatibility. By using advanced additive laser manufacturing (SLM) technology, high precision is ensured in the creation of personalized implants, adapted to the specific needs of each patient. In addition, the application of a biomimetic surface treatment with hydroxyapatite contributes to the creation of an interface favorable to osteointegration, essential for the long-term success of the implants. This integrated approach not only meets the current requirements in the field of orthopedic implantology, but also opens up new perspectives in the personalization of treatments, offering sustainable and scalable solutions to improve the quality of life of patients.

Class of Inventions: Healthcare, Medicine, and Cosmetics

PETROLEUM-GAS UNIVERSITY OF PLOIEȘTI

TEST STAND FOR DETERMINING MECHANICAL AND TRIBOLOGICAL CHARACTERISTICS IN STATIC AND DYNAMIC CONDITIONS USING THE RESISTIVE STRAIN GAUGE METHOD FOR SLIDING BEARINGS MADE OF PLASTIC MATERIALS, DESIGNED FOR OPERATION WITH CANTILEVER SHAFTS, FEATURING AN INTEGRATED LOADING SYSTEM AND DIGITAL FORCE AND DEFLECTION READING

Category: Patent application - A/00189/2024

Authors: Bogdan – Roth Mihail, Romanet Mirela, Zisopol Dragos – Gabriel, Dinita Alin, Minescu Mihail, Ripeanu George - Razvan

Description: The invention relates to a stand for the determination of mechanical and tribological characteristics in static and dynamic mode by the method of resistive tensometry of plastic sliding bearings intended for operation with cantilever shafts with their own system of loading and digital reading of force and arrow. The sectioned experimental bearing with tensometric marks glued on these sections fig. 8 is located in the stand housing together with the conjugated experimental shaft. At the free end of the shaft, the force is applied, F_2 and by means of a digital dynamometer that generates the force that acts on a system of levers that amplifies the force, and the arrow is read on the screen of the digital comparator. The stand designed and executed in this way was made with a minimum consumption of materials, does not require large spaces for storage, has its own system for generating and measuring force and arrow. F_1 F_1 .

Class of Inventions: Mechanics, Industrial Processes, and Metallurgy

DEVICE FOR DETERMINING THE COEFFICIENT OF FRICTION WHEN SLIDING IN STATIC MODE WITH DIGITAL DYNAMOMETER

Category: Patent application - RO-BOPI 135282 A0

Authors: Bogdan – Roth Mihail, Romanet Mirela

Description: The invention relates to a device for determining the coefficient of friction on sliding in static mode equipped with a digital dynamometer (5) intended for the investigation of pairs of plastics with metallic materials. More specifically, the device determines static friction coefficients for the materials used in the construction of non-circular gears.

Class of Inventions: Mechanics, Industrial Processes, and Metallurgy

**NON-CIRCULAR GEAR WITH CONTINUOUS VARIATION OF THE DISTANCE BETWEEN AXLES
(WITH A SLIDE AND SLIDING STONE) WITH AUTOMATIC ADJUSTMENT**

Category: Patent application - RO-BOPI6/2022 A0135847

Authors: Bogdan – Roth Mihail, Romanet Mirela, Ripeanu George – Razvan

Description: The invention relates to a variable offset gear produced by a remote-controlled electric motor. The use of this device allows a wide range of variable gear ratios to be obtained. This device has a wide range of use and can replace a connecting rod-crank mechanism. The device contains a circular gear that can be offset by means of a worm gear and a motor for the variation of the misalignment. The auger-auger mechanism ensures that this system is self-locking during operation without the need for any other safety elements. The device can be used for actuators in the field of agricultural machinery and textiles or packaging in the automated process. Practice shows that there are many situations in which the need for a variable gear ratio is required for the control of assembly or mechanical processing processes. Variable gear ratios can convert rotational motion into linear or oscillating displacements with variable speeds. The realization of these variable gear ratios or the variable displacement between axles can also be achieved with the help of these eccentrically offset non-circular wheels operated by remote control and during operation.

Class of Inventions: Mechanics, Industrial Processes, and Metallurgy

**ECCENTRIC CIRCULAR GEARED WHEEL WITH GEARMOTOR ATTACHED FOR CONTINUOUS
VARIATION BETWEEN THE AXES OF A GEAR WITH REMOTE CONTROL OPERATION OF THE
MOTOR DURING OPERATION**

Category: Patent application - RO-BOPI 6/ 2022/ 135849 A0

Authors: Bogdan – Roth Mihail, Romanet Mirela, Ripeanu George – Razvan

Description: The invention relates to a variable offset gear produced by a remote-controlled electric motor. The use of this device allows a wide range of variable gear ratios to be obtained. This device has a wide range of use and can replace a connecting rod-crank mechanism. The device contains a circular gear that can be offset by means of a worm gear and a motor for the variation of the misalignment. The auger-auger mechanism ensures that this system is self-locking during operation without the need for any other safety elements. The device can be used for actuators in the field of agricultural machinery and textiles or packaging in the automated process. Practice shows that there are many situations in which the need for a variable gear ratio is required for the control of assembly or mechanical processing processes. Variable gear ratios can convert rotational motion into linear or oscillating displacements with variable speeds. The realization of these variable gear ratios or the variable displacement between axles can also be achieved with the help of these eccentrically offset non-circular wheels operated by remote control and during operation.

Class of Inventions: Mechanics, Industrial Processes, and Metallurgy

**DEVICE FOR BENDING A RECESSED CONSOLE WITH DIGITAL MEASUREMENT OF ITS OWN
ACTUATION FORCE**

Category: Patent application - RO-BOPI 9/2022/ A0135999

Authors: Bogdan – Roth Mihail, Romanet Mirela, Ripeanu George – Razvan

Description: The invention relates to a device for bending test recessed bars driven by a force at the free end with the possibility of applying the force itself with a digital dynamometer. To measure the force, it is read on the digital display of the dynamometer. The device is intended for the investigation of plastic specimens subjected to bending in brackets. Due to the small size of the device, it can be inserted between the polarization filters of a photoelasticimeter, where the state of tensions in the specimen can

be visualized in polarized light, depending on the load achieved by operating the operating wheel. The self-pressure force can be precisely adjusted, as the force value is read on the display of the digital dynamometer with an accuracy of three decimal places.

Class of Inventions: Mechanics, Industrial Processes, and Metallurgy

STRAIGHT-TOOTHED CIRCULAR TOOTH-TESTING DEVICE

Category: Patent application - RO-BOPI 7/2022/ A0135898

Authors: Bogdan – Roth Mihail, Romanet Mirela, Ripeanu George-Razvan

Description: The invention relates to a device for testing the teeth of circular teeth with straight plastic teeth. The device conforming to the invention comprises a partially toothed metal wheel which can rotate around a fixed shaft engaged in the rotational movement by means of a movable rack operated by a testing machine. On the partially toothed wheel is mounted a metal piece of rack-and-pinion tooth type that acts on a plastic toothed wheel with the role of test specimen, mounted on the same horizontal shaft fixed on a support. The invention relates to a device for bending test recessed bars driven by a force at the free end with the possibility of applying the force itself with a digital dynamometer. To measure the force, it is read on the digital display of the dynamometer. The device is intended for the investigation of plastic specimens subjected to bending in brackets. Due to the small size of the device, it can be inserted between the polarization filters of a photoelasticimeter, where the state of tensions in the specimen can be visualized in polarized light, depending on the load achieved by operating the operating wheel. The self-pressure force can be precisely adjusted, as the force value is read on the display of the digital dynamometer with an accuracy of three decimal places.

Class of Inventions: Mechanics, Industrial Processes, and Metallurgy

STAND FOR THE DETERMINATION OF STRESSES AND DEFORMATIONS ALONG AND AT THE HEIGHT OF THE TOOTH FOR GEARS WITH INCLINED TEETH AND LARGE WIDTHS BY THE METHOD OF RESISTIVE TENSOMETRY

Category: Patent application - A00095/12-03-2025

Authors: Bogdan - Roth Mihail, Bucur Mihai -Tiberiu, Cananau Sorin, Romanet Mirela, Ripeanu George – Razvan, Dinita Alin

Description: The invention relates to a stand for the determination of stresses and deformations in the length and height of the tooth for gears with inclined teeth and large widths by the method of resistive tensometry. With the original design stand, it is possible to simulate the operating behavior of gears with long, inclined, bent teeth, from the moment they enter the gear until they exit the gear. The variant of the stand designed by the author differs a lot from a constructive point of view compared to other stands. The stand is designed to operate attached to a universal laboratory machine for compression, which generates the force applied tangentially to the tooth, a force that determines the bending moment of the tooth along its length and height.

Class of Inventions: Mechanics, Industrial Processes, and Metallurgy

***POLITEHNICA UNIVERSITY OF TIMISOARA, FACULTY OF ENGINEERING HUNEDOARA,
ROMANIA, CITT POLITEHNICA 2020***

DIRECT SUPERSUCTION AIR FILTER WITH MULTIPLE DIFFUSERS

Category: Patent application - A 2023 00684 / RO-BOPI 4/2024

Author: Corneliu Birtok Baneasa

Description: The invention refers to an air filter, capable of capturing, recovering, accelerating and modulating the air flow used to form the fuel mixture intended for the operation of internal combustion engines in accordance with their operating regime. The invention can be applied mainly in the field of the construction industry of motor vehicles equipped with internal combustion engines and in the aerospace, naval, petroleum industry or in any other sector that uses internal combustion engines.

Class of Inventions: Transportation (Automotive, Aviation, Marine)

POLITEHNICA UNIVERSITY OF TIMISOARA, FACULTY OF ENGINEERING HUNEDOARA

POSSIBILITIES FOR VALORIZATION OF IRON ORE WASTE IN INDUSTRY

Category: Research project

Authors: Adriana Bobora, Ana Socalici, Corneliu Birtok Baneasa

Description: Description of Innovation/ Invention: The Carbofer process represents a viable solution for utilizing powdery wastes (tailings from the mining industry, sludges and dust from the steel industry, slags resulting from secondary steel treatment, etc.) generated by the steel and mining industries. The steel industry produces significant quantities of powdery wastes rich in iron and carbon, a substantial portion of which is still being landfilled.

Class of Inventions: Environmental Protection and Energy

***POLITEHNICA UNIVERSITY OF TIMISOARA, RCEM, CITT POLITEHNICA 2020,
"GHEORGHE ASACHI" TECHNICAL UNIVERSITY OF IASI***

INFRARED RULER

Category: Patent application - A/00388/2024

Authors: Șaptebani Neta Ionelia, Mocan Liviu Marian, Dragan Florin, Ivascu Larisa, Pislaru Marius

Description: The invention relates to an infrared ruler used for measuring linear dimensions. This is achieved by wrapping an electrically heated conductor wire around an assembly of insulating plates, with a centrally located metal plate cooled by forced ventilation or cooling elements. Alternatively, the wire can be arranged on an insulating structure with compartments through which a cooling fluid circulates, either in a single compartment or in systems with opposing or multiple flows, ensuring the uniformization of the thermal field.

Class of Inventions: Transportation (Automotive, Aviation, Marine)

ROMANIAN INVENTORS FORUM

**PHYTOTHERAPEUTIC FORMULATIONS FOR PRESERVING PROSTATE HEALTH AND
BALANCING URINARY AND SALIVARY PH**

Category: Patent application - MD2025

Authors: Kamel Earar, Emil Ceban, Viorel Jinga, Mariana Jian, Solomon Oleg, Simona Pârvu, Andrei Victor Sandu, Mariana Lupoe

Description: The invention relates to a phytotherapeutic formulation designed to support long-term prostate vitality and promote a balanced internal environment. It consists of extracts or dried parts of carefully selected medicinal plants known for their synergistic effects: *Urtica dioica* (nettle) – recognized for its diuretic, anti-inflammatory, and detoxifying properties; *Epilobium parviflorum* (small-flowered willowherb) – known for its targeted anti-inflammatory action on prostate tissue; *Equisetum arvense* (horsetail) – valued for its remineralizing and pH-regulating effects on the urinary tract; *Taraxacum officinale* (dandelion) – a powerful liver and kidney detoxifier that contributes to creating an alkaline systemic environment; and *Betula pendula* (birch) – offering mild diuretic and anti-inflammatory support.

The composition is intended to maintain prostate health and function over time, while also aiding in the regulation of urinary and salivary pH.

Class of Inventions: Healthcare, Medicine, and Cosmetics

PHYTOTHERAPEUTIC SUPPORT FOR PROSTATE HEALTH USING XANTHIUM SPINOSUM

Category: Patent application - MD20251

Authors: Emil Ceban, Kamel Earar, Oleg Solomon, Mariana Jian, Viorel Jinga

Description: Prostate health is a key factor in maintaining male reproductive function. Epidemiological studies show that most men develop various prostate conditions during their lifetime, primarily due to hormonal imbalances. Therefore, maintaining optimal prostate health is a fundamental goal in preventive medicine. A balanced lifestyle and the use of phytotherapeutic preparations with anti-inflammatory and diuretic properties can contribute significantly to prevention. Among these, *Xanthium spinosum* (spiny cocklebur) stands out as a valuable medicinal plant with documented therapeutic potential. This invention explores the application of *Xanthium spinosum* in supporting prostate health through its phytotherapeutic properties. The plant, naturally occurring in Europe including Romania, contains a unique mix of bioactive compounds such as essential oils, fatty acid salts, flavones, phytosterols (including beta-sitosterol), saponins, tannins, caffeic and chlorogenic acids, and xanthanin lactones. These compounds give the plant significant therapeutic qualities relevant for prostate and urinary tract conditions.

Class of Inventions: Healthcare, Medicine, and Cosmetics

ROMVAC COMPANY S.A.

IGY – EXPERIMENTAL MODEL FOR PASSIVE IMMUNIZATION IN COVID-19 INFECTION

Category: Research project

Authors: Carolina Constantin, Monica Neagu, Teodora Diana Supeanu, Viorica Chiurciu, Demetrios A. Spandidos

Description: In the case of bacterial infections caused by antibiotic-resistant pathogens, the use of a rapid and effective treatment has become a process under continuous research and development. The emergence of increasingly resistant and aggressive bacterial and viral strains has redirected research towards the development of an efficient and affordable product, in contrast to the use of monoclonal antibodies in the treatment of these infections, which are obtained at high costs. Therefore, in recent years, attention has been focused on IgY-type antibodies, produced by bird, amphibian, and reptile species, with a function similar to IgG immunoglobulins in mammals. Passive immunization with IgY in patients, especially in those with immunosuppression, leads to a rapid active immune response, followed by the elimination of the infectious agent.

Class of Inventions: Healthcare, Medicine, and Cosmetics

THE USE OF THE IN VITRO INHIBITORY CAPACITY OF BACTERIAL MULTIPLICATION IN THE PRESENCE OF OVOTRANSFERRIN IN ALTERNATIVE MEDICINE (OVOTRANSFERRIN-BASED GELS)

Category: Patent application - A/00008-2015/13.01.2025

Authors: Ionel Victor Pătrașcu, Viorica Chiurciu, Constantin Chiurciu, Mariana Oporanu, Elena Oltean, Georgiana Topilescu, Iuliana Mihai

Description: Ovotransferrin is a significant component of the avian (chicken) egg, playing a role in the innate defense system against pathogenic microorganisms. This innate defense capacity is based on the property of ovalbumin to bind trivalent iron ions (Fe^{3+}), which are necessary for bacterial multiplication. In the absence of iron, bacteria are unable to proliferate, thus demonstrating the

bacteriostatic action of ovotransferrin. There are also data regarding the antifungal and antiviral activity of ovotransferrin. The research presented in this study aimed to obtain an ovotransferrin specific to a certain antigen, through the selective immunization of hens. For the preparation of the antigens used in the specific immunization of hens, bacteria, viruses, and fungi isolated from patients hospitalized in Romanian hospitals—microorganisms resistant to antibiotics—were employed. In addition, the hens used for immunization were administered an immunomodulator P in their feed, in order to stimulate the immune response.

Class of Inventions: Healthcare, Medicine, and Cosmetics

MODERN OVOTRANSFERRIN – SPECIFIC ANTIGEN WITH A ROLE IN STIMULATING THE IMMUNE RESPONSE IN INFECTIONS WITH *SALMONELLA ENTERITIDIS* AND *ESCHERICHIA COLI*

Category: Patent application - A/00653-2014/28.08.2014

Authors: Viorica Chiurciu, Constantin Chiurciu, Ionel Victor Pătrașcu, Mariana Oporanu, Elena Oltean, Georgiana Topilescu

Description: The paper refers to a method for producing specific ovotransferrin OTF-M for a target antigen with applications in medicine. The method consists of immunizing laying hens with an antigen composed of a mixture of antibiotic-resistant *Salmonella enteritidis* and *E. coli* bacterial strains, isolating the egg white from the immunized hens' eggs, diluting it 1:1 with deionized water, adjusting the pH to 5, and performing a two-step precipitation with ammonium sulfate and citric acid, followed by dialysis and lyophilization. OTF belongs to the group of proteins known as metalloproteinases, which induce the formation of compounds responsible for heat shock. Due to this characteristic, OTF can be used in creams and ointments designed to protect against cold stress or other environmental factors.

Class of Inventions: Healthcare, Medicine, and Cosmetics

SEPARATION AND PURIFICATION OF LYSOZYME – ACTIVE ANTIBACTERIAL COMPONENT OF THE HYPERIMMUNE EGG

Category: Research project

Authors: Viorica Chiurciu, Elena Lupu, Oana Dimulescu, Mariana Oporanu, Victor Iordănescu, Cristina Urducea, Elena Oltean

Description: Lysozyme is a glycoside hydrolase with an important role in the antibacterial defense mechanism. Its main action consists in the lysis of polysaccharides in the bacterial cell wall by cleaving the β -1,4 glycosidic bond between N-acetylmuramic acid and N-acetylglucosamine. Chicken egg white represents the most important source of lysozyme (3.5%). Egg white lysozyme is a polypeptide composed of 129 amino acids, with a molecular mass of 14 kDa and an isoelectric point ranging between 10 and 11. Its molecular structure comprises two domains connected by an α -helix. This paper presents research conducted with the aim of separating and purifying lysozyme from chicken eggs and demonstrating its antimicrobial capacity.

Class of Inventions: Healthcare, Medicine, and Cosmetics

BIOACTIVE LYSOZYME DERIVATIVES WITH ANTI-INFLAMMATORY AND ANTIMICROBIAL EFFECTS USED IN ALTERNATIVE MEDICINE

Category: Research project

Authors: Viorica Chiurciu, Mariana Oporanu, Victor Iordănescu, Elena Lupu, Petru Știube, Lucia Diaconu, Ion Nicolae, Elena Oltean

Description: Lysozyme is a biologically active protein present in egg white, playing an essential role in the immune defense of the embryo. Due to its antimicrobial properties, lysozyme is extracted and used in the preparation of various products, serving either as a preservative or as a bioactive ingredient. This

paper presents the results obtained from the analysis of lysozyme content and its specific antimicrobial activity in various immunologically active products (gels, emulsions, creams, lyophilizates).

Class of Inventions: Healthcare, Medicine, and Cosmetics

USE OF AN HPLC METHOD IN THE EXPERIMENTAL MODELING OF A VACCINE AGAINST AFRICAN SWINE FEVER

Category: Research project

Authors: Viorica Chiurciu, Elena Oltean, Elena Lupu, Silvia Stănculescu, I. Nicolae, Narcisa Mederle

Description: Saponins are secondary plant-derived compounds, characterized by a bitter taste and the ability to foam in aqueous solutions. The amphipathic nature of saponins allows their use as surfactants, due to their capacity to interact with cellular components (phospholipids and cholesterol). Various types of saponins are used as vaccine adjuvants and immunostimulants because of their ability to enhance the immune response, thereby increasing vaccine efficacy. VET SAP is a highly purified triterpenic saponin extracted from *Quillaja saponaria* Molina. It is known as QS21 and is considered the "gold standard" adjuvant due to its properties of potentiating the immune response to vaccine antigens. Nicotinic acid is present in MEM medium and was considered the dosage marker.

Class of Inventions: Healthcare, Medicine, and Cosmetics

OVOTRANSFERRIN PC2, ACTIVE IMMUNOLOGICAL COMPONENT OF THE HYPERIMMUNE EGG

Category: Patent application - A/00810-2014 / 29.10.2014

Authors: Viorica Chiurciu, Elena Lupu, Mariana Oporanu, Victoraș Iulian Iordănescu, Cristina Urducea, Elena Oltean

Description: Ovotransferrin (OTf), also known as conalbumin, is a monomeric glycoprotein from the transferrin family, isolated from egg white. The protein is synthesized in the hen's oviduct by the avian transferrin gene and stored in the egg white. It represents 12–13% of the total proteins contained in egg white, has a molecular mass of 78 kDa, and shares the same amino acid sequence as human serum transferrin. The protein folds into two globular lobes, each containing an iron-binding site (Fe^{3+}). Ovotransferrin is a functional protein with multiple bioactivities. OTf and its derived peptides have high potential, being suitable for use as antimicrobial and antioxidant agents in the food industry, as well as antihypertensive, anticancer, and antiviral agents in the medical and pharmaceutical industries.

Class of Inventions: Healthcare, Medicine, and Cosmetics

SC GARAGE TRAINING SRL

ADVANCED AUTOMOTIVE DIAGNOSTICS TRAINING

Category: Trademark - advanced training courses

Authors: Gidali Adrian, Simon Florin

Description: GARAGE TRAINING's field of activity is the development and support of advanced training courses for automotive diagnosticians and qualified technical personnel in automotive repair workshops (mechatronics, electricians and car mechanics). The courses focus on the application of practical diagnostic methods, on detailed knowledge of the systems and components of the proposed topic, on the optimal use of specific measuring and testing equipment (diagnostic tester-oscilloscope-multimeter-specific equipment), as well as on compliance with the maintenance and repair standards imposed by automotive manufacturers. The initial segment of the course structure represents a series of introductory training sessions, developed specifically to understand the functioning of AUTOMOTIVE MECHATRONIC SYSTEMS.

Class of Inventions: Transportation (Automotive, Aviation, Marine)

SC HOLISTIC LOUNGE SRL

CO-TECH- TEST, MEASURE, BALANCE (INNOVATIVE CONCEPT OF AUTOMATED SOFTWARE PROCESS FOR EVALUATION AND THERAPY THROUGH BIOFEEDBACK)

Category: Patent - 301243/29.12.2023

Author: Oana Codruta Bacean Miloicov

Description: CO-TECH is an innovative and copyright-protected concept that brings a new perspective to patient evaluation and therapy. Using biofeedback, this system optimizes evaluation processes, improves therapies, and reduces execution times, resulting in a more efficient therapeutic approach. Conclusions and the Importance of a Personalized, Non-Invasive Protocol.

Class of Inventions: Healthcare, Medicine, and Cosmetics

QVIBE FREQUENCY GENERATING THERAPEUTIC DEVICE

Category: Patent - 301240/29.12.2023

Author: Oana Codruta Bacean Miloicov

Description: Hashimoto's thyroiditis is an autoimmune condition affecting the thyroid gland, leading to fatigue, weight gain, and hormonal imbalances. Thyroid nodules, often associated with this condition, can severely impact thyroid function and overall health. Q-Vibe is an innovative therapeutic frequency generator providing a natural, non-invasive, and side-effect-free solution for supporting thyroid health.

Class of Inventions: Healthcare, Medicine, and Cosmetics

VIRAL SOLUTION "SV"

Category: Patent - 301242/29.12.2023

Author: Oana Codruta Bacean Miloicov

Description: Substance composition - BASE: 5 ml Swedish Bitter, 25 ml ozonated pure water. The product is obtained by energetic imprinting with specific frequencies of known viruses; according to scientific studies, any energetically imprinted liquid generates those frequencies for a duration of approximately one month, after which the liquid no longer retains the energetic imprint.

Class of Inventions: Healthcare, Medicine, and Cosmetics

TECHNICAL UNIVERSITY OF CLUJ-NAPOCA

INNOVATIVE USE OF SHEEP WOOL AND POLYURETHANE FOAM FOR OBTAINING MATERIALS WITH SOUND-ABSORBING PROPERTIES

Category: Patent - RO136050- B1/30.05.2024

Authors: Nemeş Ovidiu, Borlea (Mureşan) Simona Ioana, Tiuc Ancuţa-Elena, Deak Gyorgy

Description: The aim of this work was to obtain materials with sound-absorbing properties using sheep wool and rigid bicomponent polyurethane foam. Were obtained four materials composed of three layers, a layer of sheep wool previously processed by hot pressing at 80°C and 5 MPa, with final thicknesses of 2, 4, 6 and 12 mm; a layer of rigid bi-component polyurethane foam, with a thickness of 8....37 mm and a transition layer, 1...20 mm thick, resulting from the migration of polyurethane foam during the

multilayer panel manufacturing process into the wool layer and/or the migration of wool into the polyurethane foam layer. Wool and polyurethane foam are the combination of sound insulation and sound absorption - wool absorbs sound and reduces it, and due to the rigid structure of polyurethane foam (closed pore structure), it does not allow sound to travel further, resulting in sound insulation. The obtained materials have very good sound absorption properties with acoustic absorption coefficient values over 0.7 for the frequency range 800 ÷ 3150 Hz; the results prove that the sheep wool has a comparable sound absorption performance to that of mineral wool.

Class of Inventions: Environmental Protection and Energy

PROHEP-LCT- PARALLEL ROBOT FOR LAPAROSCOPIC TREATMENT OF HEPATIC TUMORS

Category: Patent - RO134189- B1/30.10.2024

Authors: Plitea Nicolae, Pîslă Doina Liana, Vaida Liviu Călin, Gherman Bogdan George, Tucan Paul George Mihai

Description: The invention relates to a parallel robot for laparoscopic treatment of unresectable liver tumors. According to the invention, the robot consists of two robotic modules: the intra-operative ultrasound (I-US) guiding module is designed for guiding a hepatic ultrasound probe in the operating field; the needle guiding module is designed for guiding and inserting brachytherapy needles in hepatic tumors (which are localized using I-US). Each robotic module has five degrees of freedom and are placed on a common frame which is fixed on the patient's bed. Furthermore, both parallel robotic modules consist of two parallel mechanisms, one with three degrees of freedom and is used for positioning an automated medical instrument (to manipulate a hepatic ultrasound probe, or for brachytherapy needle insertion), and the second mechanism with two degrees of freedom for the automated instrument orientation.

Class of Inventions: Healthcare, Medicine, and Cosmetics

PROCESS OF MANUFACTURING CUSTOMIZED MULTI-STRUCTURE MEDICAL IMPLANTS BY ADDITIVE MANUFACTURING TECHNOLOGIES

Category: Patent - RO132908- B1/28.02.2024

Authors: Leordean Vasile Dănuț, Radu Sever-Adrian, Cosma Sorin-Cosmin, Cuc Stanca, Vilău Cristian, Rusu Mircea-Aurelian-Antoni

Description: The invention is related to the development of a process (technology) for manufacturing customized implants, made of biocomposite material, reinforced with metallic structures made by SLM. The obtained implants of the multi-structure type (metal / biocomposite) are individualized for a patient and can prosthesis any area of the human bone system. It is based on CT data from which to extract the 3D model of the affected area. The final shape and the resistance structure (metal reinforcement) of the future implant it will result by using the CAD + FEA programs. The manufacture consists of two stages. The first uses two AM technologies - using SLM the metal reinforcement is made and, by SLS and Vacuum Casting is manufactured the silicone rubber mould that will form the final implant. In the second stage - the reinforcement is inserted into the silicone mould and by means of casting/injection (depending on the material recipe) the final customised implant is made.

Class of Inventions: Healthcare, Medicine, and Cosmetics

MONO-BLOCK BODY FOR LOW-MASS VEHICLES

Category: Patent - RO133971- B1/ 30.12.2024

Authors: Bere Petru Paul; Neamțu Călin Gheorghe Dan; Dudescu Cristian; Krolczyk Grzegorz

Description: The invention relates to a monoblock body for motor vehicles and to a sandwich-type fiber-reinforced composite material for making the body, the composite structure exhibiting high mechanical resistance and low mass. According to the invention, the body is made of a sandwich-type composite structure consisting of a honeycomb-like aluminium core placed between an exterior layer and an interior layer made of a glass-fiber-, carbon-fiber- or Kevlar-reinforced composite material, the body consisting of two cones, a front one and a back one, for impact, continued with a floor provided, on the edges, with two sills made of composite material, onto which four pillars supporting the ceiling, are connected, on the edge they having a resistance structure, with a reinforcing element placed inside the door with the role of protecting the passengers in case of lateral impact, all the mentioned elements being obtained in a mould with multiple separation planes inter-connected during the process of composite lamination, the operation being performed simultaneously, to finally result in a complete monoblock body.

Class of Inventions: Transportation (Automotive, Aviation, Marine)

SOFA SIDE MADE BY THERMOFORMING PROCESS AND ITS ACCOMPLISHING PROCESS

Category: Patent - RO133392 -B1/29.03.2024

Authors: Ciupan Cornel, Filip Ioan, Cionca Ioan, Ciupan Emilia

Description: The invention relates to the structure of a sofa side made of composite material based on natural fibers (hemp 50-60%) mixed with polypropylene (40-50%). The material is obtained by interweaving. The sofa side has the shape of a box and is made up of an inner shell, an outer shell and a rib that is mounted between the two shells. It replaces a classic side made mainly of wood which was made up of 21 pieces. The process presents the phases and parameters of thermoforming of the three components and the way of assembling them. The thermoforming process consists of the following phases: tailoring, heating to 210-220°C, transfer to the core mold and calibration by pressing with the cavity mold. After cooling, the piece is extracted from the mold and it is finished on the contour.

Class of Inventions: Mechanics, Industrial Processes, and Metallurgy

ECOLOGICAL ROAD CONCRETE BASED ON CEMENT, GLASS POWDER AND AGGREGATES FROM RECYCLED CONCRETE WASTE FOR APPLICATIONS IN THE FIELD OF CONSTRUCTIONS "BcR_G"

Category: Patent - RO137345- B1/30.07.2024

Authors: Corbu Ofelia-Cornelia; Puskas Attila

Description: The road concrete of the invention is an environmentally friendly concrete composed of natural aggregates (NA), recycled concrete aggregates (RCA) and waste glass powder form (WGP) that replaces part of Portland cement, RCA and WGP as an alternative to conventional materials. The concrete design was carried out so that, in addition to other durability characteristics, a remarkable resistance to abrasion was obtained. It falls into the resistance class BcR5. The microstructure and compositional characteristics of the concrete were also investigated, to confirm the efficiency of WGP. This new composite offers several advantages in terms of reducing existing and potential volumes of mineral waste both economically and visually, reducing pollution and minimizing the consumption of natural resources and energy. By applying it in the construction industry, it makes it possible to move from a linear economy to a circular economy.

Class of Inventions: Environmental Protection and Energy

THE 3D PRINTING SUSTAINABLE RESOURCE FOR TEACHING MATERIALS IN BRAILLE LANGUAGE

Category: Research project

Authors: Vartolomei Nicoleta, Tănasă Simina, Pîrvu Andrei

Description: Braille is an incredibly important accessibility aid, and yet it is left out of our home projects simply because of a lack of knowledge. With the help of 3D printers, we can create different shapes, puzzles, objects and much more. But we can also use them for much better purposes. This project supports and offers blind children the chance to learn to read the "Braille" alphabet much more easily, and not only that, geometric shapes and much more. At the base are some pieces printed with the sign of each letter of the alphabet, with which they can create words, learn the type of letter and punctuation marks. We can create small puzzles with which they can create phrases, words, geometric shapes. The piece is based on magnets that make the pieces stick to each other and form a string. These Braille plates are essential in providing information in tactile format to the visually impaired or low vision. They are made with a tactile Braille system on the front surface, allowing blind people to read and interpret information by touch.

Class of Inventions: Healthcare, Medicine, and Cosmetics

**THE NATIONAL RESEARCH AND DEVELOPMENT INSTITUTE FOR TEXTILES AND LEATHER
(INCDTP)**

COLLAGEN GELS FROM STURGEON SKIN AND PROCESS FOR OBTAINING THEM

Category: Patent application - 138741 A2

Authors: Albu Kaya Madalina Georgiana, Danila Elena, Coman Alina Elena, Marin Minodora Maria, Bumbeneci Georgeta

Description: The invention relates to a process for obtaining collagen gels from sturgeon skin used for biomedical and cosmetic applications. The process for obtaining according to the invention consists of treating sturgeon skin with organic acid, namely acetic, lactic, tartaric, citric, or ascorbic acid. The swollen skin is then treated with alkali, cleaned mechanically, and the resulting dermis is washed until it reaches a pH of 6-7. Then the dermis is treated with an organic acid solution at a temperature of 4 °C, when a consistent gel is formed, which is filtered, homogenized, and left to mature for 24 h at a temperature of 4 °C.

Class of Inventions: Healthcare, Medicine, and Cosmetics

UNIVERSITY OF AGRONOMIC SCIENCES AND VETERINARY MEDICINE OF BUCHAREST

CROISSANTS WITH BUTTER AND TUNA AND CHEESE CREAM FILLING AND METHOD FOR OBTAINING THEM

Category: Patent application - A100193/26.05.2025

Authors: Ionela Florentina Toma (Enache), Carmen Georgeta Nicolae

Description: In the context of product diversification, food waste reduction and enhancing the value of fish by-products, croissants with butter and tuna and cheese cream filling have been created and evaluated for their nutritional and sensory qualities. The innovative elements consisted of croissants and tuna meat from fish processing. This approach increases the economic value of fish by-products, resulting in foods rich in nutrients and omega-3 unsaturated fatty acids. The nutritional composition of the croissants/100g is as follows: protein - 11.86%, lipids - 26.03%, carbohydrates - 28.39%, dietary fiber - 2.86%, salt - 1.3%, energy value - 400.99 kcal. Sensory analysis demonstrated that the created

and studied products are suitable for commercialization. The applicability is in the food industry (bakery, pastry, fish processing, catering), human nutrition, consumers concerned with a healthy lifestyle, research institutions, waste management and the circular economy in the fish industry.

Class of Inventions: Food Industry

NUTRITIONALLY BALANCED - VEGETABLE PROTEIN PRODUCT AND PROCEDURE FOR OBTAINING IT

Category: Patent application - A/00427/ 23.07.2024

Authors: Drăghici Mihaela-Cristina, Popa Elisabeta–Elena, Geicu–Cristea Mihaela, Popescu Paul–Alexandru, Bujor Nenița Oana-Crina, Ion Violeta-Alexandra, Dobrin Aurora, Dragomir Nela, Constantin Carmen-Gabriela, Moț Andrei, Popa Mona Elena

Description: The invention relates to a food product of the “wafer” type, savory, with a high content of plant proteins, intended for the food industry. The novelty of the invention lies in the fact that the product is obtained from a mixture of vegetable powder—namely peas, broccoli, asparagus, *Agaricus bisporus* mushrooms, and eggplant peels—whole wheat flour, cold-pressed olive oil, water, salt, and cumin. The plant-based product can be consumed by people of all ages, representing an alternative to fast meals.

Class of Inventions: Food Industry

RESEARCH ON THE SUITABILITY OF THE SPECIES *Phyllostachys pubescens* FOR PROPAGATION BY AERIAL MARCOTING

Category: Research project - 438/14.04.2025

Authors: Ricuța Vasilica Dobrinioiu, Silvana Mihaela Dănăilă-Guidea, Mihaela Cristina Drăghici, Giovanni Bezze

Description: Since bamboo is a species with gregarious flowering, blooming only once during its life after which the plants die, and the seeds are most of the time not viable, which is why they cannot be used in the multiplication process, in order to produce on a large scale the plants necessary for the establishment of new plantations, it is recommended to use alternative methods of plant propagation, respectively by vegetative propagation. The present paper aims to present the main theoretical and practical aspects related to the techniques of bamboo propagation, as well as to identify a direction regarding in particular the vegetative propagation. The results of the present research have shown that by using alternative multiplication methods, it is possible to produce an abundance of seedlings in the bamboo species *Phyllostachis pubescens*, covering market requirements, under minimal input conditions.

Class of Inventions: Agriculture and Horticulture

EMCOPAD-DOCTOR TECH

Category: Research project - 037379

Author: Claudia Maria Stoica, Elena Maria Drăghici, Marian Velcea

Description: Research conducted on tomato crops (*Solanum lycopersicum* L.) grown in a non-conventional system and exposed to low-voltage electromagnetic fields, using devices primarily intended for treating imbalances in the human body, provides alternatives for improving tomato crop yields.

Class of Inventions: Agriculture and Horticulture

RESEARCH ON THE DYNAMICS OF BIOMASS ACCUMULATION AND CARBON SEQUESTRATION IN MOSO BAMBOO PLANTATIONS

Category: Research project - 440/11.04.2025

Authors: Ricuța Vasilica Dobrinou, Mihaela Cristina Drăghici, Giovanni Bezze

Description: Although at the moment the cultivation of giant bamboo is viewed as a challenge, in the near future this crop will certainly be regarded as an alternative source of biomass, not only because the species efficiently utilizes land deemed unsuitable for other crops, but also due to this species' extraordinary ability to fix CO₂ from the atmosphere and thus reduce the level of greenhouse gas emissions in the atmosphere, by using environmentally friendly practices. The research was carried out in a bamboo plantation of 8-year-old located in Sant'Egidio, Italy, which is a rural locality located in the municipality of Ferrara, in the province of Ferrara, in the Emilia-Romagna region. It is known that giant bamboo has a long lifespan, an intense growth rate, and an extraordinary regenerative capacity, making it a sustainable source of renewable energy, while also contributing to the reduction of greenhouse gas emissions by sequestering organic carbon from the atmosphere. Research has demonstrated the importance of cultivating moso bamboo as an alternative energy source through biomass production per unit area, while also contributing to the reduction of environmental pollution.

Class of Inventions: Environmental Protection and Energy

CLIMATE CONTROL ENERGY SYSTEM IN ORDER TO REDUCE ENERGY CONSUMPTION IN GREENHOUSES

Category: Patent application - U/00006 13.02.2025

Authors: Jerca Ionuț Ovidiu, Bădulescu Liliana Aurelia, Cîmpeanu Sorin Mihai, Teodorescu Răzvan Ionuț, Postamentel Mariana, Sannan Sigurd, Gether Harald

Description: The energy system for controlling climatic factors in order to reduce energy consumption in greenhouses is intended to ensure superior energy efficiency of continuous tomato production in controlled spaces located in the temperate-continental climate zone, characterized by excessive heat in the summer. The system is based on the energy supplied by 3 water-water heat pumps that exchange heat with a ground-water heat exchanger consisting of 30 100 m deep wells and a water-air dry cooler.

Class of Inventions: Agriculture and Horticulture

A COMPREHENSIVE DIGITAL PLATFORM FOR LAND USE PLANNING, CARBON FOOTPRINTING, AND DECISION MAKING IN EUROPEAN AGRICULTURE

Category: Research project - 87/2025

Authors: Ana Cornelia Butcaru, Roxana Ciceoi, Cristian Moise, Otso Valta, Anna Walkiewicz, Tugrul Yakupoglu, Jan Paul Lindner, Ariane Voglhuber-Slavinsky, Ibrahim Khalil

Description: The European Council's ambition to cut greenhouse gas (GHG) emissions by 80–95% by 2050 while ensuring climate-resilient agriculture highlights the need for robust decision tools. HOLOSEU responds by creating an advanced, open-source platform that integrates soils, climate, biodiversity, agroforestry, crops, livestock, and socio-economic factors to guide sustainable land use planning across Europe. Building on the HOLOS-IE model, the project extends functionality with modules for agrobiodiversity, circular bioeconomy, and carbon-neutral farm design. Through Living Labs in Poland and Romania, HOLOSEU will generate real-world data for calibration, incorporating high-resolution inputs from Copernicus, NASA, drones, and IoT sensors. The platform supports emissions quantification, climate adaptation, nutrient recycling, biodiversity assessment, and scenario analysis of mixed farming systems. By aligning with the Green Deal, CAP, and the EU Biodiversity Strategy, HOLOSEU empowers farmers, advisors, and policymakers with actionable insights to optimize resources, reduce carbon footprints, and foster resilient, economically viable agroecosystems.

Class of Inventions: Agriculture and Horticulture

VIRGINIA (DIOSPYRVIRGINIANA ROS L.) - ROMANIAN VARIETY OF PERSIMMON

Category: Patent - 6399/31.07.2023

Authors: Stănică Florin, Lehman Jerry, Mihai Cosmin Alexandru, Peticilă George Adrian

Description: The tree has medium vigor, with a divergent habit. The leaf is oval with a narrow, pointed base. The plant has only female flowers with medium-sized corollas. The fruit is medium-sized, weighing 46.9 g, flattened, with an irregular circular shape in cross-section. It has orange and astringent skin and pulp. The content in S.U.S. is 26.9%. The fruit contains an average of 1.3 seeds, medium in size and brown in color. It is a late-ripening variety. It can be grown in areas favorable for plums. Areas of application: Horticulture, organic farming.

Class of Inventions: Agriculture and Horticulture

JERRY L (DIOSPYROS VIRGINIANA L.) - ROMANIAN VARIETY OF PERSIMMON

Category: Patent - Nr. 6398/31.07.2023

Authors: Stănică Florin, Lehman Jerry, Mihai Cosmin Alexandru, Asănică Constantin Adrian

Description: The tree has medium vigor, with a semi-erect habit. The leaf is oval, with a rounded base. The plant has only female flowers, the corolla diameter is medium and has four lobes. The fruit is medium in size, weighing 44.7g, is flattened and irregularly circular in cross section. The fruit epidermis is orange and the pulp is yellow-orange and astringent. The content in U.S.S. is 26.3%. The fruit contains an average of 0.9 seeds, of medium size, semi-flattened and brown in color. The fruit ripens in the middle. It can be grown in areas favorable for plums. Areas of application: Horticulture, organic farming.

Class of Inventions: Agriculture and Horticulture

DEVELOPMENT OF A DETECTION METHOD FOR GALL MITE-RESISTANT BIOTYPES IN LYCIUM CHINENSE (GOJI)

Category: Patent application - A100767 /2022

Authors: Roxana Ciceoi, Oana Venat, Mihaela Iordăchescu, Cătălina Nicolae, Ana Butcaru, Vasilica Luchian, Minodora Tudose, Mala-Maria Stavrescu-Bedivan, Dan Popescu, Adrian Asanică, Florin Stănică

Description: The rapid expansion of goji (*Lycium* spp.) cultivation in Europe, driven by growing demand for organic functional foods with recognized health benefits, has been challenged by the spread of the invasive gall mite *Aceria kuko*. First reported in Romania in 2013, this pest threatens the sustainability of new plantations. The ProtectGoji project addresses this challenge by developing a detection method for resistant biotypes of *Lycium chinense*. The invention combines in vitro culture techniques with molecular marker-assisted selection (ISSR and SSR), enabling the early identification of gall mite-resistant plant material. The approach includes tissue disinfection with sodium hypochlorite and cultivation on hormone-free Gamborg B5 medium, followed by molecular analysis of seedlings or planting material. Resistant and susceptible biotypes can be differentiated using specific DNA banding patterns, facilitating reliable screening in breeding and propagation programs. This method supports the production of resistant varieties, strengthens goji cultivation in Romania, and contributes to sustainable, low-input berry farming.

Class of Inventions: Agriculture and Horticulture

AGROECOLOGY LIVING LABS FOSTERING PROSPEROUS AND SUSTAINABLE AGRI-FOOD SYSTEMS

Category: Research project - 107/2025

Authors: Lene Sigsgaard, Roxana Ciceoi, Daniel Pleissner, Stine Kramer Jacobsen, Junbin Zhao, Achim Schmalenberger, Essaid Ait Barka, Ole Green, Thibault Deville, Véronique Fleury, Oana Bujor, Oana Venat

Description: The AllEcoSys project promotes resilient, sustainable agricultural systems through a European network of Living Labs that foster agroecological practices enhancing soil health, biodiversity, and natural pest and disease control. By integrating traditional and indigenous knowledge with scientific insights via co-creation, the project empowers producers and strengthens collaboration with research infrastructures, advancing sustainable food production and environmental conservation. Its structure includes six work packages: stakeholder engagement and co-creation; soil quality and microbiome analysis; crop diversification and biocontrol; and socio-economic evaluation. Building on the CORE-Organic Cofund Resberry project and other initiatives establishing national Living Labs, AllEcoSys applies co-creation to align scientific knowledge with local practices, driving agroecological innovation. Preliminary results show improved soil health, biodiversity, and crop resilience. Socio-economic assessments of trade-offs and barriers will inform scaling efforts. Contributing to the European Green Deal, AllEcoSys offers a scalable model for co-created solutions that ensure resilient, prosperous, and sustainable agricultural systems.

Class of Inventions: Agriculture and Horticulture

RESEARCH ON THE USE OF PLASMA TECHNOLOGIES FOR THE CONTROL OF PESTS AND DISEASES AFFECTING STORED AGRICULTURAL PRODUCTS AND THE EVALUATION OF ITS EFFECT ON SEEDS AND PLANTS, FOR A SUSTAINABLE AND QUALITY PRODUCTION - ADER 2.1.7.

Category: Research project - ADER 2.1.7

Authors: Roxana Ciceoi, Oana Venat, Mihaela Iordăchescu, Ioana Cătălina Nicolae, Ana Butcaru, Elena Ștefania Ivan, Bujor-Nenița Oana-Crina, Liliana Bădulescu

Description: The ADER 2.1.7 project investigates the application of plasma technologies as innovative, eco-friendly alternatives for managing pests and diseases in stored agricultural products, while also evaluating their impact on seeds and plant development. The overall objective is to improve the quality and competitiveness of field crop production by reducing reliance on toxic compounds and promoting components beneficial to human health. Specifically, the project assesses the effectiveness of plasma treatments in controlling major storage pests and mycotoxin-producing fungi in cereals and legumes, with the aim of integrating these methods into sustainable pest management strategies. Parallel studies focus on seed germination, vitality, seedling growth, and biochemical parameters, providing insight into plasma's influence on plant development. By aligning with the European Green Deal targets—reducing pesticide use, enhancing soil fertility, supporting organic farming, and protecting biodiversity—this research contributes to safer, more sustainable food systems and offers promising perspectives for both agriculture and consumer health.

Class of Inventions: Agriculture and Horticulture

INTEGRATING SUSTAINABLE STRATEGIES FOR POST-HARVEST CONTROL OF FRUITS THROUGH BIOACTIVE EDIBLE COATINGS - SAFEFRUITS

Category: Research project - PN-IV-P7-7.1-PED-2024-2366/ Contract 123PED/2025

Authors: Alina Ortan, Daniela Ionescu, Carmen Laura Cîmpeanu, Simona Marcu Spinu, Mihaela Dragoi Cudalbeanu, Justinian-Andrei Tomescu, Cristina Mihaela Luntraru, Maria Ivopol, Stefan Buhaev, Gabriela Denisa Rizea

Description: Ensuring food security in the context of global population growth requires innovative, sustainable solutions to reduce post-harvest losses and extend the shelf life of perishable fruits. In this context, the project SafeFruits aims to deliver an innovative solution for concomitantly extending the shelf life of harvested fruits and providing health benefits to the consumer through the development of a technology for obtaining bioactive edible coatings, using green chemistry approaches. In particular, the scope of the project is to develop and validate on a laboratory scale a technology for obtaining edible coatings based on a natural polysaccharide, enriched with bioactive compounds with antioxidant and antimicrobial properties, obtained from the extraction of plant material using Natural Deep Eutectic Solvents (NADES). By addressing this critical intersection of post-harvest preservation and nutritional security, the project contributes to the European Union's vision for sustainable agri-food innovation by developing a natural, eco-friendly edible coating for fruits, directly supporting the Strategic Research Agenda and the UN Sustainable Development Goal 2 – “Zero Hunger”. This work was supported by a grant of the Romanian Ministry of Education and Research, CCCDI-UEFISCDI, project number PN-IV-P7-7.1-PED-2024-2366, contract 123PED/2025 within PNCDI IV.

Class of Inventions: Food Industry

ADVANCED ECOLOGICAL SOLUTIONS FOR INCREASING FOOD SAFETY OF FRUITS AND VEGETABLES, FROM PRODUCER TO CONSUMER

Category: Research project - PN-IV-P7-7.1-PTE-2024-0607/ Contract 57PTE/2025

Authors: Daniela Ionescu, Irina Elena Chican, Alina Ortan, Justinian-Andrei Tomescu, Cristina Mihaela Luntraru, Maria Ivopol, Stefan Buhaev, Gabriela Denisa Rizea, Alexandra Ene-Manea, Irina Fierascu, Radu Claudiu Fierascu, Cristina-Emanuela Enascuta, Simona Marcu Spinu, Mihaela Dragoi Cudalbeanu, Carmen Laura Cîmpeanu

Description: The project SIGUR focuses on the transfer of an innovative technology from laboratory to industrial scale. This technology combines the synthesis of natural surfactants with their conditioning using bioactive phytocompounds obtained from plant residues, aiming to develop an eco-friendly washing solution with antimicrobial action for fresh produce. The technology ensures the safe removal of dirt, bacteria, pesticides, and wax from fruits and vegetables, without altering their taste or natural properties, thus contributing to higher standards of food safety and consumer protection. To achieve this goal, several key objectives will be addressed: documenting the scale-up of validated laboratory processes (natural surfactant synthesis, acetic solution from polysaccharide-rich residues, extraction and purification of antimicrobial phytocompounds); identifying functional, operational, and energy optimization opportunities in line with the latest scientific progress; transferring and refining the technology under industrial conditions; validating its performance both in-house and by third parties; and finally, demonstrating its efficiency at industrial scale. Through this integrated approach, the project aims to provide a sustainable and innovative ecological solution that supports food safety, promotes the circular use of plant resources, and enhances the competitiveness of the agri-food and phytotherapy sectors in Romania.

This work was supported by a grant of the Romanian Ministry of Education and Research, CCCDI-UEFISCDI, project number PN-IV-P7-7.1-PTE-2024-0607, contract 57PTE/2025 within PNCDI IV.

Class of Inventions: Food Industry

UNIVERSITY OF AGRONOMIC SCIENCES AND VETERINARY MEDICINE OF BUCHAREST, FACULTY OF ANIMAL PRODUCTIONS ENGINEERING AND MANAGEMENT

BioTA – SMART BLOCKCHAIN-BASED IOT SYSTEM FOR LIVESTOCK FARMS

Category: Research project - BioTa project, "Blockchain-Based IoT System for Monitoring and Controlling Livestock Farms", The Academy of Scientists of Romania for Young Researchers "AOȘR-TEAMS-IV" Edition 2025-2026 "Digital Transformation in Science", 2025-2026

Authors: Dănuț-Nicolae Enea, Iuliana Marin, Roxana Elena Vasiliu, Diana-Alexandra Ciungan

Description: BioTa is a blockchain-based IoT system designed for real-time monitoring and control in livestock farms, studied within a research project financed by the Academy of Scientists of Romania for

Young Researchers. The solution integrates smart lighting, sensors, wearable devices for cattle, and distributed data management to ensure secure and scalable monitoring of animal health and farm environments. Data like heart rate, movement, temperature, and humidity are collected, encrypted, and stored using a hybrid blockchain, guaranteeing traceability. Big Data and Artificial Intelligence techniques enable predictive analytics for early detection of anomalies, improving animal welfare and farm efficiency. Our research on cattle behavior recognition demonstrated that a multi-classifier approach enhances activity classification accuracy, achieving over 90% precision in distinguishing behaviors like feeding, resting, and walking. By combining data management with behavior recognition, BloTa empowers farmers, veterinarians, and regulators with insights, reducing costs, improving animal health, and contributing to sustainable livestock farming.

Class of Inventions: Information Technology, Communication, and Security

**UNIVERSITY OF AGRONOMIC SCIENCES AND VETERINARY MEDICINE OF BUCHAREST,
FACULTY OF BIOTECHNOLOGIES**

**SUSTAINABLE PROCESS FOR DELIVERING WATER AND BIOSTIMULANTS TO PLANTS
GROWN IN PROTECTED SPACES**

Category: Patent application - A/00345/20.06.2024

Authors: Miteluț Amalia Carmen, Dănăilă-Guidea Silvana Mihaela, Popa Mona Elena, Drăghici Mihaela Cristina, Popa Elisabeta Elena, Geicu-Cristea Mihaela, Popescu Paul Alexandru, Mănăilă Elena

Description: The proposed invention aims to use a sustainable technology for managing inputs (water and nutrients), in a sustainable manner, in vegetable cultivation under protected environments. The use of superabsorbent polymeric materials has recently become a popular technology, especially in protected cultivation, to compensate for water and nutrient requirements due to their high absorption and release capacity for water and nutrient solutions. Moreover, recent emphasis has been placed on the biodegradability and ecotoxicity of these materials to ensure their use does not lead to soil pollution. The results presented in this invention are innovative and consist of the application of superabsorbent, biodegradable, and non-toxic polymeric materials for the soil-plant system. The application technology of these biodegradable superabsorbent polymer materials has been developed and validated in greenhouses, for two vegetable crops (tomatoes and lettuce). The application of superabsorbent polymer material technology in protected environments align with current requirements for sustainable input management in horticulture.

Class of Inventions: Agriculture and Horticulture

UNIVERSITY OF LIFE SCIENCES "KING MIHAI I" FROM TIMISOARA

CROSS-BORDER AMBIENT AIR MONITORING NETWORK

Category: Research project

Authors: Florin Crista, F. Imbrea. I. Radulov, L. Nita, I. Imbrea, L. Smuleac, I. Hotea, L. Botos, I. Banatean Dunea, A. Berbecea, A. Lato, L. Crista, S. Batrina

Description: The specific objective of the project is to implement advanced air quality monitoring systems and to enhance public awareness regarding the impact of air pollution. To this end, two monitoring systems will be established in the cross-border region encompassing the Southern Banat district (Serbia) and Timiș County. The first system will consist of automated stations equipped with real-time analyzers for detecting key atmospheric pollutants (CO₂, NO_x, SO₂, H₂S, BTEX compounds, etc.). The second system will involve the collection of particulate matter (PM) samples, which will be analyzed in laboratory settings to identify specific contaminants such as polycyclic aromatic hydrocarbons (PAHs), heavy metals, pesticides, and persistent organic pollutants (POPs). The data generated by these systems will be made available to the relevant authorities, providing a comprehensive overview of the distribution and concentration of pollutants in the monitored region. This information is crucial for the development of effective air pollution mitigation strategies and for the preparation of integrated air quality management plans.

Class of Inventions: Environmental Protection and Energy

EFFECT OF UREASE AND NITRIFICATION INHIBITORS ON HEAVY METAL MOBILITY IN AN INTENSIVELY CULTIVATED SOIL

Category: Research project

Authors: Nicoleta Vicar, Alina Lațo, Iaroslav Lațo, Florin Crista, Adina Berbecea, Isidora Radulov

Description: Urease and nitrification inhibitors represent ways to reduce nitrogen losses; their presence modifies microbial and enzymatic activity in the soil, affecting pH and organic matter (OM), which in turn affects the mobility of heavy metals. To evaluate the effect of urea with inhibitors, pH, OM content, and pseudo-total and mobile metal content (Cu, Cd, Ni, Pb, Cr, Zn, and Mn) were determined in soil samples fertilized with six different urea variants with inhibitors. The modification in the pseudo-total content of heavy metals following fertilization (%) was as follows: Cu ($-39.26 \div -8.82$), Cd ($10.74 \div 15.40$), Ni ($5.76 \div 18.84$), Pb ($-13.30 \div 12.46$), Cr ($-15.55 \div 11.60$), Zn ($35.10 \div 162.76$), and Mn ($-1.32 \div 12.17$). The pH was situated in the range of 7.05 to 7.17, while OM content showed an average increase of 16%. The determined pollution indicators revealed an accumulation of Zn in the soil. The results showed a trend of accumulation of bioavailable heavy metals, with the greatest increase for Mn (43%). Only in the case of Zn, there was a decrease in mobile content with the lowest value when applying two urease inhibitors and one nitrification inhibitor. Inhibitors modify the OM content and soil pH, influencing the mobility and bioavailability of heavy metals.

Class of Inventions: Agriculture and Horticulture

ESTABLISHING THE ANTIMICROBIAL POTENTIAL OF MILLET POWDER (*PANICUL MILIACEUM* L.) WITH THE AIM OF VALORIZATION IN THE FOOD AND PHARMACEUTICAL FIELDS

Category: Research project

Authors: Borozan Aurica-Breica, Bordean Despina-Maria, Stoin Daniela, Dumbravă Delia-Gabriela, Moldovan Camelia, Popa Mirela-Viorica, Mișcă Corina-Dana, Lăcătuș Mihaela, Moigrădean Diana, Raba Diana, Caba Ioan Ladislau, Popescu Sorina

Description: The aim of this study was to evaluate the antimicrobial activity of hulled and unhulled *Panicum miliaceum* L. cultivated in Romania, in order to explore its potential for use in nutritional formulations, particularly those intended for individuals with special dietary needs, such as gluten intolerance. *Panicum miliaceum* L. is a drought-resistant cereal that has recently attracted the interest of agricultural specialists. Due to its lack of gluten, it can be included in the diet of individuals with gluten intolerance. Its rich chemical composition, containing vitamins and polyphenols, provides it with antioxidant properties. These phytochemicals support health maintenance, help prevent cardiovascular and tumor diseases, and positively influence digestion. Despite these benefits, the crop remains underutilized, which prompted us to initiate studies on millet cultivated on small areas in Romania. In this research, two types of millet were analyzed: hulled millet from the "organic" category and unhulled millet. For the biological assays, bacterial strains relevant to the food and medical industries were selected. Among the food-related species were *Bacillus cereus* and *Escherichia coli*, which contribute to food spoilage and negatively impact human health. In addition, *Streptococcus pyogenes* and *Gaffkia tetragena*, involved in various infectious processes, were also tested. The results of the antimicrobial activity evaluation indicated that millet can improve food products and support the development of nutritional formulations suitable for all consumers, particularly for those with special dietary needs. Among the tested bacterial species, *Escherichia coli* showed the highest sensitivity to the chemical compounds present in both millet types.

Class of Inventions: Biotechnology

INFLUENCE OF THREE ESSENTIAL OILS ON PATULIN PRODUCTION IN APPLES INFECTED ARTIFICIALLY WITH *PENICILLIUM EXPANSUM*

Category: Research project

Authors: Tamara Edina Gal, Ersilia Alexa, Sorina Popescu, Olimpia Alina Iordănescu

Description: The aim of this study was to evaluate the antifungal efficacy of cinnamon, anise, and clove essential oils against *Penicillium expansum* infection in apples, with a particular focus on their ability to limit lesion development and reduce patulin (PAT) accumulation in different fruit tissues. *Penicillium expansum* (*P. expansum*) is a filamentous fungus, widespread in the environment, that can cause blue mold, which is one of the most prevalent postharvest diseases of apples. Mycotoxins are naturally occurring toxins produced by certain fungi that can be found in food. Patulin (PAT) is the mycotoxin produced in apples by *P. expansum* and can cause neurotoxicity, genotoxicity and immunotoxicity, as well as different health conditions of the liver, kidneys, lungs, the gastrointestinal tract. The antifungal effects of cinnamon, anise, and clove essential oils were evaluated on Florina and Starkrimson apples artificially inoculated with *P. expansum*. Considering that PAT can diffuse within the fruit and that the absence of visible mold in healthy tissue does not guarantee the absence of the toxin, three categories of apple tissues were analyzed: decayed areas, tissues adjacent to lesions, and apparently healthy tissues. Among the tested oils, anise showed the greatest efficacy in limiting lesion expansion, whereas cinnamon was the most effective in reducing PAT accumulation.

Class of Inventions: Agriculture and Horticulture

CALLUS INDUCTION AND MAINTENANCE IN SUNFLOWER: ASSESSMENT FOR GENOTYPE CONSERVATION

Category: Research project - 9577/08.11.2024

Authors: Cristian Mate, Irina Petrescu, Cerasela Petolescu, Sorina Popescu, Alina-Maria Țenche-Constantinescu, Cristina Toța, Emilian Onișan, Ioan Sărac

Description: In vitro techniques for sunflower germplasm conservation represent a valuable tool for strengthening breeding programs and accelerating genetic improvement. The present study focused on callus induction and direct plant regeneration from sunflower seeds belonging to three commercial hybrids (G1–IMI, G2–SU, and G3–CONV). Murashige & Skoog (MS) media supplemented with combinations of auxins and cytokinins was used to stimulate morphogenetic responses. Callus induction was recorded in all three genotypes on media containing 5 mg/L BAP and 2 mg/L 2,4-D, with genotype G3 exhibiting the highest response, reaching 100% induction on BAP. Plant regeneration occurred exclusively on the medium supplemented with 5 mg/L BAP and 0.35 mg/L NAA, achieving 30% efficiency in genotype G1. No regeneration was observed under the other hormone combinations tested. These results demonstrate a clear genotype dependency in the in vitro regeneration process and emphasize the necessity of fine-tuning phytohormonal concentrations for successful plant recovery. The study provides evidence that in vitro technology can contribute significantly to the conservation of sunflower germplasm and offers new opportunities for integrating biotechnological tools into modern breeding strategies. Ultimately, such approaches may accelerate the development of improved sunflower hybrids adapted to current agricultural challenges.

Class of Inventions: Biotechnology

APPLICATION OF BIOTECHNOLOGICAL METHODS FOR THE DEVELOPMENT OF NEW *LOLIUM PERENNE* LINES AIMED AT OBTAINING IMPROVED CULTIVARS ADAPTED TO CURRENT CONDITIONS

Category: Research project - 6878/02.07.2025

Authors: Emilian Onișan, Cristian Mate, Irina Petrescu, Cerasela Petolescu, Sorina Popescu, Alina-Maria Țenche-Constantinescu, Marinela Nicolae Horablagă, Ionel Samfira, Cristina Toța, Ioan Sărac

Description: The project explores the integration of biotechnological methods with classical breeding to accelerate the development of improved *Lolium perenne* cultivars. A key focus is the use of molecular

markers to assess genetic diversity, verify genetic purity, and support marker-assisted selection of valuable traits. In vitro culture techniques will be applied for rapid multiplication and maintenance of elite lines, ensuring the conservation of germplasm and the creation of stable genetic resources. Molecular markers (SSR, RAPD, ISSR) will provide precise tools for identifying polymorphism, establishing genetic relationships, and selecting superior genotypes with enhanced forage quality, abiotic stress tolerance, and adaptability. By combining marker-assisted selection with controlled polycross breeding, the project aims to develop pre-breeding material and novel lines suitable for modern agriculture. The expected outcome is the establishment of efficient protocols for biotechnological improvement, leading to high-quality cultivars that contribute to sustainable livestock production systems.

Class of Inventions: Biotechnology

ASSESSMENT OF THE NUTRITIONAL AND BIOFUNCTIONAL PROFILE OF SIBIU SALAMI, VERIFICATION OF THE STABILITY OF BIOFUNCTIONAL COMPOUNDS DURING THE SHELF LIFE AND DEMONSTRATION OF THE NUTRITIONAL BENEFITS OF THE PRODUCT FOR THE HUMAN BODY

Category: Research project - 8611/11.10.2024

Authors: Diana Nicoleta Raba, Delia Gabriela Dumbravă, Camelia Moldovan, Ileana Cocan, Isidora Radulov, Adina Berbecea, Popescu Iulina

Description: The project focuses on studying Sibiu salami, a well-known Romanian meat product, to better understand its nutritional value and health benefits. The proximate composition (moistures, proteins, fats, carbohydrates, ash and salt), water activity and nitrite content of the five Sibiu salami's provided by five Romanian producers were analyzed. Also, total fatty acids composition, with an emphasis on omega-3 and omega-6 fatty acids and mineral content were evaluated to assess the nutritional value of the salami samples. The study will also check how stable these compounds are during the product's shelf life, making sure they remain effective over time. In addition, the project aims to show how eating Sibiu salami can contribute to a balanced diet and support the human body's functions. By combining food analysis with nutritional science, the research will help promote Sibiu salami not just as a traditional food, but also as a product with real health value. This could support both consumer awareness and the development of better-quality meat products in the future.

Class of Inventions: Food Industry

RIS CONSUMER ENGAGEMENT LABORATORY (CEL-2025), ROMANIA: A CO-CREATION INITIATIVE FOR PLANT-BASED PROTEIN PREMIXES AIMED AT WEIGHT MANAGEMENT

Category: Research project - IMP-RIS-2325-19153-02

Authors: Delia-Gabriela Dumbrava, Ersilia-Călina Alexa, Diana-Nicoleta Raba, Camelia Moldovan, Codruța Petcu, Adela Radu

Description: The EIT Food RIS Consumer Engagement Labs project, EIT Food/19153-25, aimed to address the growing demand from consumers who are oriented towards a low-calorie, vegan diet focused on weight management. In this regard, the fundamental objective was the co-creation of specially designed vegan protein premixes for body weight control, facilitating both weight reduction and maintenance. In the context of the activities carried out within this project, the "King Michael I" University of Life Sciences of Timișoara, in partnership with Pronat S.R.L., initiated and implemented a series of interactive approaches. These included organizing work sessions, creative meetings with consumers, in-depth interviews, focus groups, consumer panels, and co-creation workshops. Through these methodologies, the goal was to promote healthy eating, with a particular focus on vegan products. The essential characteristics of these products, highlighted during the interactions, were their high content of protein and dietary fiber, a low carbohydrate intake, and the absence of synthetic additives.

Class of Inventions: Food Industry

SUNFLOWER OIL FUNCTIONALIZED WITH TOMATO PROCESSING BY-PRODUCT (OXI STABLE OIL WITH TOMATO BY-PRODUCT BY AKADEMIKAFOOD)

Category: Trademark M2024/002547, Certificate no. 202947/2025

Authors: Mariana-Atena Poiana, Diana Moigradean, Diana-Nicoleta Raba, Camelia Moldovan, Viorica-Mirela Popa, Delia-Gabriela Dumbrava, Daniela Stoin, Despina-Maria Bordean, Cristina-Georgiana Torjoc, Aurica-Breica Borozan, Corina Dana Misca, Ariana-Bianca Velciov, Florina-Adriana Radu, Luminita Pirvulescu, Adrian Riviş

Description: The invention relates to the innovative application of the by-product derived from tomato processing for juice production in the development of sunflower oil (SFO) formulations with enhanced thermo-oxidative stability. SFO samples were enriched with tomato by-product powder (TBP) at doses corresponding to a total phenolic content (TPC) in the range of 200–500 ppm GAE (gallic acid equivalents) and subjected to thermal treatment at 185°C for up to 12 hours. The thermo-oxidative degradation of the TBP-enriched oils was monitored using specific chemical indices, in comparison with a sample supplemented with 200 ppm butylated hydroxytoluene (BHT) and a control sample without antioxidants. Results showed that TBP, at a level providing 300 ppm GAE TPC, exhibited an inhibitory effect comparable to BHT, while higher TBP doses provided superior protection against thermo-oxidative degradation. These findings support the use of TBP as a natural antioxidant for SFO, indicating its applicability in food products exposed to high temperatures.

Class of Inventions: Food Industry

GOLD-TRI-BOOST BREAD BY AKADEMIKA FOOD

Category: Trademark - M 02516./2025

Authors: Laura Rădulescu, Iulia Bledea, Despina Maria-Bordean*, Adrian Riviş, Ersilia Călina Alexa, Nicoleta-Gabriela Hadarugă, Ariana-Bianca Velciov, Corina-Iuliana Megyesi, Liana Maria Alda, Aurica-Breica Borozan, Delia-Gabriela Dumbravă, Corina Dana Mişcă, Camelia Moldovan, Mariana-Atena Poiană, Georgeta-Sofia Popescu, Diana Moigrădean, Patricia-Cristina Tarkany, Mihaela Lăcătuş, Simion Alda

Description: The invention M 002516/2025 – GOLD TRI BOOST Bread by Akademika Food is an innovative functional bread combining traditional artisan baking with modern healthy eating trends. Enriched with turmeric, flax seeds, and chia seeds, it supports an active lifestyle while providing satiety and real health benefits. The product is 100% natural, free of additives and preservatives, with a crisp crust, airy crumb, and balanced flavor, making it versatile for any meal. Nutritionally, it stands out for low calories (231.86 Kcal/100g), high protein (8.02 g/100g), low fat (3.46 g/100g), and high fiber (3.00 g/100g).

GOLD TRI BOOST Bread transforms a traditional staple into a modern, healthy, and delicious solution, demonstrating how scientific research and modern nutrition can bring real value to consumers.

Class of Inventions: Food Industry

RV-Forest Fruit Jam for Health, by AkademikaFood

Category: Trademark - M 02516./2025

Authors: Ştef Ducu Sandu, Alexa Ersilia Călina, Bordean Despina-Maria, Bujancă Gabriel Stelian, Cazacu Mihaela, Dumbravă Delia Gabriela, Drugă Mărioara, Hegheduş Mîndru Gabriel, Hegheduş Mîndru Ramona, Jianu Călin Ionel, Mişcă Corina Dana, Moldovan Camelia, Negrea Monica Viorica, Popa Viorica Mirela, Stoin Daniela, Ştef Lavinia, Traşcă Teodor-Ioan

Description: Traditionally, jam is obtained through intense heat treatment that can cause the irreversible loss of bioactive compounds responsible for health-related properties. Thus: the water content changes due to boiling and the addition of pectin; fiber content is lost during the separation stages; water-soluble vitamins can be lost during cooking by passing into the cooking liquid, fat-soluble

ones are susceptible to oxidation; antioxidant substances are affected by light, pH, temperature and added pectin. The food product "RV-forest fruit jam for health" is obtained under low temperature conditions, from natural ingredients, namely berries, chia seeds and natural sweeteners. When obtaining the product, no heat treatment or addition of pectin is used. To obtain the sweet taste, only natural sweeteners are used, free sugars having a low content. Different product variants are obtained, according to the manufacturing.

recipe. **Class of Inventions:** Food Industry

C-P-SWEETNESS BY AKADEMIKA FOOD

Category: Trademark - M 2025 002791

Authors: Velciov Ariana – Bianca, Bordean Despina – Maria, Hădărugă Nicoleta Gabriela, Alexa Ersilia, Cocan Ileana, Popescu Georgeta – Sofia, Stoin Daniela, Poiană Mariana – Atena, Moigrădean Diana\, Rada Maria, Drugă Mărioara, Rădulescu Laura, Cozma Antoanela, Tarkanyi Patricia, Lăcătuș Mihaela, Kaversznyuk Alexandra

Description: C-P-Sweetness by Akademia Food is a spreadable cream based on sweet potato (*Ipomoea batatas*), enriched with pomegranate peel powder – a valuable by-product resulting from the processing of pomegranate fruit (*Punica L.*) – and coconut butter. This combination provides essential nutrients, such as minerals, fiber, carbohydrates, β -carotene, and vitamin C, from the sweet potato tuber, as well as a significant amount of biologically active compounds (phenolic acids, tannins, flavonoids, alkaloids, glycosides) from the pomegranate peel powder. The resulting product harmoniously combines the pleasure of taste and the feeling of indulgence with health benefits, offering a unique sensory and nutritional experience.

recipe. **Class of Inventions:** Food Industry

ENERGY BOOSTER -NEW APPROACHES TO DESIGN A FUNCTIONAL PROTEIN BAR

Category: Trademark - M2025/002502

Authors: Mihaela Lacatus, Despina-Maria Bordean, Tiberiu Iancu , Luminita-Cornelia Pirvulescu , Georgeta-Sofia Popescu, Diana-Nicoleta Raba, Aurica-Breica Borozan, Daniela Stoin, Liana Maria Alda, Delia-Gabriela Dumbrava, Corina Dana Misca, Camelia Moldovan, Mariana-Atena Poiana, Laura Radulescu, Diana Moigradean, Viorica-Mirela Popa, Patricia-Cristina Tarkanyi, Simion Alda, Alexandru-Erne Rinovetz

Description: The ProAmaranth Bar is a nutritious and energy-boosting snack made with expanded amaranth seeds, flaxseeds, honey, walnuts and pollen. Rich in essential nutrients, it provides a valuable source of energy and supports a balanced diet. The combination of amaranth and flaxseeds enhances the protein and omega-3 content, while the honey and pollen offer a natural source of carbohydrates and beneficial antioxidants. The walnuts add a creamy texture, making this bar a healthy and delicious choice.

Class of Inventions: Food Industry

INNOVATIVE FUNCTIONAL CHOCOLATE FORMULATIONS WITH CAROB AND ROSEHIP POWDER AS PARTIAL COCOA REPLACEMENTS

Category: Research project

Authors: Ioana-Alina Pop, Mariana-Atena Poiana, Ersilia Alexa, Diana Moigradean, Daniela Stoin, Delia Dumbrava, Calin Jianu, Diana Raba

Description: A major challenge in contemporary food technology is the development of innovative products that enhance nutritional and functional value while remaining economically viable. This study evaluated the bioactive potential of carob powder (CP) and rosehip powder (RP) as partial cocoa substitutes in chocolate formulations with improved functionality. Nine chocolate formulations were

prepared by replacing cocoa powder (w/w): 0% (control), 10% CP, 20% CP, 30% CP, 40% CP, 30% CP + 10% RP, 20% CP + 20% RP, 10% CP + 30% RP, and 40% RP. Changes in proximate composition, total phenolic content (TPC), total flavonoid content (TFC), and antioxidant activity were evaluated. Increasing CP levels enhanced the bioactive properties, while CP and RP mixtures further amplified these characteristics, with the most pronounced bioactive profile observed in the 40% RP formulation. High TPC and TFC levels significantly contributed to antioxidant activity, strengthening the functional properties of the developed formulations. These findings support enriching chocolate with phenolic compounds from CP and RP to expand the range of functional confectionery products.

Class of Inventions: Food Industry

WILDLIFE AS A RESERVOIR OF ZOO NOTIC PARASITES: ONE HEALTH

Category: Research project

Authors: Maria Monica Florina Moraru, Ana-Maria Marin, Dan-Cornel Popovici, Azzurra Santoro, Kalman Imre, Sorin Morariu, Narcisa Mederle

Description: Wildlife represents an important ecological reservoir for numerous parasitic pathogens, playing a significant role in their maintenance and transmission to domestic animals and humans. Due to increasingly frequent interactions between wildlife, domestic animals, and the human population—within the context of environmental changes and habitat expansion—the risk of zoonotic parasite transmission is rising. Large wild carnivores, such as the brown bear (*Ursus arctos*), wolf (*Canis lupus*), and Eurasian lynx (*Lynx lynx*), as well as mesocarnivores including the golden jackal (*Canis aureus*), red fox (*Vulpes vulpes*), raccoon dog (*Nyctereutes procyonoides*), European wildcat (*Felis silvestris*), and European badger (*Meles meles*), are considered key hosts for a variety of zoonotic pathogens. These species contribute to the persistence and spread of parasitic agents through ecological networks with potential impacts on both public and veterinary health. In Romania, parasitological studies focused on wildlife—particularly wild carnivores—are relatively scarce, resulting in insufficient data regarding their parasitic burden. This doctoral research project, conducted under the supervision of Prof. Narcisa Mederle, aimed to perform a comprehensive investigation of the parasitic load in wild mammals from Romania. A total of 441 wild animals, belonging to 11 host species, were examined: Brown bear (*Ursus arctos*), wolf (*Canis lupus*), Eurasian lynx (*Lynx lynx*), Golden jackal (*Canis aureus*), Red fox (*Vulpes vulpes*), Raccoon dog (*Nyctereutes procyonoides*), European wildcat (*Felis silvestris*), European badger (*Meles meles*), European polecat (*Mustela putorius*), Pine marten (*Martes martes*), Stone marten (*Martes foina*). The samples were collected from various hunting grounds located in 28 counties across Romania. Through classical diagnostic methods, both ectoparasites (mites, insects, and non-dermatophytic fungi) and endoparasites (from the phyla Protozoa, Trematoda, Cestoda, and Nematoda) were identified. Preliminary results revealed a significant diversity of parasitic species, with variations based on host species and geographical region. Based on these findings, the research was further refined to focus on cestodes in wild carnivores, due to their high zoonotic relevance and underrepresentation in Romanian parasitological literature. Among the 441 examined animals, cestodes were identified in the following hosts: Brown bear (*Ursus arctos*) – 1/115, Wolf (*Canis lupus*) – 5/10, Eurasian lynx (*Lynx lynx*) – 1/1, Golden jackal (*Canis aureus*) – 29/83, Red fox (*Vulpes vulpes*) – 72/161, European wildcat (*Felis silvestris*) – 22/27, European badger (*Meles meles*) – 7/22. Molecular biology techniques allowed the identification of cestode species with significant zoonotic potential. This project reports, for the first time in Romania, the presence of *Taenia arctos* in brown bears and *Mesocestoides melesi* in badgers, contributing novel data to the knowledge of parasite biodiversity in Romanian wildlife.

Class of Inventions: Healthcare, Medicine and Cosmetics

**UNIVERSITY OF LIFE SCIENCES "KING MIHAI I" FROM TIMIȘOARA, NOKIA NETWORKS SRL,
POLYTECHNIC UNIVERSITY OF TIMIȘOARA**

Category: Research project

Authors: Alexandru Hădărugă*, Andreea Pîrvu, Darius Pop, Florin Ciocan, Cătălin Chițu, Septimiu Lică

Description: The innovation refers to the implementation of Artificial Intelligence (AI) / Internet of Things (IoT) technology in the field of automatic irrigation monitoring and control, through the ESP32 microcontroller, the Adafruit IO platform and the Arduino IDE software. The general architecture of the system consists of a video monitoring system, based on a “smart” camera, capable of transmitting images in real time via the internet, and an automatic irrigation system, built using the ESP32 microcontroller, humidity sensors and submersible pumps. The irrigation system was controlled by developing the hardware and code in the Arduino IDE, and the data was transmitted and collected using the Adafruit IO platform, where they were stored and displayed in a user-friendly dashboard. Protection mechanisms were implemented for the safe operation of the “smart” irrigation system: Fail-safe at BOOT, Auto-OFF timed, ON time limit and Watchdog.

A robust and safe irrigation system was designed for practical use, both at the level of Agricultural Micro-Farms and Industrial Agriculture, to optimize water consumption, reduce costs and increase productivity – “SMART AGRICULTURE”.

Class of Inventions: Information Technology, Communication, and Security

INSTITUTE OF GENETICS, PHYSIOLOGY AND PLANT GENETICS, CHISINAU, REPUBLIC OF MOLDOVA; UNIVERSITY OF LIFE SCIENCES "KING MIHAI I" FROM TIMISOARA, ROMANIA

GRAPE CULTIVAR ‘BEGA’

Category: Research project

Authors: Alexandrov Eugeniu, Dobrei Alin, Botnari Vasile, Dobrei Alina, Găină Boris

Description: In our study, we registered a new grape cultivar developed at the Institute of Genetics, Physiology and Plant Genetics in Chisinau, Republic of Moldova, in collaboration with the University of Life Sciences "King Mihai I" from Timișoara, which is intended for industrial processing and suitable for both wine and juice production.

Ampelographic description: The mature leaves are palmate-lobed and green in colour. The leaf blade has a revolute profile, with pronounced teeth along the leaf edges. The petiole sinus is wide open, a characteristic that aids in cultivar identification. The clusters are medium to large, cylindrical-conical in shape, uniaxial, single-winged, and loosely structured, which allows for better aeration of the berries. Typically, there are two clusters per shoot, ensuring consistent yields. The clusters are resistant to handling and can be transported and stored fresh without significant quality loss. The berries are medium-sized (averaging about 60 mg), elongated, evenly distributed within the cluster, and display an attractive blue-violet skin colour. The pulp is colourless, juicy, and firm, with a pleasantly neutral taste, and separates easily from the 1–2 seeds despite slight adherence to the skin.

Ripening period: Medium, allowing flexibility in harvest timing.

Resistance: The cultivar is drought-tolerant and resistant to low winter temperatures.

Yield: Depending on cultivation practices, ‘Bega’ produces 5–7 kg per vine, equivalent to 14–16 tons per hectare.

Class of Inventions: Agriculture and Horticulture

**UNIVERSITY OF LIFE SCIENCES "KING MIHAI I" FROM TIMISOARA
ASOCIAȚIA ALTERNATIVA ECO
ASOCIAȚIA ECHIPA DE URGENȚE TIMIȘOARA**

DIGITAL YOUTH WELLNESS

Category: Research project - Erasmus+ KA152 Mobility of young people

Authors: William Burbulea, Theodor Muntean, Osman Kutay Ayata, Mîrza Adina, Șutoi Dumitru, Williams Carmen, Popa Daian, Purja Adrian, Cîndrea Alexandru, Mederle Ovidiu

Description: The Digital Youth Wellness project addressed digital inequality among young people from Romania, Hungary, Czechia, Bulgaria, North Macedonia, and Croatia, with a focus on those from rural or disadvantaged backgrounds. Its objectives were to: support 30 young people in understanding how

entrepreneurship, employment, and education had been digitized, strengthening their confidence in navigating online sectors during the 8-month project; enhance participants' competencies in artificial intelligence, civic engagement, and cybersafety during the 8-day mobility; teach 30 disadvantaged young people about digital wellness and the importance of balance for mental, physical, and social health; and foster international cooperation among six NGOs by empowering participants to organize follow-up workshops in disadvantaged communities. Through expert-led workshops, non-formal education, and intercultural exchange, participants improved their digital skills and awareness. Quantitative and qualitative evaluations showed a 40% increase in digital competencies and a 50% rise in understanding of digital wellness. Professional outcomes included greater confidence in online job markets, digital tools, and interview preparation. The project also encouraged active citizenship, cultural exchange, and collaboration across borders. By equipping young people with leadership skills and networks, it ensured a lasting impact on both personal development and community engagement, promoting responsible technology use and more inclusive, digitally literate societies.

Class of Inventions: Other

"VICTOR BABES" UNIVERSITY OF MEDICINE AND PHARMACY TIMISOARA

TELEMEDICINE EDUCATION ADVANCEMENT THROUGH MICRO-CREDENTIALS

Category: Research project - 2023-1-SI01-KA220-HED-000165481 - proiect Erasmus+ (TEAM)

Authors: Focşa Mircea Adrian, Rotaru Virgil

Description: The Telemedicine Education Advancement through Micro-credentials (TEAM) project, co-financed by the Erasmus+ Programme, aims to strengthen digital health education by developing innovative training on legal, regulatory, and ethical frameworks for telemedicine. The course explores national and international legislation, digital infrastructures, and communication technologies that enable safe and effective virtual care. Learners are introduced to key legal instruments, such as GDPR and EU cross-border healthcare directives, and to global best practices in telemedicine regulation. A strong focus is placed on interoperability, cybersecurity, and the integration of advanced technologies like AI and IoT. Ethical perspectives are embedded throughout, addressing patient privacy, informed consent, equity, and professionalism in digital health interactions. By completing the course, learners acquire micro-credentials certifying their competence in telemedicine law, digital infrastructure, and ethical practice, enhancing their ability to deliver safe, compliant, and patient-centered virtual care across diverse healthcare systems.

Class of Inventions: Healthcare, Medicine, and Cosmetics

DENTAL IMPRESSION GUIDE AND METHOD OF USE

Category: Patent application - A 2020 00523

Authors: Chete Sofia, Cojocariu Andreea Codruța, Sinescu Cosmin, Laszlo Kabai, Negruțiu Meda Lavinia, Romînu Mihai, Leretter Marius Traian, Jivănescu Anca, Crăciunescu Emanuela Lidia, Neagu Carina Sonia, Levai Codrina

Description: The invention relates to a dental impression device designed for fixed prosthetic restorations, along with its method of use. The device consists of a body (G) shaped as a cover that fits over prepared teeth, with one or more internal cavities (1, 2, 3...) corresponding to the number and morphology of the prepared abutments. Externally, the covering segments exhibit a truncated conical shape, interconnected by continuity bridges, which ensure conformity with the dental arch configuration and maintain an optimal height (h) adapted to the average height of the abutments.

The method of use involves a preliminary positioning of the impression device on the prepared prosthetic field of a patient, followed by a conventional impression using the device body (G) embedded in a putty-type impression material. Subsequently, a fluid silicone material is injected into the incorporated impression device, enabling a final impression. The resulting impression can then be used to obtain accurate fixed prosthetic restorations.

Class of Inventions: Healthcare, Medicine, and Cosmetics

DIETARY SUPPLEMENT: ALPHA-ALFA/MALTODEXTRIN AND METHOD OF OBTAINING

Category: Patent application - A/00375

Authors: Adina Segneanu, Titus Vlase, Gabriela Vlase, Alexandru Pahomi

Description: The invention presents a novel food supplement with proven advantages for human health, obtained by encapsulating micronized alfalfa (*Medicago sativa*, Fabaceae) within a maltodextrin biopolymeric matrix. This innovative formulation offers multiple benefits: it safeguards alfalfa's delicate bioactive compounds from oxidation and degradation, improves their solubility and intestinal absorption, and provides a sustained release profile for prolonged physiological action. By combining the high nutritional and therapeutic potential of alfalfa with the protective and carrier properties of maltodextrin, the supplement delivers enhanced antioxidant protection, supports detoxification processes, promotes metabolic balance, and contributes to immune system strengthening. Furthermore, the encapsulation process increases product stability, extends shelf life, and ensures consistent efficacy. Through these cumulative effects, the invention establishes a superior nutraceutical solution designed to optimize human health and wellbeing.

Class of Inventions: Food Industry

REPUBLIC OF MOLDOVA

ACADEMY OF ECONOMIC STUDIES OF MOLDOVA

INNOVATIONS IN THE INTERNATIONAL FINANCIAL SECTOR. THE EFFECTS AND CHALLENGES OF TOMORROW'S ECONOMY

Category: Research project - Cifrul 19 00208.1908.08

Author: Maia Pisaniuc PhD Researcher

Description: The research focused on the impact of information technologies on the financial industry: namely, the impact of the fintech industry on traditional banks, blockchain technology, and the role of cryptocurrencies in the global market, changing perspectives, and the structure of the financial system. A significant part of the research is dedicated to the effects of disruptive innovations on financial services, the future of banks, customers, and bank shareholders. The novelty of the research lies in the analysis of the financial industry from a business rather than a system perspective. The effects of this business on society, the economy, and social responsibility. In this context, the deduction of economic singularity caused by the technological boom. Approaching the economy as a state that must be researched according to Einstein's laws of physics. Advocating for the continued application of physics in economic research, arguing that the state and movement of the economy depend on the speed of innovation, which actually determines the expected economic results. Deduction of the thresholds and levels of risk that economic singularity can cause to society.

Class of Inventions: Other

COMRAT STATE UNIVERSITY

PROBIOTIC DAIRY PRODUCT WITH HIGH ANTIOXIDANT ACTIVITY (YOUNG RESEARCHES PROJECT LACTANOX)

Category: Research project - LACTANOX

Authors: Cartasev Anatoli, Neicovcena Iulia, Mahamat Yamtitina, Lazareva Iulia

Description: This study characterizes artisanal yogurt made with native lactic acid bacteria and polyfloral honey, focusing on its probiotic potential and functional properties. The yogurt, enriched with 2-8% honey, exhibited desirable coagulation, acidity, and viscosity, and showed enhanced probiotic viability and antioxidant activity. Results highlight the potential of combining local lactic cultures and honey for functional artisanal dairy products.

Class of Inventions: Food Industry

"ION CREANGĂ" STATE PEDAGOGICAL UNIVERSITY OF CHISINAU

CHEMSPARK: THE TABLE THAT GUIDES YOUR LEARNING

Category: Patent - PC 8211

Authors: Bludaru Viorica, Gîncu Eudochia, Ciorîi Emiliana, Coropceanu Eduard, Indoitu Irina, Secara Gabriela

Description: The ChemSpark project aims to revolutionize the learning of chemistry by transforming the periodic table into an interactive, technology-based tool. Through modern simulations and access to real-time information, the study of chemical elements becomes engaging, dynamic, and easier to understand. To raise awareness among chemistry teachers about the ChemSpark project, with the potential to scale up nationwide. Within 12 months, the functional prototype - which includes simulations

and dynamic interactions - will be tested in different schools through 2 demonstration sessions. To ensure accuracy and accessibility, the table will be connected to a real-time database by 2026, guaranteeing over 95% reliability of chemical data. Within 2 years, the project aims to gain support from investors and government authorities, reducing the dependence on static materials by 40% and ensuring digital access for 80% of students. Training and dissemination activities for teachers will follow: 100 teachers will be trained over 18 months, while over 1000 students will directly benefit, strengthening the sustainability of the project and its long-term educational impact.

Class of Inventions: Information Technology, Communication, and Security

NOVEL ZINC COORDINATION POLYMER WITH ANTIFUNGAL AND ANTIBACTERIAL PROPERTIES

Category: Patent - MD 4640

Authors: Vitiu, A.; Chișca, D.; Gorincioi, E.; Coropceanu, E.; Bouroș, P.

Description: The coordination compound $[Zn(5,5'\text{-rda-rda})(dmf)_2(H_2O)_2]_n$ was obtained by the condensation of two molecules of rhodanine-3-acetic acid (rdaH), which allowed obtaining a new ligand – 5,5'-rda-rda. The composition and structure of the zinc coordination polymer were determined. The coordination polyhedron of the central metal atom has the shape of an octahedron, formed by the set of donor atoms O6, two oxygen atoms belonging to the two anions 5,5'-rda-rda²⁻, and four chelates – to the two molecules of DMF and the two molecules of water. Testing of biological properties demonstrated that this coordination compound exhibits antifungal and antibacterial activity against *E. coli* and *S. aureus*. The minimum inhibitory concentration values for the studied compound against the gram-positive bacteria *S. aureus* are in the range of 70–413 $\mu\text{g/mL}$, and against the gram-negative bacteria *E. coli* – in the range of 137–413 $\mu\text{g/mL}$.

Class of Inventions: Healthcare, Medicine, and Cosmetics

COMPLEX PREPARATION FOR ADAPTATION TO DROUGHT CONDITIONS AND INCREASING CROP PRODUCTIVITY

Category: Patent - MD 1348, 4647

Authors: Bulhac Ion, Ștefăriță Anastasia, Coropceanu Eduard, Brînză Lilia, Covaci Olga

Description: New processes for growing crops (maize, soybeans, etc.) have been developed that increase the resistance to adverse climatic conditions and contribute to increased productivity. The process is based on treating seeds before sowing and plants during growth with aqueous solutions containing $[Co(DmgH)_2(SeUrea)_2]BF_4 \cdot 2H_2O$, $[Co(DmgH)_2(Nia)_2]BF_4 \cdot 2H_2O$, $[Fe_3O(CH_3COO)_6(H_2O)_3]NO_3 \cdot 3H_2O$, $Mg(NO_3)_2 \cdot 6H_2O$, $Ca(NO_3)_2 \cdot 4H_2O$, $Mn(CH_3COO)_2 \cdot 4H_2O$, $Zn(NO_3)_2 \cdot 6H_2O$, $(NH_4)_6Mo_7O_{24} \cdot 4H_2O$, $(HOC_6H_4COO)_2Cu \cdot 4H_2O$, potassium salicylate, thiourea, at the same time the plants treat 2 times with a consumption of 200...250 L/ha. The proposed process contributes to the reduction of redox reactions, the intensification of the activity of the enzymatic system, the increase of drought tolerance and the increase of agricultural production.

Class of Inventions: Agriculture and Horticulture

SMART HELMET – TECHNOLOGY FOR PROTECTION AND RAPID INTERVENTION

Category: Patent application - 3126

Authors: Bobeico Svetlana, Muntean Adelina, Bludaru Viorica, Gîncu Eudochia, Coropceanu Eduard

Description: The smart helmet is an innovation designed to enhance personal safety in high-risk situations. The device is based on an electronic system capable of recognizing critical situations and quickly sending an alert message, along with location data, to a predetermined contact. This functionality helps reduce reaction time and enables immediate intervention, which is essential for

preventing serious consequences. The product is designed to meet the needs of both individual users and professionals in fields such as construction, sports, or industrial activities. With its innovative nature, the smart helmet presents a practical and efficient technological solution for protecting life and health.

Class of Inventions: Information Technology, Communication, and Security

MOLDOVA STATE UNIVERSITY

IDENTIFICATION AND EXPLOITATION OF VALUABLE PARENTS OF AGRICULTURAL CROPS IN THE CREATION OF A NATIVE GENETIC BASE OF SOCIO-ECONOMIC INTEREST

Category: Research project - 23.70105.5107.04

Authors: Lupascu Galina, Mihnea Nadejda, Leatamborg Svetlana, Rotari Silvia, Gore Andrei, Saşco Elena, Malii Aliona, Cristea Nicolae

Description: The objectives of the project are: 1) Establishing the particularities of the common wheat x fungal pathogens/drought interaction; 2) quantification of the genetic variance of the tested forms (common wheat, soybean, tomato) in terms of resilience/vulnerability to unfavorable abiotic factors and diseases; 3) identification of parents capable of inducing valuable transgressive variability and of hereditary transmission of characters of biological and food interest (common wheat, durum wheat, triticale, soy, tomato); 4) establishing the impact of the parental entity when obtaining new hybrids and positive transgressions (common wheat, durum wheat, triticale, tomato).

Class of Inventions: Agriculture and Horticulture

MODULATION OF THE TOTAL ANTIOXIDANT STATUS IN BEES

Category: Patent - WO 2022/018009 A1; MD 4905 / 2024.10.31

Authors: Aurelian Gulea, Ion Toderaş, Olga Garbuz, Victor Țapcov, Vasilii Graur, Sebastien Floquet, Arcadie Fuior, Diana Cebotari

Description: The invention pertains to chemistry and apiculture, specifically to a biologically active cobalt coordination compound which stimulates the total antioxidant status of the hemolymph of *Apis mellifera* bees and their larvae to enhance their resistance to diseases. Addition of this substance at the first feeding after wintering enhances the total antioxidant status of the bee's hemolymph and bee larval hemolymph by 5.4-7.9 times in comparison to control, and up to 5.3 times in comparison with prototype.

Class of Inventions: Agriculture and Horticulture

NEW MOLECULAR INHIBITOR AS ANTICANCER AGENT

Category: Patent - MD 4899 / 2024.08.31

Authors: Aurelian Gulea, Doina Chiaburu-Chiosa, Dorin Istrati, Victor Țapcov, Donald Poirier

Description: The invention relates to chemistry and medicine, namely to a biologically active coordination compound from the class of thiocarbazidates of transition metals. It may find application in medicine for the prophylaxis and treatment of human liver cancer. The claimed compound inhibits the proliferation of liver cancer HepG2 cells 4 times more effectively than the prototype. The discovered properties of this substance are of interest for medical practice for enhancement of the arsenal of inhibitors of liver cancer cells.

Class of Inventions: Healthcare, Medicine, and Cosmetics

NEW INHIBITORS OF THE PROLIFERATION OF FUNGI OF THE SPECIES CANDIDA ALBICANS

Category: Patent - MD 4886 / 2024.09.30; request for patent MD a 2024 0021 / 2024.06.17

Authors: Aurelian Gulea, Ianina Graur, Vasillii Graur, Irina Usataia, Victor Țapcov, Carolina Lozan-Tîrșu

Description: The invention relates to chemistry and medicine, namely to the biologically active synthetic compounds of the thiocarbamide derivatives. The described compounds possess fungistatic and fungicidal activity within the limits of concentrations 0.004-0.031 µg/mL against fungi of the species *Candida albicans*, which exceeds 23-175 times the activity of the prototype. The present inventions expand the arsenal of fungal inhibitors of the *Candida albicans* species with high antifungal activity.

Class of Inventions: Healthcare, Medicine, and Cosmetics

CONVERGENCE MATRIX OF ACCOUNTING METHODOLOGY AND INTERNATIONAL PRACTICE FOR RECOGNITION OF ECOSYSTEM ASSETS IN AGRIBUSINESS

Category: Research project - 24.80013.0807.1TR "The Model of Accounting and Reporting Changes in Agribusiness Ecosystem Assets in the Context of an Environmental Crisis"

Authors: Maria Cojocaru, Irina Golochalova

Description: The development of a convergence matrix that integrates modern international practices (IFRS and SEEA) with the accounting methodology of the Republic of Moldova (RM) aims to create a model for sustainable agribusiness accounting and reporting, thereby contributing to the gradual mitigation of the environmental crisis. Its design was carried out following a four-step algorithm proposed by the authors. The proposed matrix substantiates the relevance of applying the IFRS methodology, which does not contradict the use of statistical information — a key element of the SEEA framework — demonstrates the convergence between IFRS and SEEA, and highlights the divergence between NAS and SEEA. It serves as a foundation for developing an accounting and reporting model for sustainable agribusiness in the context of addressing the environmental crisis and supports the formation of an informational reporting environment that enables agribusiness investors to assess risks when making environmentally significant decisions.

Class of Inventions: Environmental Protection and Energy

COMBINING UAV - LIDAR AND UAV - PHOTOGRAMMETRY FOR RAPID ASSESSMENT AND ANALYSIS OF TERRAIN AND ENERGY SYSTEMS

Category: Research project - 011210

Authors: Veaceslav Sprincean, Liviu Donțu, Florentin Paladi

Description: This research presents the development of a UAV-based LiDAR system designed to enhance the resilience assessment of critical energy infrastructure. By combining LiDAR with photogrammetry, the approach enables detailed and rapid terrain mapping, supporting efficient data analysis and interpretation. Case studies also highlight LiDAR's wider applicability, such as in archaeology, demonstrating its versatility. The methodology integrates advanced drones for real-time monitoring, structural evaluation, and risk detection of power grids and energy assets. A key innovation is the integration of LiDAR into the eALERT monitoring system, improving accuracy in identifying vulnerabilities caused by both environmental and structural factors. The workflow covers preflight planning, UAV safety procedures, and real-time data processing, ensuring reliable operations. Additionally, AI-driven anomaly detection and predictive computational models strengthen proactive maintenance and risk prevention strategies. Overall, the findings contribute to improved energy security, operational efficiency, and sustainable infrastructure development.

Class of Inventions: Environmental Protection and Energy

TI AND TiO₂ EPITAXIAL LAYERS FOR PHOTOVOLTAIC DEVICES

Category: Patent - MD4772/2022.05.31; MD1740Z2024.08.31; Decision granting the patent no. 1059 of 2025.03.14; MEC subprogram 011207

Authors: Leonid Gorceac, Vasile Botnariuc, Simion Raevschi, Petru Chetrus, Elena Bercu, Sergiu Vatavu

Description: The application of CVD (chemical vapor deposition) and HVPE (hydride vapor phase epitaxy) methods in separate flows of Ar and O₂ and respectively H₂ and HCl (gas) allowed the preparation of epitaxial layers of Ti for GaN ohmic contacts, epitaxial layers of TiO₂ and ITO-TiO₂-InP heterojunction for photovoltaic cells and photodetectors.

Class of Inventions: Environmental Protection and Energy

NEW COPPER(II) COMPOUNDS AS INHIBITORS OF CANCER CELLS PROLIFERATION

Category: Patent application – 20240031/ 2024.10.16

Authors: Aurelian Gulea, Victor Țapcov, Olga Garbuz, Roman Rusnac, Aliona Pîntea

Description: Synthesis and structural characterization of {N-[(2-methoxyphenyl)-2-(pyridin-2-yl-methylidene)hydrazine-1-carbothioamido]]copper(II) nitrates (compound I) and {N-[(4-methoxyphenyl)-2-(pyridin-2-yl-methylidene)hydrazine-1-carbothioamido]]copper(II) (compound II) as proliferation inhibitors of a) cell lines: BxPC-3 – pancreatic cancer, RD – human muscle rhabdomyosarcoma, HeLa – cervical cancer, HL-60 – human myeloid leukemia, LNCaP – human prostate carcinoma cancer, MCF-7 – breast carcinoma cancer, HepG-2 – human liver hepatocellular carcinoma cancer, K-562 – human bone marrow chronic myeloid leukemia cell line. The invention consists of the establishment of anticancer activity of compounds I and II, which exceeds the cisplatin activity by 17-2.7 times and exceeds the analogous characteristics of the structural analogue by 30-1.1 times.

Class of Inventions: Healthcare, Medicine, and Cosmetics

DIETARY SUPPLEMENT FOR THE PROPHYLAXIS OF HYPOTHYROIDISM IN CARBOHYDRATE METABOLISM DISORDERS IN RODENTS (*RATTUS NORVEGICUS*)

Category: Patent application – A 2025 0005 / 2025.01.28

Authors: Iurie Bacalov, Aurelia Crivoi, Elena Chirița, Adriana Druța

Description: The present invention relates to a dietary supplement that provides increased efficiency in preventing hypothyroidism associated with carbohydrate metabolism disorders, acting both by maintaining blood glucose levels and by functionally regulating the thyroid gland, which is frequently affected in endocrine pathologies. Thus, the supplement contributes to maintaining interglandular balance. Its formula, characterized by high purity and the absence of toxic substances, supports the prevention of the onset and progression of complications associated with these types of pathologies, as well as dysfunctions of other endocrine glands. The dietary supplement contains, as a bioactive substance, an infusion obtained from the leaves of *Cucurbita maxima*, *Hippophae rhamnoides*, *Cydonia oblonga*, and from the aerial parts of *Equisetum arvense*, *Lavandula angustifolia*, and *Anethum graveolens*.

Class of Inventions: Healthcare, Medicine, and Cosmetics

THE NEW CULTIVAR 'MIHAI' OF JERUSALEM ARTICHOKE, HELIANTHUS TUBEROSUS L.

Category: Patent - MD 2024.0024/ 19.11.2024

Author: Victor Țîței

Description: The new cultivar „MIHAI” of Jerusalem artichoke, *Helianthus tuberosus* L., family Asteraceae has been created by individual breeding of local form and introduced taxa. The aerial parts can be used as forage for animals (green mass, silage, vitaminized flour) and as substrates for biorafenary and biofuel production. The tubers may be used as feed, fodder, feedstock for pharmacy industry and biorafenary. The aerial mass productivity 68-70 t/ha green mass or 68-70 t/ha dry matter. The nutrient composition and forage value of harvested aerial mass: 184-240 g/kg dry matter with 9.9-12.1 % ash, 10.8-13.5 % CP, 32.2-37.7% ADF, 45.4-52.2 % NDF, 5.0-5.5 % ADL, 28.2-32.0% Cel, 12.2-14.5% HC, 2.2-2.3% EE, 595-629g/kg DDM, 9.67-10.18 MJ/kg ME, 5.69-6.21 MJ/kg NEI, RFV=106-122. The prepared silage had agreeable colour with specific smell, may be use as alternative forage. The green mass and silage substrates in biogas reactor for anaerobic digestion, have optimal C/N ratio, amount of lignin and hemicellulose, biomethane potential archive 300 l/kg ODM. The energy value of biofuel from dry stalks 18.5 MJ/kg GCV with 2.1% ash, The ethanol potential of substrates from dry stalks -565 l/t. The tubers contain 237g/kg dry matter with 5.5 % ash 9.9 % CP, 54.00% inulin and other carbohydrates, eligible for feed, forage and feedstocks for the pharmaceutical and food industry. Financially supported- subprogram no. 01.01.02.

Class of Inventions: Agriculture and Horticulture

CHRYSANTHEMUM INDICUM L. 'DOMNIȚA' - IS A NEW VARIETY

Category: Patent application - 2024 0018/ 2024 08.19

Authors: Voineac Ina, Roșca Ion, Slivca Vasile, Mîrza Alexandru

Description: Variety Domnița was obtained in 2001, from the seeds (collection of 2000) of the variety Fuchsia Fairy from the group of small-flowered chrysanthemums with an average flowering period. The bush is 60-70 cm tall, the foliage is medium, the shoots are resistant to lodging. The leaves are rounded, large, shiny. Inflorescences are terry dark pink with a lilac tint, 4.5-6 cm in diameter. In full dissolution, the center (tubular flowers) is clearly visible, small, bright yellow with a slightly greenish tint. The variety belongs to the group of early flowering, it begins to bloom from the end of September and retains its decorative effect from 36 to 52 days. Drought - and frost-resistant, can be used for cutting, in mixborders and group plantings.

Class of Inventions: Agriculture and Horticulture

HEMEROCALLIS X HYBRIDA HORT. 'COSÂNZEANA' (DAY LILY)

Category: Patent application - V 2024 0017/ 2024 08.19

Authors: MANOLE Svetlana, Ph.D.; SÎRBU Tatiana, Ph.D.; ȘABAROV Doina

Description: Rhizome perennial plant with abundant radical foliage: linear, light green, leaf length about 50 cm. They grow about 100 cm tall in the flowering stage. It has simple funnel-shaped flowers, wide open, acuminate petal lobes. The diameter of the flower is 14-17 cm. Internal tepals are intensely pink-reddish with cherry red spots at the base (173 CD; 178 BCD), golden in the center. The external tepals are light brick-brown, tinged with burgundy (168 - 172 CD). The inflorescence has 3-6 branches, each with 6-8 fragrant flowers. 5-7 year old plants form 12-18 flower stalks. The flowering stage extends from June to July, sometimes into early August (60 days). The variety can grow in sunny and half-shaded areas. It is undemanding towards soil, but prefers rich, well-irrigated substrate. The plants are very resistant to pathogens and pests. Universal variety: for cut flowers, in landscape planning, can be promoted as a container plant.

Class of Inventions: Agriculture and Horticulture

IDENTIFICATION OF VALUABLE FORMS OF PLANT RESOURCES WITH MULTIPLE USES FOR THE CIRCULAR ECONOMY

Category: Research project - RVEMAF 010102

Author: Victor Țîței

Description: As part of the implementation of the National Program RID, research subprogram no.010102 "Identification of Valuable Forms of Plant Resources with Multiple Uses for the Circular Economy", within the strategic priority of Sustainable Agriculture and Food Security and the strategic direction of High-Productivity Cultivars and Hybrids of Agricultural, Technical, and Fodder Crops, a collection of new and forgotten food crops has been established at NBGI MSU. The collections of melliferous, fodder, and energy plants, mobilized from local flora and various floristic regions worldwide, were expanded with the addition of 43 new taxa. Several agro-biological characteristics were assessed, including physical parameters of seeds, biochemical composition, and the nutritional and energy value of plant biomass in the form of fresh matter, hay, and silage for farm animals. In addition, the biochemical biomethane potential and cellulosic bioethanol potential of these plant substrates were evaluated. New multi-purpose cultivars were developed through breeding and have been officially registered in the Catalogue of Plant Varieties (https://cstsp.md/uploads/files/Ordinul%20Nr_%2098%20A%20din%206%20noiembrie%202024.PD), as well as patented by the State Agency on Intellectual Property (AGEPI) of the Republic of Moldova (https://agepi.gov.md/sites/default/files/bopi/BOPI_03_2025.pdf#page=52). Furthermore, two new cultivars of non-traditional crops have been submitted for state testing and patenting. The scientific achievements of the project team were widely disseminated. Results were presented at 24 scientific events, and 130 research papers were published, including 20 journal articles indexed in Web of Science and SCOPUS, and 26 articles in other internationally recognized research journals. The project's innovations were also presented at 8 international invention exhibitions held in Romania and the Republic of Moldova, earning 17 gold medals, 1 silver medal, 1 bronze medal, 6 special awards, and 17 diplomas of excellence. Furthermore, the project was featured in 12 television and radio programs. These ecotypes of mobilized plant species can provide valuable sources of food, fodder, renewable bioenergy, and raw materials for other sectors of the circular economy. Financial support for research subprogram no.010102 in 2024-2025y., three million Moldovan lei annually, was offered by the Ministry of Education and Research and Moldova State University.

Class of Inventions: Agriculture and Horticulture

THE INNOVATIVE TECHNOLOGY FOR CULTIVATION AND USE OF SOME NON-TRADITIONAL FORAGE CROPS

Category: Patents - MD 456/ 2025.03.31; MD 400 / 2023.02.28; MD 207/ 2016.05.31

Author: Victor Țîței

Description: The revitalization and development of the national livestock sector require the diversification and increased production of locally sourced vegetal feeds, balanced in both quantity and quality throughout the year, in line with the physiological needs and productivity indicators of livestock. The establishment of plantations and the production of fresh and preserved forage (hay, silage, haylage) using new cultivars of non-traditional forage plants – developed at the National Botanical Garden (Institute) of Moldova State University, patented by the State Agency on Intellectual Property and registered in the Catalogue of Plant Varieties of the Republic of Moldova – will play a key role in achieving this goal. These include 'VIGOR' (*Astragalus galegiformis* L.) and 'SOFIA' (*Galega orientalis* Lam.) from the Fabaceae family, and 'ENERGO' (*Sida hermaphrodita* Rusby) from the Malvaceae family. These cultivars ensure an annual productivity of 16-25 t/ha of nutritive units and 2,100-3,300 kg/ha of digestible protein over a period of 10-15 years. The implementation of these innovative technologies will contribute to an improved animal welfare, enhanced national food security and greater sustainability. The benefits include reduced feed imports, improved environmental conditions, and the productive use of degraded, eroded, or otherwise underutilized agricultural land.

Class of Inventions: Agriculture and Horticulture

FLORA OF BESSARABIA

Category: ISBN: 978-9975-47-235-7

Authors: A. Negru, Valentina Cantemir, V. Ghendov, Gh. Gînju, Stela Gînju, Olga Ionița, Tatiana Izverscaia, P. Pinzaru, Elena Tofan-Dorofeev

Description: The monographic work "Flora of Bessarabia", vol. V includes the general characterization of families, genera and species of vascular plants (341 species, 98 genera, 5 families of the Magnoliophyta phylum), recorded in the spontaneous flora of Bessarabia. The species, included in the volume – 544 pages, are accompanied by synonyms, detailed descriptions of morphological, biological and ecological characters, general distribution, areas of use, as well as their original drawings. The conservation status of rare species is also indicated. The monograph "Flora of Bessarabia" (vol. V) is edited in 1000 hard copies and distributed through the international book exchange to the main botanical institutions throughout the world, as well as to the educational institutions of the Republic of Moldova. The monograph edited for the first time in the republic contributes to the development of the activities of education and information of the population regarding the conservation and protection of the environment.

Class of Inventions: Environmental Protection and Energy

**MOLDOVA STATE UNIVERSITY,
INSTITUTE OF CHEMISTRY, INSTITUTE OF APPLIED PHYSICS**

TWO-DIMENSIONAL ZINC COORDINATION POLYMER WITH PHOTOLUMINESCENT PROPERTIES

Category: Patent - MD 4909

Authors: Danilescu Olga, Bulhac Ion, Cocu Maria, Bourosh Pavlina, Kulikova Olga, Podgornii Daniel

Description: The invention relates to coordination chemistry, in particular to the synthesis of a new two-dimensional coordination polymer of zinc(II) 2,6-diacetylpyridine-bis(isonicotinoyl hydrazonato)(2-)zinc(II) with the formula $[Zn_2(L)_2]n$, $H_2L = 2,6$ -diacetylpyridine bis(isonicotinoylhydrazone), with photoluminescence properties. The claimed complex exhibits photoluminescent activity about 10 times more intense than the free ligand (H_2L), a fact established by evaluating the effect of the fluorescent emission in the range 550-650 nm which can be observed even with the naked eye. $[Zn_2(L)_2]n$ is proposed as a applicable material for obtaining green light sources.

Class of Inventions: Photography and Optical Industry

**MOLDOVA STATE UNIVERSITY
QUANTUM OPTICS AND KINETIC PROCESSES LABORATORY, INSTITUTE OF APPLIED
PHYSICS**

UV-C STERILIZING DEVICE

Category: Patent - MD s 2024/ 0049

Authors: Munteanu Ion, Țurcan Marina

Description: The invention refers to the decontamination and annihilation of pathogens, frequently present on objects with irregular surfaces (for example: laboratory instruments, dental, surgical instruments and equipment, measuring devices, various devices), as a result of the action of ultraviolet radiation type C applied, which can be applied in the disinfection of various objects with irregular surfaces within medical, secondary and higher education institutions, the food industry, public health, etc...

Class of Inventions: Healthcare, Medicine, and Cosmetics

**MOLDOVA STATE UNIVERSITY,
INSTITUTE OF GENETICS, PHYSIOLOGY AND PLANT PROTECTION**

NEW TOMATO CULTIVAR - PETRAMAK

Category: Patent application - MD 424 2024-03-31

Author: Milania Makovei

Description: The PETRAMAK tomato cultivar of determinant type of growth (sp). Growing period from mass sprouting to the beginning of ripening – 114...117 days. Simple inflorescence of 5...7 flowers. The first inflorescence appears after the 7th-8th node, the following ones after 2...1...1. Pedicel of fruit, without geniculate joint. The fruits are large, round, smooth, pink-intensive with thick pericarp (0.5-0.7cm). Fruit mass 120...150 g. Fruits have high taste properties due to high dry substance content – 5.4...6.1%; sugar – 4.9...5.3%; vitamin C – 33.1...34.8mg/% and total acidity – 0.48%. The presence of the rin gene in the genome of cultivar ensures high fruit density and their persistence on the bushes at the biological stage of maturity without signs of softening for 20...25 days. Total yielding capacity is of 58.6...62.7 t/ha, with fruit vendibility 92.4...96.7%. Resistant to high temperatures and to a complex of diseases: Verticillium, Fusarium, Cladosporium, Alternaria and Viral infections.

Class of Inventions: Agriculture and Horticulture

NEW TOMATO VARIETIES SOLANUM LYCOPERSICUM L. DARGEN

Category: Patent - MD 460 / 2025.03.31

Authors: Mihnea Nadejda, Lupașcu Galina, Climăuțan Diana, Roșca Cristian, Cristea Nicolae

Description: The fruits of the Dargen variety are circular (round), small, average weight – 32,2 – 40,0 g, the surface of the fruit – smooth, without a green spot at the base, color until maturity – very light, at maturity – red. The fruits contain 6,5-8,0% of dry matter, 4,6...5,0% – sugars, 20,5...30,0 mg/% – vitamin C, 0.40...0.50% – acidity. The variety is early, vegetation period is 103 days. In the transplant culture, the variety ensures a yield of 30,0...53,6 t/ha, while the standard fruit yield is high (91,0...96,0%). The fruits of the Dargen variety are circular (round), small, average weight – 32,2 – 40,0 g, the surface of the fruit – smooth, without a green spot at the base, color until maturity – very light, at maturity – red. The fruits contain 6,5-8,0% of dry matter, 4,6...5,0% – sugars, 20,5...30,0 mg/% – vitamin C, 0.40...0.50% – acidity. The variety is early, vegetation period is 103 days. In the transplant culture, the variety ensures a yield of 30,0...53,6 t/ha, while the standard fruit yield is high (91,0...96,0%).

Class of Inventions: Agriculture and Horticulture

VARIETY OF WINTER TRITICALE (TRITICOSECALE WITT) – INGEN 33

Category: Patent application - MD 433/ 2024.05.31

Authors: Buiucli Petr, Veverita Efimia, Jacota Anatol, Rotari Silvia, Gore Andrei, Lupascu Galina, Leatamborg Svetlana, Chirtoaca Ilie

Description: The variety Ingen 33 was obtained by crossing the triticale varieties Ingen 8, Plai and individual selection from the hybrid combination for 8 years. The variety is part of the Leucurum-Leocomelean variety. The height of the plants – 90-93 cm. The spike is white, medium length (10.0–11 cm), the grain – red, the weight of 1000 grains – 45-49 g, the number of grains in the spike varies from 50 to 70, contains 12.0–14.0% protein and 24–25% gluten. The variety is mid-early, the vegetation period – 273-280 days. It has good biochemical and baking qualities. The variety is productive and its potential of productivity reaches up 5.9-8.0 t/ha. It is more productivity than control variety Ingen 93 with 0.5 – 0.8 t/ha. Tolerant to drought, wintering and the main fungal diseases.

Class of Inventions: Agriculture and Horticulture

STRAIN OF LECANICILLIUM LECANII FUNGI FOR THE CONTROL OF PESTS AND PHYTOPATHOGENS IN PROTECTED LAND

Category: Patent - MD 4922B1

Authors: Șcerbacova Tatiana, Voloșciuc Leonid, Lungu Andrei

Description: The invention relates to agricultural microbiology, in particular to the field of protecting plants from pests and diseases. The *Lecanicillium lecanii* strain has insecticidal and acaricidal activity against pests of greenhouse crops. It also exhibits fungicidal activity against phytopathogens: *Alternaria* sp., *Fusarium gibbosum*, *F. oxysporum*, *F. solani*, *F. sporotrichioides*, *F. graminearum*, *Sclerotinia sclerotiorum*, *Thielaviopsis basicola* and others. The strain can be used to produce a biological product for protecting plants from piercing-sucking pests and a complex of phytopathogens in protected soil conditions. The invention will enable protective measures against melon aphids, common spider mites, and phytopathogens to be implemented simultaneously in greenhouses.

Class of Inventions: Agriculture and Horticulture

ECO-FARMING FOR INNOVATIVE PROTECTION OF NEW WALNUT VARIETIES: HARNESSING METHODOLOGIES AND TECHNOLOGIES

Category: Research project - 25.80013.5107.01TR

Authors: Stîngaci Aurelia, Șcerbacova Tatiana, Harciuc Oleg

Description: The experiments showed that the new *Trichoderma* strains exhibit fungistatic alimentary and territorial antagonism—the growth of the *Trichoderma* fungus colony on the surface of the phytopathogen colony. At the same time, inhibition of the pathogen's conidia and mycelium was observed, as well as its thinning, deformation, and destruction under the influence of *Trichoderma* metabolites.

Class of Inventions: Agriculture and Horticulture

SOYBEAN VARIETY PENTATA

Category: Patent - MD 417 2023.10.31

Authors: Harciuc Oleg, MD; Budac Alexandr, MD

Description: New soybean varieties for ecological agriculture are in view of replacement of maize by soybean in Italy, Romania and Hungary (Lauerwald R. et al., 2023). The new soybean variety Pentata was obtained by the method of individual selection for the seasons with sufficient moisture supply. On the upper (8 and above) tiers of soybean Pentata plants are observed the leaves with an increased (4-5) number of leaf blades; the harvest consists of large (up to 250 mg dry weight) yellow grains, evenly light in color. The photosynthetic parameters of leaves Pentata variety are identical upon measurements by two different photosynthetic devices (Lcpro-SD, ADC Bioscientific Ltd., UK and Smart Phyto-Sensor™ Pro PLS-10R-485M, Bio Instruments S.R.L., Republic of Moldova). Research was funded by the Subprogramul 011103: "Elaborarea mijloacelor ecologic inofensive de reducere a impactului organismelor dăunătoare ale culturilor agricole pe fundalul schimbărilor climatice".

Class of Inventions: Agriculture and Horticulture

“TETHYS” - GENOTIP INTERSPECIFIC RIZOGENIC (V. VINIFERA L. X M. ROTUNDIFOLIA MICHX.)

Category: Patent application - 437 / 2024.03.31

Authors: Alexandrov Eugeniu, Botnari Vasile, Gaina Boris

Description: As a result of the development of the methodology for creating interspecific rhizogenic grapevine genotypes, using the species *Vitis vinifera* L. and *Muscadinia rotundifolia* Michx. Finally, rhizogenic interspecific grapevine genotypes were obtained and selected in BC3, with valuable characters, which allows to expand the grapevine cultivation area to the northern limit, on own roots and cultivation in biological system. Genotype with moderate growth vigor. Blooms in the first decade of June. Berries ripen in September. Grape weight - 250-350 g. At full maturity, the berries accumulate a sugar content in the must of 20-22%. Relative fertility coefficient - 1.15. Absolute fertility coefficient - 1.46. Relative productivity index - 0.28-0.4 and absolute productivity index - 0.36-0.51. Depending on the cultivation technology, the possible harvest is 10-11 t/ha. Resistant to phylloxera, drought, low temperatures during the wintering period and to the attack of pathogens. Recommended for organic cultivation. Grapes can be used both for processing and for fresh consumption.

Class of Inventions: Agriculture and Horticulture

NATIONAL AGENCY FOR PUBLIC HEALTH

METHOD OF TESTING BLOOD IN IMMUNOCOMPROMISED PEOPLE FOR VIRAL HEPATITIS E MARKERS

Category: Patent application - S 2024 0087

Authors: Sajin Octavian, Iziumov Nina, Paraschiv Angela, Țurcanu Adela, Holban Tiberiu, Blaj Valentina

Description: The invention presents an improved method for diagnosing Hepatitis E virus (HEV) infection in immunocompromised individuals, including hemodialysis patients. It starts with ELISA testing for anti-HEV IgG and IgM antibodies. If IgM is positive, a PCR test follows to detect HEV RNA, confirming acute infection. The novelty lies in an optimized sequence of reagent additions and incubations that enhance detection accuracy and speed. The procedure includes precise washing, enzyme conjugation, and colorimetric detection steps, improving photometric measurement of optical density (OD). Results are interpreted based on the serum-to-cutoff OD ratio, allowing classification as negative, gray zone, or positive. Ambiguous results may be retested after two weeks.

Class of Inventions: Healthcare, Medicine, and Cosmetics

ASSESSMENT OF THE PREVALENCE AND RISKS ASSOCIATED WITH HEPATITIS E VIRUS INFECTION IN PREGNANT WOMEN (2024-2027)

Category: Research project - 130104 PRIHEF

Authors: Sajin Octavian, Iziumov Nina, Blaj Valentina

Description: This subprogram is the first nationwide study assessing Hepatitis E Virus (HEV) seroprevalence among pregnant women in the Republic of Moldova. Its objectives include: determining HEV infection prevalence, evaluating maternal-fetal impact, identifying associated risk factors, and analyzing the effectiveness of current preventive measures to optimize response strategies. The project addresses a critical research gap in maternal-fetal health, offering essential data for tailoring public health interventions related to HEV among pregnant women in Moldova. HEV markers will be detected using ELISA. Data on risk factors and clinical evolution will be collected via questionnaires and medical record analysis. Statistical tools will be used to interpret findings and support targeted prevention efforts. The study will generate reliable data on HEV prevalence, risk factors, and infection patterns in pregnancy, providing a foundation for improved preventive strategies and enhanced maternal-fetal health outcomes.

Class of Inventions: Healthcare, Medicine, and Cosmetics

VIRAL HEPATITIS E: FROM VIRUS DISCOVERY TO DISEASE TREATMENT

Category: Scientific Work No. 7947, May 22, 2024

Authors: Sajin Octavian, Iziumov Nina, Blaj Valentina, Guțu Veaceslav

Description: "Viral Hepatitis E: From Virus Discovery to Disease Treatment" is a comprehensive monograph that explores hepatitis E, an increasing global health concern. Written by field experts, it traces the virus from its discovery to current knowledge about its health impact. The book examines the virus's structure, genetic diversity, and transmission mechanisms, highlighting high-risk groups and infection routes. It includes in-depth sections on epidemiology, pathogenesis, and clinical features of both acute and chronic forms of the disease, including liver failure and extra-hepatic effects. Diagnostic tools, laboratory techniques, and differential diagnoses are presented, alongside current treatment options. The monograph also focuses on prevention, outlining both general and specific strategies to reduce transmission. It aims to expand understanding of hepatitis E and provide practical insights for clinicians, researchers, and students. This work serves as a vital resource for improving disease management and advancing research, contributing to more effective responses to hepatitis E across medical and public health contexts.

Class of Inventions: Healthcare, Medicine, and Cosmetics

THE EVOLUTION OF HUMAN POPULATIONS' HEALTH OR THE THEORY OF EPIDEMIOLOGICAL TRANSITION

Category: Scientific Work No. 8201, June 12, 2025

Author: Sajin Octavian

Description: This book explores the concept of epidemiologic transition—the shift from infectious diseases and malnutrition to chronic non-communicable diseases (NCDs) like cardiovascular disease, diabetes, and cancer as leading global health challenges. It traces how advances in medicine, technology, education, and living standards have transformed causes of illness and death, improving life expectancy and quality of life. The book examines historical trends, regional differences, and contributing factors behind these transitions, including lifestyle changes and economic development. It also analyzes the implications for public health systems and the urgent need to adapt policies and care models to address the growing burden of NCDs. Challenges in prevention and control are discussed, along with practical solutions. Aimed at health professionals, students, researchers, and policymakers, this resource offers insights for improving health outcomes in the context of modern epidemiologic patterns. It serves as both an educational and strategic guide for managing current and future public health priorities.

Class of Inventions: Healthcare, Medicine, and Cosmetics

HYGIENIC METHOD FOR ASSESSING THE PERCEPTION OF WORKING CONDITIONS AND HEALTH STATUS AMONG WORKERS IN THE GARMENT INDUSTRY

Category: Patent - 8018/ 05.11.2024

Author: Bucata Elena, Pînzaru Iurie, Deleu Raisa

Description: The Hygienic Method is a valuable tool that integrates the assessment of knowledge, attitudes, and behaviors related to occupational health risks. It offers key insights into how workers perceive and respond to workplace hazards, enabling the development of targeted, effective interventions. This participatory approach ensures that evaluations reflect workers' real experiences, building trust and promoting inclusivity. By encouraging awareness and prevention, the method helps improve workplace safety and fosters long-term health and well-being, especially among vulnerable groups in the garment industry. It supports the sustainable enhancement of working conditions and contributes to reducing occupational injuries and illnesses over time. The Hygienic Method can be used by employers, occupational health professionals, researchers, trade unions, government agencies, and

NGOs to assess workers' perceptions, identify risks, and create safer, healthier, and more equitable work environments. Ultimately, it contributes to improved worker well-being and better organizational performance in the garment sector.

Class of Inventions: Healthcare, Medicine, and Cosmetics

THE HYGIENIC METHOD OF COMPLEX DIAGNOSIS OF RISK FACTORS IN THE ETIOLOGY OF NON-COMMUNICABLE DISEASES

Category: Research project - Scientific work No 7699 from 2023.10.30

Author: Bernic Vladimir, Friptuleac Grugore, Miron Inga

Description: The "Hygienic Method for Complex Risk Factor Diagnosis in the Etiology of Non-Communicable Diseases" is a valuable tool for assessing risk factors, enabling their ranking and prioritization based on their aggressiveness. Through a questionnaire, it simultaneously evaluates exposure to various risk factors: psychosocial, behavioral, dietary, environmental, occupational, biological, and hereditary, as well as the population's knowledge of their influence. Identifying these risk factors is essential for guiding the healthcare system and the public towards effective preventive measures. By implementing prevention programs, mortality from these diseases could be reduced by over 75%, and their incidence could decrease by over 50%. The method is designed for public health specialists, family doctors, and other stakeholders involved directly or indirectly in disease prevention and improving quality of life. Additionally, it contributes to enhancing the professional training of healthcare personnel at both undergraduate and postgraduate levels.

Class of Inventions: Healthcare, Medicine, and Cosmetics

AN INNOVATIVE COMMUNICATION METHOD FOR INFORMING THE PUBLIC ABOUT THE HEALTH RISKS AND IMPACT OF ENDOCRINE DISRUPTORS

Category: Patent - 7916/ 2024.05.03

Author: Corețchi Roman, Pinzaru Iurie, Bernic Vladimir, Stinca Kristina, Miron Inga

Description: The communication method developed to raise awareness about the health risks and impacts of endocrine disruptors targets both specific groups and the general public through a comprehensive approach. It includes the implementation of a practical guide titled *"Endocrine Disruptors: Challenges and Perspectives."* Endocrine disruptors are a wide group of substances that interfere with the hormonal system, affecting key physiological functions such as metabolism, reproduction, the nervous system, and immunity. This method is particularly relevant for public health professionals involved in monitoring chemical substances, healthcare providers diagnosing and treating related conditions, economic operators using chemicals, researchers, and educators. Its main goals include offering clear, practical recommendations to national authorities and the public to reduce risks associated with these substances, especially by promoting their safe use. Despite their serious health implications, endocrine disruptors remain an underestimated and underregulated issue at the national level, highlighting the need for informed action and improved communication strategies.

Class of Inventions: Healthcare, Medicine, and Cosmetics

101 QUESTIONS AND ANSWERS ABOUT ENDOCRINE DISRUPTORS

Category: Research project - Scientific work nr. 8160 from 31.03.2025

Author: Pinzaru Iurie, Bernic Vladimir, Miron Inga, Stîncă Kristina, Corețchi Roman

Description: It represents an innovative public education tool designed to raise awareness about endocrine disruptors and encourage the adoption of preventive behaviors among the population. The

goal of this work is to provide the public with an accessible, well-documented, and easy-to-understand guide on endocrine disruptors. Organized in the form of a set of 101 questions and answers, this material aims to address the most common questions related to chemicals that disrupt the endocrine system, explaining in simple terms the risks to which we are exposed daily and practical measures to reduce their impact on health. The practical value of the guide is undeniable, offering direct and effective solutions for protecting public health by preventing exposure to endocrine disruptors. Understanding the main sources of exposure to endocrine disruptors and how they function can help the public make healthier choices in daily life.

Class of Inventions: Healthcare, Medicine, and Cosmetics

RHIZOPUS STOLONIFER FUNGI STRAIN FOR BIODEGRADATION OF COBALT AND NICKEL COMPOUNDS

Category: Patent - 4486/ 21.01.2016

Author: Coretchi Liuba, Plavan Irina, Bahnarel Ion

Description: The invention pertains to the fields of biotechnology and environmental protection, aiming to reduce soil pollution by using non-pathogenic microorganisms. The proposed solution involves the fungal strain *Rhizopus stolonifer** CNMN-FD-18, which exhibits the capacity to biodegrade toxic heavy metal compounds such as cobalt phosphate and nickel nitrate. This strain synthesizes extracellular proteolytic enzymes and organic acids that convert these metals into less soluble forms like hydroxides, oxides, or oxalates. These transformations are visually indicated in laboratory conditions by color changes in the medium: pink to colorless for cobalt phosphate and white to transparent for nickel nitrate. The oxalates formed are further biodegraded by naturally occurring soil microorganisms. The fungal strain was isolated from soils in the Republic of Moldova using a standard microbiological procedure involving serial dilutions and culture on must-agar medium. Identification of the isolated strain was performed following classical microbiological techniques. This process enhances the efficiency of heavy metal biodegradation in contaminated soils.

Class of Inventions: Healthcare, Medicine, and Cosmetics

"NICOLAE TESTEMITANU" STATE UNIVERSITY OF MEDICINE AND PHARMACY

METHOD OF DECELLULARIZATION OF AVASCULATORY LYMPH NODES

Category: Patent application - 6381

Authors: Stoian Alina, Jian Mariana, Cobzac Vitalie, Iacubițchii Vitalie, Nacu Ana-Maria, Iordachescu Rodica, Verega Grigore, Nacu Viorel

Description: The invention relates to the field of regenerative medicine and tissue engineering, with applications in the medical field. Its purpose is the decellularization of lymph nodes from laboratory animals in order to support the development of tissue-engineered constructs for the lymphatic system. This approach aims to contribute to the advancement of new treatment methods for secondary lymphedema. Among the advantages of the proposed method are the use of a reduced volume of reagents and a simple decellularization protocol, which can be performed and supervised by a small team. Thus, the method represents an innovative, efficient, and accessible solution, with the potential to open new directions in research and treatment of lymphatic pathologies, particularly in the case of secondary lymphedema. The procedure involves the sequential processing of avascular lymph nodes collected from laboratory animals.

Class of Inventions: Healthcare, Medicine, and Cosmetics

HYBRID CONSTRUCTION OF THE OCCLUSAL SPLINT

Category: Research project - 323

Authors: Vadim Oineagra, Chele Nicolae, Oleg Solomon, Vasile Oineagra, Erar Kamel, Oineagra Liudmila, Vasile Rusu, Natalia Groza

Description: The device proposed by us, a hybrid construction that combines a removable partial denture and an occlusal splint, provides superior stability of the structure in various clinical situations, a problem frequently encountered especially in partial edentulism. At the same time, the advantage of detecting and correcting occlusal discrepancies in a reduced number of appointments and with less need for remakes leads to more predictable treatment outcomes—an essential aspect for clinical efficiency and patient satisfaction, contributing to an overall more positive experience.

Class of Inventions: Healthcare, Medicine, and Cosmetics

SPACE MAINTAINERS FOR THE TREATMENT OF CONGENITAL EDENTULISM PATENTED WITH INVENTION PATENTS

Category: Patent MD-2699

Authors: Oleg Solomon, Lilia Solomon, Olga Solomon, Erar Kamel, Vasile Rusu, Mariana Jian, Mihail Moisei, Vadim Oineagră

Description: This invention is intended to maintain spaces for permanent teeth in the dentition when the dental follicle is present but also in congenital dentition when the dental follicle is absent. In addition, this device will replace the dental arches with artificial teeth, functionally and aesthetically, in the places of unerupted teeth. The device can be made of acrylic with artificial teeth or silicone. It will be maintained in the oral cavity until the appearance of permanent teeth or until definitive prosthetic treatment.

Class of Inventions: Healthcare, Medicine, and Cosmetics

PI NATIONAL INSTITUTE FOR APPLIED RESEARCH IN AGRICULTURE AND VETERINARY MEDICINE

PROCESS FOR OBTAINING THE FOOD PRODUCT EXTRUDED FROM CEREALS

Category: Patent - 4826/ 2023.05.31

Authors: Iușan Larisa, Terentieva Galina, Migalatiev Olga

Description: The invention relates to the food industry, in particular to the production of extruded products like as breakfast cereals. The problem solved in the present invention is the development of a new enriched extruded food product with nutritional value and content of vitamins and minerals increased, not complicating the technological process, as well as diversifying the range of extruded products from native raw materials: soris and corn. During the procedure, the mixture is prepared on the basis of soris grains, to which corn grits and wheat germ are added. The mixture is moistened with water to 16-18%, after which it is extruded, where the processing is carried out at a temperature of the product in the matrix of 418-423 K and a pressure in which a pre-matrix zone of 5.5-6.0 MPa and cords with a thickness of 6-8 mm are obtained. The cords are cut and dried to 20 - 25 °C, then the product is packed in bags for 12 - 14 hours to balance the moisture in the product. The mixture is prepared with the following ratio of components: soris 60-65%, corn grits 15-20%, wheat germ 15-25%. Extrusion process occurs in modes with low temperature and pressure parameters, which helps reduce the loss of nutrients (vitamins) from the raw materials. The invention provides a new extruded product with increased nutritional and biological value. Increasing the nutritional value of the product is achieved through the use of unrefined soris and corn grains.

Class of Inventions: Laboratory and Chemical Industry

PROCESS FOR OBTAINING STRUCTURED FRUIT SNACKS WITH A HIGH CONTENT OF BIOACTIVE POLYPHENOL COMPOUNDS

Category: Patent application - s 2024 0081/ 28.08.2024

Authors: Shlyagun Galina, Yushan Larisa, Kastravets Liudmila, Tofan Svetlana, Golubi Roman, Cupcea Tatiana

Description: Process for obtaining structured fruit snacks with a high content of bioactive polyphenolic compounds includes the preliminary preparation of raw materials, the preparation of fresh fruit mass, consisting from grape, puree of other fruits and structure-forming agents taken in a ratio that ensures structuring of the product. The grapes are used as the main ingredient, and their preparation involves careful sorting, washing, crushing into particles, passing through a sieve, and pressing with subsequent collection of puree and squeezed juice. The grape pomace is dried until a maximum moisture of 8% is reached and then crushed. The fruit mass is prepared by mixing heated fruit puree, crushed pomace, and dietary fiber, holding for 15-30 minutes and activating. The resulting mass is combined with hydrated pectin and squeezed juice, and heated while slowly stirring. The ratio of the ingredients is set within the following limits (in % dry matter): prepared grapes 75–92, including crushed pomace 2.5–8.5, puree of other fruits 12–25, fiber 3–5 and pectin 0.8–3. Before forming, the dehydrated product is stored in the form of sheets at a temperature between 2–12 °C.

Class of Inventions: Laboratory and Chemical Industry

TECHNICAL UNIVERSITY OF MOLDOVA

QUEEN BEE BREEDING PROCESS

Category: Patent – 10646/ 2025.06.10

Authors: Eremia N., Macaev F., Krasocico, P., Jereghi, V., Coșeleva O., Zagareanu, A., Pogrebnoi S., Sucman N., Cataraga, I.

Description: Queen bee rearing process includes forming a family of nurse bees by removing the queen and the combs with unhatched brood, introducing the frame with transferred larvae into the nest and feeding the nurse bees with a mixture of 50% sugar syrup and 1.0-3.0 ml/L of 2% aqueous solution of hexaaminocobalt(III) chloride in an amount of 1.0 L of the mixture per family of bees, daily for 5 days, from the introduction of the frame with transferred larvae until the hives are hatched. The result of the invention consists in increasing the diameter, length and mass of the hives, as well as the mass of the queens.

Class of Inventions: Agriculture and Horticulture

ROYAL JELLY PRODUCTION PROCESS

Category: Patent – MD 1860 Y, s 2023 0098/ 2024.10.11

Authors: Eremia N., Macaev F., Jereghi, V., Coșeleva O., Pogrebnoi S., Mardari T., Modvala S., Sucman N.

Description: The procedure for obtaining royal jelly includes the introduction into the rearing colony of 1–3 frames equipped with 40–110 grafted larvae and the daily feeding of nurse bees, in the absence of a maintenance nectar flow, with a 50% sugar mixture containing 1.25–3.25 ml/L of an aqueous solution of hexaminecobalt(III) chloride, in the amount of 1.0 L of mixture per bee colony, for 3 days. After this period, the frames are removed from the hive for royal jelly collection, and the procedure is repeated twice more. Standard frames of 435x300 mm are used, with 2 bars (upper and middle) fitted with 30 (15/15) queen cups, as well as frames with 3 bars (upper, middle, and lower) fitted with 40 (14/13/13) queen cups, the queen cups consisting of a fixing cap for the cup holder, a cup holder, and the cup itself. The result of the invention consists in increasing the number of larvae accepted for rearing, as well as the diameter, length, and mass of the queen cells, improving the physiological state of the bees, stimulating secretion, and increasing the production of royal jelly both per queen cell and per colony in one cycle.

Class of Inventions: Agriculture and Horticulture

THAILAND

**DEPARTMENT OF THAI TRADITIONAL AND ALTERNATIVE MEDICINE, MINISTRY OF PUBLIC
HEALTH, THAILAND
SCHOOL OF PHARMACEUTICAL SCIENCES, UNIVERSITY OF PHAYAO, THAILAND**

DUALQUIT: NOVEL APPROACHES IN SMOKING CESSATION DELIVERING DUAL ACTION TO BOTH BRAIN AND LUNGS WITH FAST-DISINTEGRATING TABLETS

Category: Research project

Authors: Theerathorn Sungrai (B.Pharm.), Asst. Prof. Maleeruk Utsintong (Ph.D.) and Tewan Thaneerat (M.D.)

Description: Over 1.1 billion people worldwide are smokers. In 2025, the highest prevalence rates are expected in the European, Western Pacific, and Eastern Mediterranean regions. Tobacco use leads to severe brain, cardiovascular, and respiratory damage, contributing to approximately 13,000 deaths daily and imposing an economic burden exceeding €1.5 trillion annually. Standard treatments such as nicotine gum are commonly used to manage breakthrough cravings. However, these options have significant limitations with high cost around €300 per month, unsuitable for cardiovascular disease or dental appliances, GI irritation, and do not support lung function recovery. Most herbal products offer only taste deterrence without clear evidence. Our innovation integrates traditional knowledge with modern science. We have discovered Yaluangkratom, a traditional medicine used in Thailand for over 170 years, consumed as a boiled decoction to alleviate opium addiction. Through advanced molecular studies, we identified that the active compounds in this recipe bind to both Kappa Opioid Receptors (KORs) and Nicotinic Acetylcholine Receptors (nAChRs) $\alpha 4\beta 2$ subtype in the nucleus accumbens for reducing cigarette consumption, relieving nicotine withdrawal and maintaining dopamine balance during smoking cessation. Mitragynine and speciociliatine show greater efficacy than nicotine at nAChRs. These findings highlight strong potential for this formulation as an effective smoking cessation therapy. However, the traditional recipe is difficult to standardize in terms of chemical composition across different plant sources, and there is a risk of microbial growth in the water-based formulation over the long term. For limitation, we applied pharmaceutical technology and eco-friendly extraction method to transform the traditional liquid form into a dry concentrated powder through freeze drying method. We then developed fast-disintegrating tablets that dissolve within one minute in the mouth, no water needed, ensuring consistent dosing and safety. The product meets international pharmaceutical standards and has shown long-term stability in shelf-life studies. Clinical studies show a significant reduction in cigarette consumption within the first week, achieving an 83% cessation rate within four weeks. Withdrawal symptoms such as anxiety, irritability, and restlessness were significantly reduced with a statistically significant decrease in the Nicotine Withdrawal Scale score from 5.16 in the first week to 1.31 in the fourth week. No serious adverse effects were reported. Moreover, the product improves lung function in smokers by increasing %PEFR and decreasing CO levels through antioxidant activity, anti-lung cancer cell proliferation, and anti-inflammatory activity, along with inhibiting nitric oxide secretion. It also exhibits neuroprotective effects in human neuronal cells, with no observed toxicity. This innovation has the potential to reduce global pharmaceutical expenditure by over €2.5 billion annually and significantly enhance the quality of life. More than 100,000 tablets have been distributed through domestic healthcare services. Finally, we are now seeking global partners to expand into the international smoking cessation market and offer patients and healthcare professionals a new approach to treatment.

Class of Inventions: Healthcare, Medicine, and Cosmetics

YA ODT YA BA: NOVEL APPROACHES IN AMPHETAMINE WITHDRAWAL TREATMENT: MEDICAL INNOVATIONS TO ENHANCE THE QUALITY OF LIFE FOR DRUG ADDICTION IN THE PUBLIC HEALTH SERVICE SYSTEM

Category: Research project

Authors: Theerathorn Sungrai (B.Pharm.), Asst. Prof. Maleeruk Utsintong (Ph.D.) and Preecha Nootim (Ph.D.)

Description: In 2020, 34.07 million people worldwide used amphetamines, with the highest rates in the Americas, Asia, and Europe. Long-term abuse can lead to severe brain and cardiovascular damage, and there is no pharmacotherapy currently available for amphetamine addiction. We found a potent formula from Thai Traditional Medicine, originally designed to treat opium withdrawal symptoms over a century ago. Our molecular docking studies revealed that all substances in this recipe interact with the Kappa Opioid Receptor in the Nucleus Accumbens. Among the compounds in the recipe, mitragynine exhibited the strongest binding affinity to kappa-opioid receptors compared to CBD, THC, Isopaynantheine, and GTG. This discovery suggests that the composition of this recipe could be effective in treating amphetamine withdrawal. To ensure standardization and prevent microbial growth, we applied pharmaceutical technology to extract the active ingredients and converted the liquid extract into a dry powder using freeze-drying. This preserved the chemical integrity of the formula, enabling the development of effervescent tablets that are easy to take, rapidly dissolve, absorption action with the same original formula and meet international standards. These tablets have shown long-term stability in shelf-life studies. Cellular studies confirmed the product's efficacy and safety, demonstrating neuroprotective activity by promoting autophagy in SH-SY5Y cells. It also showed no neurotoxicity after treatment. In 2,832 patients, the product significantly reduced amphetamine withdrawal symptoms such as reporting cravings, pain, insomnia, headaches, and fatigue, about 90% improvement and no severe side effects. Moreover, the product significantly reduced the score on the amphetamine withdrawal questionnaire, with a statistically significant improvement, and no severe adverse events were reported in 63 methamphetamine-dependent patients. We have fully implemented industrial-scale production, and 250,000 tablets have been distributed to healthcare services nationwide. This innovation has the potential to elevate both the herbal and medical industries, saving approximately 150 million baht in medicinal costs annually domestically and 3.7 billion euros globally each year, making it a highly cost-effective solution. Additionally, it promises to improve quality of life and help reintegrate individuals into society, offering long-term benefits for both patients and healthcare systems.

Class of Inventions: Healthcare, Medicine, and Cosmetics

SAUDI ARABIA

HIGHLY INNOVATIVE UNIQUE FOUNDATION (HIUF)

BY EMOTIONAL STORIES, PARASITOLOGY COURSE BECOMES SIMPLE AND EASY

Category: Research project

Author: Prof. Dr. Najia A. Alzanbagi

Description: Parasitology courses are one of the Science subjects that students find very difficult due to the similarity of parasites among themselves, the various stages in their life cycles and the multiplicity of infection methods. Through my interesting teaching of this subject for many years and noticing the students' annoyance with the subject, difficulty due to its minutes and very important details. Despite the variety of teaching methods that I usually used while I was teaching it, this did not reduce the bad feeling of Parasitology subjects and the fear of studying it, so I decided to include a new method in teaching Parasitology, which depends on using the Emotional Novels. For that, I put the parasite in every story, under the focus of attention, he wants to live, marry, have children, feel, cry and he is a very emotional being. God created him to be like that, and he has nothing to do with it, I made him tell us his story by himself. He sometimes cries and sometimes laughs, he loves, he hates, gets angry and screams, he is a very sensitive being, and the circumstances made him a parasitic being that attacks others against his well, and he is in order to live, he tries to overcome the bad environmental conditions, always apologizing to his host for what he does in him and for the diseases and complications that happen to him. These emotional stories which I wrote for the various parasites and medical insects, have for each story an interesting with somewhat strange and attractive title, that cannot be forgotten and to keep the memories of this parasite in the students' minds. These stories are available for students in two ways; they can read in Blog and hear it via Podcast. Hopefully that stories will raise their educational level in Parasitology and they can achieve their goals in the future.

Class of Inventions: Education & Entertainment Teaching Methodologies

**HIGHLY INNOVATIVE UNIQUE FOUNDATION (HIUF)
JEDDAH, KINGDOM OF SAUDI ARABIA**

REVOLUTIONIZING SOLAR POWER IN LOW-LIGHT CONDITIONS RHODAMINEPVP LIGHT- ABSORBING LAYER FOR ENHANCED SOLAR CELL EFFICIENCY

Category: Research project

Authors: Shaden N. Albalawi, Dr. Muna Al-Husaini

Description: Solar cells often suffer significant efficiency losses of up to 30% under low-light or cloudy conditions, limiting their ability to provide consistent renewable energy. This study introduces a hybrid light-absorbing layer composed of Rhodamine B (RhB), Rhodamine 6G (Rh6G), and polyvinylpyrrolidone (PVP) polymer to address this challenge. The layer was prepared by dissolving PVP in ethanol, mixing it with the dyes, and applying it to glass substrates. UV-Vis spectrophotometric analysis revealed a significant improvement in combined RhB/Rh6G absorbance, increasing from 0.577 to 0.959, representing a 66.2% enhancement. These findings confirm that the polymer improves dye dispersion and reduces aggregation, leading to a notable boost in light absorption. This scalable, low-cost approach can be applied as an additional coating to existing solar panels, enhancing their performance in suboptimal lighting conditions and contributing to global clean energy efforts in line with UN SDG 7.

Class of Inventions: Environmental Protection and Energy

RAIDER+ SMART HELMET PROJECT SUMMARY

Category: Patent Application - 51590838

Author: Nouf Abdullah Khabti

Description: Raider+ is a smart helmet designed for motorcycle riders to enhance safety on the road. It is equipped with sensors and an alert system that monitor the rider's condition and surrounding environment. The helmet provides real-time warnings to reduce accidents and can be connected to a mobile application for tracking data and ensuring rider protection.

Class of Inventions: Other

IMAM ABDULRAHMAN BIN FAISAL UNIVERSITY

AUTOMATED X-RAY IMAGE CLASSIFICATION USING ARTIFICIAL INTELLIGENCE FOR CUSTOMS INSPECTION

Category: Research project - No.SA 1020242475

Author: Supervisor: Dr. Saad Al-Shahri, Mentor: Dr. Al Dwaihi Al-Qabbani

Description: This project introduces a novel AI-based approach for automatic material identification in X-ray imaging to assist customs authorities in efficiently detecting prohibited items. The methodology involves collecting X-ray images of various materials and training a convolutional neural network to classify and distinguish them accurately. By leveraging AI, the system can automatically identify suspicious items in luggage or cargo, significantly reducing inspection time and human error. The novelty of this project lies in real-time AI-assisted detection, enabling faster, more reliable screening in ports and airports. Its implementation has the potential to transform customs operations worldwide, making border security smarter, more efficient, and safer. By providing an innovative solution to a global challenge, this project demonstrates how AI can redefine traditional inspection processes, supporting decision-making, enhancing efficiency, and protecting societies from prohibited and restricted materials.

Class of Inventions: Information Technology, Communication, and Security

KING ABDULAZIZ UNIVERSITY

CONVERSION OF SPENT COFFEE GROUNDS AND DATE SEEDS INTO A COSMETIC INGREDIENT FOR SUNSCREEN FORMULATIONS

Category: Research project

Author: Juri Al-tuwaijri

Description: Grounds and date seeds—into a sustainable, high-value cosmetic ingredient. Through a green dual-extraction protocol, polyphenols from coffee residues and vitamin E-rich oil from date seeds are standardized and combined into formulations that enhance sun protection factors (SPF and UVA-PF). The approach leverages antioxidant and photoprotective properties to improve stability, efficacy, and consumer safety, while complying with international ISO and SFDA/GSO regulatory standards. Beyond scientific novelty, the project creates a circular economy model by reducing organic waste, lowering carbon footprint, and localizing value chains in the cosmetic industry. This aligns with Saudi Vision 2030 goals on sustainability, innovation, and economic diversification.

Class of Inventions: Healthcare, Medicine, and Cosmetics

INVESTIGATING THE EFFECT OF 3D GRAPHENE ON MECHANICAL PROPERTIES AND THERMAL BEHAVIOR OF POLYMER MATRIX

Category: Research project - SA 1020252917

Author: Shahad Abdulaziz Alanazi

Description: This invention presents a breakthrough in polymer matrix composites by incorporating 3D graphene structures. Unlike conventional fillers, 3D graphene creates an interconnected network that dramatically improves both strength and thermal stability. Experimental results proved remarkable enhancements: tensile strength increased by 47%, elasticity improved by 16%, and thermal resistance rose by 60°C. These significant improvements address long-standing challenges in high-performance materials. The reinforced composites demonstrate outstanding durability, reduced weight, and superior resistance to extreme environments, making them ideal for next-generation aerospace, automotive, and renewable energy applications. By combining lightweight design with unprecedented performance, this invention delivers a pioneering solution that has the potential to revolutionize structural materials and drive safer, more efficient, and sustainable technologies worldwide.

Class of Inventions: Mechanics, Industrial Processes, and Metallurgy

UNIVERSITY OF JEDDAH, COLLEGE OF ART AND DESIGN

THE AESTHETICS OF SADU ART IN THE MANUFACTURE OF SMART ACCESSORIES WITH POLYMER CLAY AND EMBROIDERY

Category: Research project

Author: Lojun zainalabdien serri

Description: This project introduces a collection of innovative accessories that combine the traditional beauty of Saudi Sadu art with smart embroidery techniques. The pieces are handcrafted using polymer clay, an unconventional material for embroidery, and enriched with luminous threads to enhance their visual and interactive appeal. The aim is to create culturally inspired, modern accessories that are both aesthetic and meaningful. This invention also explores new possibilities for merging craft-based design with smart textile technologies, while supporting small business development in the field of polymer clay accessories. The project is part of an ongoing Master's thesis at the University of Jeddah.

Class of Inventions: Textile Industry and Jewellery