SCIENTIFIC CONFERENCE OF DOCTORAL SCHOOLS

BOOK OF ABSTRACTS

2025

SCDS-UDJG 2025
The 13th Edition,
GALAJI, 12th-13th of June 2025

Universitatea "Dunărea de Jos"
din Galaţi

“DUNĂREA DE JOS”
UNIVERSITY OF GALATI
DOCTORAL SCHOOL OF FUNDAMENTAL AND ENGINEERING SCIENCES

BOOK of ABSTRACTS
Scientific Conference
of Doctoral Schools

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CONFERENCE PROGRAMME

THURSDAY – 12 of June 2025

10:00 - 19:00	Invited pelnaru lectures/Invited lectures/Oral presentations

FRIDAY – 13 of June 2025

9:00 - 13:00	Oral presentations/Poster session in concurrent sections
11:00 - 13:00	Workshop
13:00 - 14:00	Awarding Ceremony. Closing ceremony
14:00 - 15:00	Lunch

PLENARY LECTURES (all sections)

PERSPECTIVES AND CHALLENGES IN DOCTORAL SCHOOLS

PL.1.

Artificial Intelligence for Energy efficiency: Towards Sustainable Development Goals

Parikshit N. Mahalle

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Abstract

This study aims to explore the integration of artificial intelligence (AI) in sustainable energy solutions, highlighting the crucial role of AI in accomplishing the United Nations and Sustainable Development Goals (SDGs). This talk explores the integration of AI technologies with sustainable energy practices, presenting a comprehensive analysis of how AI can be utilized to create more efficient, cost-effective, and environmentally friendly energy solutions. It covers a wide range of topics, starting with the introduction of Sustainable Development Goals and their relevance to global energy needs. Then, the role of energy in sustainable development, the potential of AI in enhancing sustainability, and specific applications of AI in providing affordable and clean energy are explored. Furthermore, it examines the application of AI in energy management and addresses ethical concerns about AI adoption in the energy industry. The major goal of this talk is to give an in-depth overview of how AI may help achieve sustainable energy solutions. It attempts to address the knowledge gap and provide practical insights into integrating AI to accomplish sustainable energy goals.

PL.2.

Humour in Linguistics presentation overview

Selma Đuliman

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Abstract

University of Sarajevo, Faculty of Philosophy Abstract Humor has been extensively discussed in recent linguistic research. Humor, as part of the universal human transcultural trait, occurs in people's everyday lives, either as a conscious linguistic expression or as a spontaneous reaction to phenomena that surround us, which are not necessarily caused by the actions of human beings. The aim of the presentation is to offer an insight into different aspects of linguistic research of humor, primarily Raskin's Semantic Script theory, and Raskin and Atardo's seminal General Theory of Verbal Humor, as well as the interconnectedness of linguistic research of humor with other disciplines.

PL.3.

3,3'-Bisindolylmethane Derivatives as Antibiotic Resistance Disruptors

Victoria Lipson[a],[b]*, Mikola Lyapunov[a], Olena Bezugla[a], Anna Lyapunova[a], Igor Zinchenko[a], Volodymir Vakula[a], Svitlana Dzhoraieva[c]

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Abstract

Resistance to antibacterial drugs and the emergence of multi-resistant strains of microorganisms is a problem of global importance that require a rapid response from a wide range of researchers [www.who.int/health-topics/antimicrobial-resistance]. The proposed report examines the current trends in the search for antibacterial agents. Particular attention is paid to the opportunities opened up by the combined use of substances of both natural and synthetic origin that do not have antibiotic properties, but in combination with known drugs can significantly increase their effectiveness in the fight against multi-resistant strains of pathogens. Our own results on the synthesis of such substances, in particular new derivatives of 3,3'-bisindolylmethane (BIM), as potential components of drugs capable of increasing the effectiveness of representatives of various classes of antibiotics in the fight against bacteria of the ESKAPE group (Enterococcus faecium, Staphylococcus aureus, Klebsiella pneumoniae, Acinetobacter baumanii, Pseudomonas aeruginosa, Enterobacter spp.) - the main cause of nosocomial infections and increased mortality - are presented. The results of microbiological screening of the obtained compounds on standard and clinical strains of the indicated microorganisms, as well as Escherichia coli and Candida albicans fungi are presented. Pharmaceutical compositions are proposed, which include an active pharmaceutical ingredient with antibacterial properties, a certain BIM and excipients. The effect of these compositions on the biofilm formation of pathogens is determined. Part of this work was carried out with the financial support of the National Research Foundation of Ukraine, grant No. 2022.01/0087.

Keywords: antibiotic resistance, 3,3'-bisindolylmethanes, pharmaceutical compositions, antibiofilm properties.

PL.4.

Metabolic Labeling of Cancer Cells Using Glycodendrimers to Stimulate Immune-Mediated Cytotoxicity

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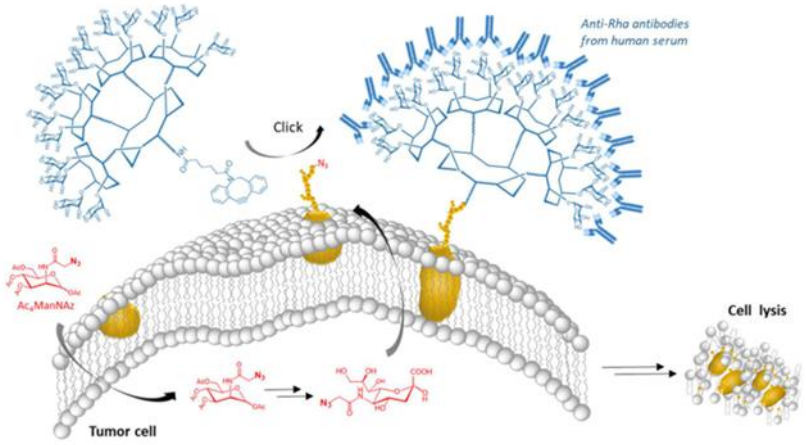
Abstract

The recruitment of immune actors, particularly, antibodies naturally present in the human serum on the surface of cancer cells, has proved to be a promising immunotherapy strategy to fight cancer. Antibody recruitment molecules (ARMs) combining tumour-antibody binding modules were developed for this purpose,[1-3] however the formation of the ternary complex between these bimodal molecules with both antibodies and cells is difficult to optimize to stimulate immune-mediated cytotoxicity. To overcome this limitation, we have opted for a

more direct approach combining azido-sugar cell metabolism and biorthogonal click chemistry to conjugate glycodendrimers structurally well defined as antibody binding module (ABM) to the cell glycocalyx. We have shown that this strategy not only allows the recruitment of natural antibodies on the surface of isolated cells or solid tumor models, but also activates a cytotoxic response with human serum as a single source of immune effectors. [4]

Keywords: glycometabolism, bioorthogonal reaction, glycoconjugates, mutivalency, immunotherapy



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PL.5.

The Role of AI and VR in Advanced Sports Research

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Abstract

In contemporary sports, where athletic performance is often quantified in terms of milliseconds and millimeters, technology has emerged as a vital ally. Artificial Intelligence (AI) and Virtual Reality (VR) are increasingly integral to advanced sports research, fostering innovation in athlete training, injury prevention, and optimization of game strategies. AI facilitates precise and objective performance analysis by utilizing machine learning algorithms to process biometric and kinetic data derived from wearable sensors or smart cameras in real time. This data allows for an in-depth assessment of various performance metrics, including technique, endurance, speed, and injury risk, thereby providing coaches and researchers with a comprehensive overview of an athlete's condition. Conversely, VR is transforming the training landscape through realistic and interactive simulations that allow athletes to practice complex game scenarios without incurring physical risks. This technology aids in the development of strategic thinking, enhances performance under pressure, and improves decision-making capabilities. Furthermore, both AI and VR contribute significantly to injury prevention and rehabilitation. AI possesses the capability to identify unsafe movement patterns, while VR can facilitate rehabilitation by providing guided motor exercises that incorporate gamification elements. This approach not only increases efficiency but also enhances the engagement level of

the athlete during recovery.

Additionally, the integration of AI and VR presents novel opportunities within sports research. Virtual models that accurately replicate the physical behavior of real individuals are being developed, enabling the testing of training methods, equipment, and strategies without jeopardizing the safety of actual athletes. In summary, AI and VR technologies transcend mere technological trends; they serve as essential tools in high-performance sports. Their precision, interactivity, and capacity for personalization significantly contribute to the advancement of sports research, aiding athletes in attaining their maximum potential and challenging the limits of human performance.

PL.6.

Exploring the Frontiers of Rapid Technologies in Forensics

Anna Barbaro

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Abstract

The ability to determine the origin (human or animal) of a biological sample found at a crime scene, along with its nature and the time since deposition, is crucial for criminal investigations. This information is essential for accurately linking evidence to a crime. Additionally, the ability to quickly obtain a DNA profile from crime scene evidence or a suspect is vital for advancing the investigation. This presentation will explore the application of rapid methods, such as infrared (IR) spectroscopy for identifying bodily fluids and the RapidHit system for DNA typing. These technologies offer significant advantages by enabling investigators to swiftly identify and analyze critical evidence.

PL.7.

Bridging Disciplines in the Pursuit of Justice: Doctoral Research on Missing Persons in Post-Conflict Societies

Naim Uka

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Institute of Forensic Medicine, Ministry of Justice, Kosovo

Abstract

The phenomenon of missing persons in post-conflict societies remains one of the most persistent humanitarian and legal challenges of the contemporary era. This presentation draws upon ongoing doctoral research centered on the Western Balkans, with a specific focus on Kosovo, to examine the intersection of international law, human rights, and forensic science in addressing this critical issue. Through a multidisciplinary lens, the research investigates how legal frameworks and forensic methodologies can be jointly mobilized to advance the fundamental right of families to know the fate of their missing relatives. The presentation identifies key legal ambiguities, political impediments, and institutional shortcomings that continue to obstruct progress in the resolution of missing person's cases. It further explores the pivotal role of forensic science in processes such as exhumation, identification, and the production of scientifically grounded documentation, while critically assessing instances of misidentification and the ethical responsibilities they invoke. By situating these findings within a broader academic and policy context, the presentation underscores the potential of doctoral research to inform legal reform,

strengthen institutional capacities, and enhance humanitarian practices. It highlights the transformative impact of bridging disciplinary boundaries to foster accountability, promote justice, and uphold the dignity of victims and their families in post-conflict settings.

Key words; Doctoral research, Forensics, Missing persons, International Humanitarian Law.

PL.8.

Redefining Solvent Systems in Pharmaceutical Research: The Role of Deep Eutectic Solvents

Maria Luisa Di Gioia

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Abstract

Deep eutectic solvents (DESs) represent a rapidly emerging class of green solvents with considerable potential in pharmaceutical science. Composed of hydrogen bond donors and acceptors, DESs are characterized by low volatility, non-flammability, biodegradability, and ease of preparation from readily available, often natural, components. In this presentation, I will explore the application of DESs as sustainable media throughout various stages of pharmaceutical development. Emphasis will be placed on their use as environmentally benign alternatives to conventional organic solvents in key organic transformations relevant to the synthesis of active pharmaceutical ingredients (APIs), as well as in formulation processes within the pharmaceutical industry. Particular attention will be given to natural deep eutectic solvents (NADES) and their growing role in enhancing the solubility and bioavailability of poorly water-soluble drugs. By aligning with the principles of green chemistry and the circular economy, DESs demonstrate exceptional versatility and hold the potential to redefine solvent paradigms in pharmaceutical research and manufacturing. Keywords: eutectic solvent, environmentally, synthesis, pharmaceutical compound

PL.9.

Social media facilitated sexual assault

José Darío Martínez Villarreal

Christus Muguerza Hospital High Specialty University of Monterrey Monterrey, Mexico

Abstract

Tropical dermatology is a specialized field focused on the study, diagnosis, and treatment of skin diseases prevalent in tropical and subtropical regions. The warm, humid climate characteristic of such areas creates a unique environment that contributes to the emergence and propagation of various dermatological conditions. More relevant is the world climate change that is causing these maladies to be more common, particularly in travelers.

Fungal Infections: Tinea corporis, tinea cruris, and pityriasis versicolor are common due to the constant moisture on the skin. Deep fungal infections are now more frequent in workers, travelers and immunocompromised patients. Bacterial Infections: Conditions such as impetigo, erisipela, ecthyma, and tropical ulcers are frequently observed. Systemic infections are now more prevalent due to climate change among other factors. Parasitic Diseases: Cutaneous larva migrans, myiasis, gnatosthomiasis, cutaneous leishmaniasis, and scabies are notable parasitic infections among travelers.

Preventative Measures: Maintaining good hygiene practices to reduce the risk of infections; Using broad-spectrum sunscreens to protect against UV radiation; Wearing loose, appropriate clothing to prevent insect bites; Use of insect repellents containing DEET.

Medical Treatments: Topical antifungal and antibacterial agents for infectious diseases; Oral medications when topical treatments are insufficient; Anti-parasitc drugs.

Tropical dermatology faces several challenges, including the accessibility to healthcare facilities, the availability of medications, and the socioeconomic conditions of affected populations. These maladies are more common these days due to climate change and the expanded range of vectors. Tropical dermatology is an essential field that addresses the unique skin health needs of populations living in tropical and subtropical regions. Travelers, migrants and refugees can carry these skin souvenirs, and it is very important for dermatologists to recognize these maladies. Understanding these common conditions, prescribing effective treatments, and recommend preventive measures is crucial for improving dermatological care in these areas.

PL.10.
New Phenomenological Constitutive Models for the Description of Material Behavior under Static and Dynamic Loads: Application to High-Speed Machining and Use of Inverse Methods

Adinel Gavrus

Department of Mechanical and Control Systems Engineering Laboratory of Civil and Mechanical Engineering LGCGM, INSA Rennes, France

Abstract

Machining process of titanium alloys requires challenging task especially regarding the reached high gradients of plastic deformations, plastic strain rates and temperatures during the material forming. Both static and rapid (dynamic) loadings conditions occur during the material chip formation during machining processes. On the other hand, despite the wide spread adoption of titanium alloys in a wide range of industrial applications, several problems are encounter during their machining: high plastic strain localization, segmented chips, accelerated local tool wear. Although the recent advances concerning the experimental devices, it is still difficult experimentally to investigate on a mesoscopic scale all these instantaneous phenomena. Therefore, to obtain a reliable numerical analysis in addition with some experimental tests is still an efficient alternative for a better understanding of cutting processes. The modeling reliability is dependent on the definition of an adequate work-piece material behavior based on physical phenomena. This research study is start from the general physically based material constitutive models proposed by Gavrus [1-3] adopted to reproduce isotropic plastic behavior of the Ti6Al4V titanium alloy for large plastic deformations. Based on the literature review [4–9], rheological models of Ti6Al4V alloy [10-11] are improved and identified starting from on iterative non-linear regression methods. The main goal is to allow a well description of both static & dynamic loading conditions for a wide range of plastic strains, plastic strain rates and temperatures together with use of a transition state identification. The adequacy of the proposed rheological models is discussed and comparisons with experimental results of literature [4-8] are presented. A general user material subroutine VUHARD© is implemented in the commercial code Abaqus®/Explicit. Numerical simulations of tensile/compression tests are performed. A 2D FE modeling of Ti6Al4V machining is carried out and adequacy of proposed constitutive models to predict local variables for both moderate and high kinematic speeds is examined.

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I. INVITED LECTURES

SECTION 4
ADVANCES IN ENGINEERING AND MANAGEMENT IN AGRICULTURE AND RURAL DEVELOPMENT

IL.4.1.
Academic Engagement in the Integration of Small Farmers into Urban Food Systems: A Case Study of Iași Municipality

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Abstract

The access of small agri-food producers from rural areas to urban food systems is jeopardized by a range of economic, social, cultural, and, not least, political factors. At the same time, recent years have seen growing interest from urban consumers in organic, traditional, and mountain agri-food products, as well as those made by small producers or processors. The valorization of agri-food products through the principles of short supply chains represents a viable way to facilitate the connection between the two main actors of the urban food system: the producer and the consumer. However, for this connection to be organized, legal, predictable, and cyclical, the involvement of all key actors in an urban food system is necessary. Academia plays an important role in these systems and can serve as a central pillar for participatory governance actions aimed at facilitating the access of small producers to urban agri-food markets. In this regard, Gust de Iași and Iașul în bucate are examples of good practices developed within the Food for Iași Living Lab, RoRuralia Living Lab, and Organic Food Living Lab, highlighting the potential of academia to actively contribute to the construction of resilient and inclusive urban food ecosystems.

Keywords: urban food systems, short food supply chains, participatory governance

IL.4.2.
Sustainable development in agritourism based on circular economy

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Abstract

Research in the field shows that the agritourism sector is a growing sector. Therefore, the connection between agritourism and sustainable development requires the identification of new

directions and models to support the development of this new field of activity. Circular economy in agritourism can lead to sustainable use of resources for generations actual and future and to realize a development sustainable in this domain. The problem is how to integrate the principles of the concept of economics circular economy in a management system based on agrotourism activities that also leads to a sustainable development from an environmental point of view. The paper is a contribution to the realization of ways in which agritourism can contribute to sustainable development with the influence of the circular economy through highlighting new types of agrotourism structures and by bringing of major benefits for local community. Some are proposed directions to follow for the creation of such an agrotourism structure: administrator refuse products and caution agreement improve to separate collection of garbage; the use of electricity and thermal, paying special attention possibility consumption and production from renewable sources; water resources management, especially in terms of what at looks reducing their consumption; pair behavior responsive of tourist and staff with efficiency technologies used.

Keywords: circular economy, rural development, environmental protection, agritourism

IL.4.3.

The Strategic Importance of Canola Crops in Romania

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Abstract

This paper presents the how rapeseed (brassica napus) has become a cornerstone crop in Romanian agriculture, with increasing significance due to its dual purpose as a food-grade oil and a key raw material for biodiesel production. Romania ranks among the top rapeseed producers in the European Union, leveraging its favorable climate and arable land. The expansion of rapeseed cultivation not only enhances crop rotation and soil health but also contributes substantially to the national economy through exports and domestic processing. Furthermore, rapeseed-derived biofuels support the country's renewable energy targets and reduce dependence on imported fossil fuels. This paper explores the agronomic, economic, and environmental benefits of rapeseed production in Romania, positioning it as a vital element of sustainable rural development.

Keywords: rapeseed, statistical methods, energetic crop.

IL.4.4.

Associative Forms in Romanian Agriculture: Opportunities for Enhancing Competitiveness and Rural Development

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Abstract

Associative forms in Romanian agriculture, such as cooperatives and producer groups, play a crucial role in improving the competitiveness of small and medium-sized farms and

fostering sustainable rural development. Despite the support provided through national and European policies, the level of association among Romanian farmers remains low, mainly due to historical distrust, lack of managerial skills, and weak institutional frameworks. However, associative models offer multiple benefits, including improved market access, reduced production costs, increased bargaining power, and better integration into agri-food chains. This paper explores the current state of agricultural associations in Romania, identifies the main obstacles to their development, and highlights successful case studies that illustrate their potential. Strengthening associative structures is essential for creating resilient rural communities, ensuring food security, and enhancing the economic performance of the agricultural sector. Policy recommendations focus on fiscal incentives, capacity building, and improved governance mechanisms to support the growth of agricultural cooperatives.

Keywords: agricultural cooperatives, rural development, farm competitiveness

IL.4.5.

Economic Measures of Sustainable Development

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Abstract

It is proposed to analyze the economic benchmarks of sustainable development in Romania through the lens of three essential indicators: GDP/capita, Human Development Index (HDI) and Gini coefficient. Through a comparative approach with the European Union (EU-27) average, the progress recorded by Romania in the last decade, as well as the persistent challenges, are highlighted. The results show a positive trend of convergence of GDP per capita with the EU average, as well as a constant increase in HDI, signaling improvements in the areas of health, education and income. However, the relatively high level of the Gini coefficient indicates the persistence of social and economic inequalities. The study emphasizes the need for coherent and balanced public policies, which promote social inclusion, regional cohesion and economic sustainability, to align Romania with the standards of authentic sustainable development in the European context.

Keywords: Common Agricultura Policy (CAP), National Strategic Plan, Romania, EU, sustainable development

SECTION 5
ADVANCED RESEARCH IN ELECTRICAL / ELECTRONIC ENGINEERING, SYSTEM ENGINEERING AND INFORMATION TECHNOLOGIES

IL.5.1.

Next Generation of Electric Drives

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Abstract

The use of artificial intelligence enhances the electric drives performances applied in real world. At the present, the industrial drives are based on the conventional control, in cascaded manner. The parameter variations in the harsh environment conditions of the industrial processes are a real challenge for the performances of the system. In this paper, the authors present a methodological approach to the use of artificial intelligence techniques in the control of electric drives. Due to the rapid development of this field, the real-time implementation of this technology in the various hardware structures or specialized platforms are envisaged. At the same time, taking into account the fast acceleration of the artificial neuro-controllers introduction in all development areas, the numerical results obtained by the authors in the industrial area of electric drives will be presented.

Keywords: artificial intelligence, reinforcement learning, machine learning, neuronal networks, speed control

SECTION 6
FUTURE OF ECO-NANOTECHNOLOGIES, FUNCTIONAL MATERIALS AND COATINGS

IL.6.1.
Energy Efficiency Assessment in Educational Institutions in the Republic of Moldova: Case Study Based on Energy Audit Reports Developed within the GIZ Project

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Abstract

This paper examines the impact of energy efficiency measures implemented in eight educational institutions in the Republic of Moldova, within the framework of the "Modernization of Local Public Services" project, supported by the German Agency for International Cooperation (GIZ). The study is based on the analysis of energy audit reports developed under the EU Action "Construction of Water and Sanitation Infrastructure and Energy Efficiency in Public Buildings." The research evaluates the main proposed interventions, energy consumption before and after implementation, and the extent to which energy performance indicators were achieved. The results highlight the significant role of energy audits in planning and optimizing investments for sustainable and energy-efficient public buildings.

Keywords: Energy efficiency, GIZ project, Energy audit reports, Republic of Moldova.

IL.6.2.
Modern Strategies in Fixed Implant Prosthodontics Using Zirconium Support

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Abstract

Zirconium-based materials have become a cornerstone in fixed implant prosthodontics due to their exceptional mechanical properties, biocompatibility, and aesthetic potential. This paper shows current strategies in the design and implementation of zirconium-supported fixed implant restorations, focusing on digital workflows, surface treatments for improved osseointegration, and material innovations that enhance both functional and esthetic outcomes. Emphasis is placed on clinical protocols, long-term performance, and the integration of CAD/CAM technology to ensure precision and predictability in treatment. The results highlight that zirconium-supported solutions offer a reliable and modern approach to implant prosthodontics, combining strength, biocompatibility, and esthetics to meet the demands of contemporary dental practice.

Keywords: Zirconium, Fixed implant prosthodontics, CAD/CAM technology, osseointegration.

SECTION 7
CHEMISTRY - ELECTROCHEMISTRY IN LIFE SCIENCES

IL.7.1.
In search of inhibitors of Tau amyloid fibers: synthetic peptide fragments as fibers models

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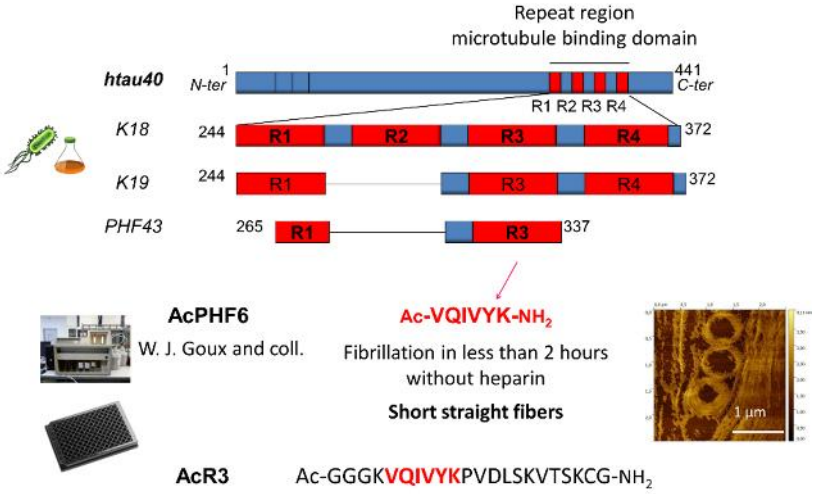
Abstract

Neurotoxic aggregates and fibers formed from abnormally phosphorylated tau protein are regarded as the main actors involved in the destruction of neurons in tauopathies such as Alzheimer's disease. Yet, only a few molecules have shown to efficiently prevent or detect the formation of those aggregates, and the identification of such molecules is still an ongoing interest in a therapeutic and diagnostic context. In line with this objective, we develop *in vitro* models of tau fibers to investigate the inhibitory effect of small library of molecules by means of thioflavin fluorescence assays, circular dichroism and microscopy techniques. In particular, the model based on the R3 repeat region of tau protein adopts a β-sheet structure as shown by CD experiments and forms fibrils that are very similar to those obtained with native tau protein



This work is supported by the French National Research Agency in the framework of the "France 2030" program ANR-17-EURE-0003 through the LabEx Arcane", and by the CerCoG Labex.

IL.7.2.

Voltametric data processing using genetic algorithms

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Abstract

The use of techniques for data processing before statistical analysis is of great interest and could improve the quality of the results obtained by multivariate data analysis [1,2]. In this study, an array of voltametric sensors was used to classify wines aged using two different techniques: aging in traditional oak barrels and using stainless steel tanks with oak chips inserted and micro-oxygenation. Models based on genetic algorithms with linear regressions were developed to identify the aging type of a given sample evaluated. This technique provides a reduction in variables for the final multivariate data analysis. A comparison was made between this new method and the use of all the variables recorded by the sensors array. The results showed that genetic algorithms are more accurate and also allow for the identification of areas where the recorded signal could impair the accuracy of a subsequent linear regression.

Keywords: sensor array, genetic algorithm, regression

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II. ORAL PRESENTATIONS

SECTION 3
PROGRESS IN FOOD SCIENCE AND BIO-RESOURCES ENGINEERING

OP 3.1.

Soy Protein Hydrolysates as Valuable Ingredient for Gluten-Free Muffins

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Abstract

Gluten-free products became very popular among people who are careful about their health, leading to the development of innovative gluten-free products in recent years. Due to their high carbohydrate content and lack of essential nutrients, the gluten-free diet might cause nutritional deficiencies. In order to provide balanced nutrition and a good digestion, it is crucial that diets based on gluten-free products include adequate sources of proteins. The aim of the present study was to investigate how the addition of soy protein isolate and hydrolysates influence the thermo-mechanical behavior of the gluten-free dough and the quality attributes of baked muffins. Soy peptide mixtures with enhanced bioactivity were prepared with three different endopeptidases. Among the tested hydrolysates, those obtained with trypsin exhibited the highest foaming capacity and emulsion stability, while the Neutrase-derived hydrolysates showed the strongest antioxidant activity. Composite flours consisting of rice and quinoa were used to develop gluten-free muffin formulations supplemented with 10% soy proteins or peptides. Rheological analysis revealed that the addition of soluble peptides delayed starch gelatinization, while the insoluble fraction led to increased dough consistency. The most notable improvements in dough behavior were observed in samples containing hydrolysates prepared with bromelain and trypsin. Baked muffins enriched with soy protein hydrolysates exhibited enhanced antioxidant activity and more intense crumb color. These results support the potential of soy protein hydrolysates as valuable ingredients in the development of gluten-free bakery products with enhanced health benefits.

Keywords: soy proteins, quinoa flour, rice flour, hydrolysates, rheological properties.

OP 3.2.

Investigation of the Inhibitory Mechanism of *Salvia officinalis* Supercritical Fluid Extract against *Listeria monocytogenes*

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Abstract

In this study, the extract of sage (*Salvia officinalis*), obtained from separator S45 of a supercritical CO_2 pilot-plant extractor (Natex, Prozesstechnologie GesmbH., Austria) belonging to the BioAliment-TehnIA research center, was tested for its antibacterial activity potential against *Listeria monocytogenes* ScottA employing different investigation methods. Initially, the phytochemical profile of the extract was analyzed for its polyphenolic and lipophilic compounds using High-Performance Liquid Chromatography. The analysis revealed that *α*-carotene, zeaxanthin, and cafestol exhibited the highest content among the identified compounds. The fatty acid profile was evaluated using a Perkin–Elmer gas chromatograph with flame ionization detection, identifying nonanoic, undecanoic, linolenic, and palmitic acid as the four main fatty acids present in the sage extract. Further, the Minimal Inhibitory Concentration (MIC) was determined through a microdilution assay, resulting in an MIC of 0.39 mg/mL.

The growth curve kinetics of *L. monocytogenes* was observed over a 10-hour period in the presence of sage extract, showing a significant difference between lag and exponential phase for the control and the cells treated with MIC and sub-inhibitory concentration. Scanning electron microscopy analysis showed that the treated bacterial cells were less translucent, highly distorted, partially disintegrated, and exhibiting damaged cellular aggregation. Additionally, the SDS-PAGE analysis indicated the effects of sage extract afeected protein synthesis, particularly those responsible for division and survival of *Listeria*. DNA cleavage evaluation demostrated the degradation of the genetic material in cells treated with the extract compared to the control DNA band. The fluorescence spectroscopy revealed that nonanoic acid had the highest affinity for binding DNA. Molecular docking tests, performed by using the Transcriptional Regulator PrfA as a receptor and the four main fatty acids as potential signalling molecules, suggested that the production of the virulence factor in *L. monocytogenes* may be influenced by these interactions.

Keywords: *Salvia officinalis,* Supercritical Fluid Extraction, *Listeria monocytogenes,* SDS-PAGE, DNA cleavage, molecular docking

OP 3.3.

Metabiotic ingredient obtained through the biotransformation of spirulina biomass with kombucha

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Abstract

Metabiotics (pre-, pro-, and postbiotics) are used in aquaculture for their beneficial effects in enhancing disease resistance, improving feed conversion, assimilation, and digestion, reducing oxidative stress, and supporting immune function [1]. As a natural probiotic source, kombucha beverages could serve as a starter culture for unconventional substrate fermentation to obtain innovative fermented products

with enhanced bioactive properties. Spirulina biomass provides essential nutrients, improves feed-to-body conversion rates, and enhances water quality by reducing excess nutrients. The biotransformation of dried spirulina biomass with a wild symbiotic consortium of bacteria and yeasts (SCOBY) from kombucha is a challenging opportunity to develop novel bioingredients for aquaculture, which can contribute to faster growth, improved health, and a more sustainable aquaculture environment [2-3]. The study aimed to obtain fermented products through the fermentation of black tea, kombucha beverage, and *Limnospira platensis* (spirulina) biomass (raised in controlled conditions at ICDEAPA Galați) with applications in aquaculture. The fermented products were analyzed in terms of functional properties: pH and total titratable acidity, color (CIE Lab system), soluble protein (Bradford method), protein profile (SDS-PAGE electrophoresis), total flavonoids ($AlCl_3$ method), total polyphenols (Folin-Ciocalteu method), polyphenol profile (HPLC), antioxidant activity (DPPH and ABTS methods), and antimicrobial activity. Three samples, coded KCS (black tea, 10% sugar, 10% kombucha, and 3.5% dried spirulina biomass), KS (water, 10% sugar, 10% kombucha, and 3.5% dried spirulina biomass), and M(K) (control) (black tea, 10% sugar, 10% kombucha) were obtained during 5 days of fermentation, at 30°C, followed by freeze-drying. The sample-coded KCS demonstrated high antioxidant potential, with 86.516% and 88.23% by the DPPH and ABTS, respectively. Additionally, this sample showed values of 15.88 mg/g dry weight in terms of soluble protein, 5.007 mg gallic acid/g dry weight for total phenolic content, and 3.21 mg catechin/g dry weight for total flavonoid content. Moreover, this fermented product showed antimicrobial activity against *Staphylococcus aureus* ATCC 25923. Additionally, the KCS sample revealed two peptide bands with molecular weights ranging from 15 to 20 kDa and a band with a molecular weight of approximately 100 kDa, demonstrating their bioactive potential. Moreover, gallic, chlorogenic, p-coumaric, and vanillic acids were detected in the KCS sample. Color parameters like L (32.3), a (-0.87), b (0.14), and E (32.31) were also detected.

The results demonstrate the potential of wild microbial consortium (lactic acid bacteria, acetic acid bacteria, and yeasts) from kombucha to transform spirulina biomass in unconventional fermentation conditions to obtain new metabiotic formulations with bioactive features. Future research will aim to assess these ingredients for improving fish feed and the quality of aquatic ecosystems, facilitating sustainable aquaculture methods.

Keywords: *Limnospira platensis* (spirulina), kombucha microbial consortium, unconventional fermentation, metabiotic ingredients

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OP 3.4.

Corn-Based Extruded Snacks Supplemented with Bilberry Pomace Powder: Physical, Chemical, Functional and Sensory Proprieties

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Abstract

Corn-based extruded snacks are tasty and very popular food products; however, they have high starch and oil and low bioactive content. The aim of the present study was to improve the functional value of corn-based extruded snacks by enrichment with bilberry pomace powder (BPP). Proximate composition, total phenolic content, antioxidant activity, physicochemical properties, including color and texture

properties, titratable acidity, expansion ratio, bulk density, water absorption, and water solubility index were evaluated in snacks supplemented with BPP at 2%, 4%, and 6% addition levels compared with the control. The results showed that protein, fiber, and ash content increased with increasing addition levels of BPP. The fiber content increased in the extruded products by about 2.7 times at the 6% BPP addition level compared to the control. The addition of 4% and 6% BPP did not worsen the expansion ratio and hardness of the snacks but significantly decreased their cohesiveness, gumminess, resilience, chewiness, and fracturability. Total phenolic content increased by about 54%, 86%, and 118% for the 2%, 4%, and 6% addition levels, respectively, compared to the control. Based on the results, enrichment with 6% BPP produced a new healthy and attractive snack, which could be recommended for commercial production.

Keywords: corn-based extruded snacks; bilberry pomace powder; expansion; texture; color; bioactive content

OP 3.5.

Synergistic Interactions Between Gut Microbiota and Short-Chain Fatty Acids: A Crucial Axis in Human Health and Chronic Disease Prevention

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Abstract

Short-chain fatty acids (SCFAs)-primarily acetate, propionate, and butyrate-are bioactive metabolites generated by the fermentation of dietary fibers by the gut microbiota. These compounds perform an essential role in sustaining host health by modulating metabolic, immune, and neurological functions. This presentation will provide a comprehensive overview of the synergistic relationship between gut microbiota and SCFAs, emphasizing their importance in preserving gastrointestinal integrity, promoting glucose and lipid homeostasis, and regulating systemic immune responses. Particular attention will be given to how alterations in gut microbiota composition (dysbiosis) can impair SCFA production and contribute to the onset and progression of chronic diseases such as obesity, type 2 diabetes, inflammatory bowel disease, and neurodegenerative disorders. Comprehending the intricate relationship between gut microbiota and short-chain fatty acids (SCFAs) paves the way for innovative therapeutic approaches. including the use of targeted prebiotics and probiotics to enhance SCFA production and restore host-microbe balance.This presentation will highlight recent advances in the field to emphasize the central role of the microbiota-SCFA axis in human health and disease, and to demonstrate its potential as a promising target for innovative preventive and therapeutic strategies.

Keywords: Gut microbiota, short-chain fatty acids, SCFAs, dietary fiber, dysbiosis, butyrate, acetate, propionate, metabolic health, immune regulation, chronic disease, microbiome, prebiotics, probiotics

OP 3.6.

Ripening Dynamics of Fetească Neagră Grapes in Response to Vintage Variability: A Three-Year Study from Southern Romania

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Abstract

The optimal harvest time of wine grapes is a pivotal factor in ensuring high-quality wine production, especially in regions facing increasing climatic challenges. This study investigates the technological and

phenolic maturity of *Vitis vinifera* L. var. Fetească Neagră grapes over three consecutive vintages (2021–2023) in the "Terasele Dunării" viticultural area - one of the driest wine-growing regions in Romania. The research involved detailed monitoring of physicochemical parameters (sugar content, total acidity, pH, and berry mass) and phenolic compounds (anthocyanins and total polyphenols) to understand the ripening process under variable climatic conditions. Data collection was performed through systematic sampling, followed by practical and time-efficient analyses, suitable for routine use in winemaking facilities. The results reveal significant interannual differences in ripening progression, largely attributed to variations in hydric stress and temperature regimes. The findings underline the importance of adaptive harvest strategies based on grape maturity type (technological vs. phenolic) and wine style objectives (rosé vs. red). This integrative approach provides practical insights for vineyard management and contributes to defining scientifically grounded harvest guidelines tailored to climate-resilient viticulture.

Keywords: Fetească Neagră, grape ripening, technological maturity, phenolic maturity, vintage variability, harvest timing, climate-resilient production.

OP 3.7.

Improvement of Gluten-Free Products through the Use of Sourdough

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Abstract

Sourdough-based breadmaking technology offers several advantages in terms of nutritional and sensory properties, especially in the case of the gluten free products. In order to obtain sourdough samples for the current study, different gluten-free flour blends based on quinoa and sorghum flours were used. Two distinct starter cultures, consisting of mixtures of lactic acid bacteria, were used to ferment the composite flours representing mixtures of quinoa (Q) and sorghum (S) of 100:0 (100Q), 75:25 (75Q), and 50:50 (50Q). The obtained sourdough samples were evaluated for physical and chemical characteristics, dough thermo-mechanical behavior, and bread making performance. The acidity of the sourdoughs made with starter culture of lactic acid bacteria was noticeably higher than that of the matching spontaneously fermented sample following 20 hours of fermentation at 30°C. Sourdoughs with a higher glycerol and lactic acid content and a lower ethanol and acetic acid content were produced by using the starter cultures. The fundamental rheological measurements indicated that both the sorghum level and the type of starter culture had an impact on viscosity of the gluten free dough. The use of sourdough allowed obtaining gluten-free bread rich in bioactive compounds and with pleasant texture. In conclusion, the quality of gluten-free bread products can be improved through the use of sourdough fermentation.

Keywords: sourdough, lactic acid fermentation, gluten free products

OP 3.8.

Biopolymers from renewable resources - sustainable raw materials with applications in agriculture

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Abstract

Given the current environmental requirements and the need to ensure the sustainability of products and global food security, the agricultural sector is under increasing pressure to identify innovative and

adaptive solutions. One of the promising innovations facilitating the sustainable transformation of agriculture is the use of biodegradable natural polymers (biopolymers), which are a key component in the transition toward sustainable agricultural practices. The advantages of using biopolymers go beyond environmental sustainability by reducing pollution; they also offer a practical solution to the problem of agricultural waste, while improving crop yields and reducing the use of synthetic plastic materials currently in use. Furthermore, biopolymers can serve as matrices for incorporating compounds with phytosanitary properties and controlled release mechanisms, helping to control pest attacks and acting as soil and plant amendments. Polysaccharides are the most widely used biopolymers in agricultural applications. Among them, cellulose and its derivatives (i.e.nanocellulose), hemicelluloses, starch, chitosan and alginates stand out as promising candidates due to their abundance, versatility, and valuable functional properties. This paper provides an overview of biopolymers as renewable resources for agriculture, with a particular emphasis on their use in the production of agricultural films (i.e. mulch). It is explored in detail the technical and environmental advantages they offer, along with the essential functional properties required for effective application in supporting plant growth and development.

Keywords: biopolymers, polysaccharides, sustainable agriculture

OP 3.9.

The Impact of Pumpkin Pomace Powder on the Quality and Antioxidant Activity of Gluten-Free Cake Products

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Abstract

Pumpkin (*Cucurbita* spp.) is a nutritious vegetable abundant in vitamins, minerals, and bioactive compounds, notably β-carotene, a precursor to vitamin A, which is vital for vision, skin health, and immunological function. This study investigates the impact of pumpkin pomace powder (PPP) on the nutritional composition and antioxidant activity of gluten-free cakes. Pumpkin pomace, a by-product of pumpkin processing, is rich in dietary fiber, carotenoids, minerals, and bioactive compounds, making it a promising ingredient for enhancing the nutritional profile of gluten-free baked goods. The gluten-free cakes were prepared by incorporating varying concentrations of PPP (8% and 16% *w/w*) into the cake batter. The physicochemical properties, such as texture, moisture content, and color, as well as the antioxidant activity, carotenoids of the cakes, were assessed. Results indicated that the addition of PPP significantly increased the antioxidant activity, as measured by ABTS radical scavenging and total phenolic content, in a dose-dependent manner. Sensory evaluation revealed that the cakes with 8% PPP received the highest ratings for taste, texture, and overall acceptance. The incorporation of PPP not only improved the antioxidant properties but also contributed to a higher nutritional value, offering a sustainable approach to utilizing pumpkin by-products in gluten-free food formulations. This study highlights the potential of PPP as a functional ingredient to enhance the quality and health benefits of gluten-free cakes.

Keywords: carotenoids, dietary fiber, sustainable food waste utilization, sensory evaluation, cake formulation.

SECTION 4
ADVANCES IN ENGINEERING AND MANAGEMENT IN AGRICULTURE AND RURAL DEVELOPMENT

OP. 4.2
Sustainable managerial practices in implementation of circular economy concepts in Romanian agriculture

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Abstract

The financing of rural development in Romania through the National Recovery and Resilience Plan (NRRP) represents a strategic opportunity to address persistent disparities between rural and urban areas and to support the sustainable transformation of the agri-food sector. Within the framework of the NRRP, key components such as the modernization of agricultural infrastructure, digitalization of rural services, support for young farmers, and environmental sustainability are prioritized. These funding instruments aim to enhance rural competitiveness, reduce poverty, and encourage demographic stability in disadvantaged areas. However, the actual implementation of the NRRP in rural Romania faces several challenges, including limited administrative capacity at the local level, insufficient digital infrastructure, and a lack of coordination among stakeholders. Moreover, the absorption rate of funds and the long-term impact of investments on rural resilience require continuous monitoring and evaluation. This paper analyzes the structure and objectives of the NRRP in relation to rural development priorities, assesses the current state of fund implementation, and explores policy recommendations for improving governance and ensuring inclusive growth. Emphasis is placed on the role of local actors, including public administrations, NGOs, and academia, in facilitating access to resources and promoting innovation in rural areas.

Keywords: rural development, national Recovery and Resilience Plan (NRRP), inclusive growth

OP. 4.6
Agri-Food Public Procurement in Romania: Policy Gaps and Potential for Rural Development

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Abstract

In the agri-food sector, public procurement can serve as a strategic instrument to support local producers, educate the population on healthy eating, and stimulate the growth of the rural economy. The Romanian legal framework allows for the inclusion of sustainability and local origin criteria; however, their application is often hindered by the fragmentation of supply, limited administrative capacity, and restrictive interpretations of European competition legislation.

The conducted research analyzes recent trends in public procurement for institutions such as schools, hospitals, and military units, highlighting the importance of cooperation between contracting authorities and farmers' associative structures. European best practices were examined, identifying ways to adapt them to the Romanian context: the development of intermediary platforms, the application of the best value for money principle, and the simplification of procedures for small and medium-sized producers. The findings emphasize the role of integrated public policies, as well as food education and the active involvement of civil society. Agri-food public procurement can become a driver of progress, contributing to the development of a more equitable, resilient, and sustainable food system in Romania.

Keywords: public procurement, agri-food sector, Romania

OP. 4.7

Cross-Border Agri-Food Trade: Romania–Moldova

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Abstract

Cross-border agri-food trade between Romania and the Republic of Moldova represents a strategic dimension of regional cooperation, economic integration, and food security in the Eastern European context. Despite shared linguistic and cultural ties, as well as a common agricultural heritage, the bilateral trade flows are often limited by infrastructural bottlenecks, regulatory asymmetries, and logistical inefficiencies. However, recent European integration efforts and cross-border cooperation programs have created new opportunities to harmonize standards, reduce trade barriers, and promote joint ventures in the agri-food sector. This paper analyzes the dynamics of agri-food trade between the two countries, focusing on key product categories, trade balance, and recent policy developments. It also highlights success stories and ongoing challenges, offering recommendations for enhancing competitiveness, transparency, and sustainability. Strengthening institutional collaboration and investment in modernizing agri-food value chains are essential for unlocking the full potential of this bilateral trade relationship.

Keywords: aquaponic agriculture, urban area, consumers

OP. 4.9

Financing Scenarios for Rural Vocational Training: A Case Study from Brăila County and insights for Romania’s South-East Region

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Abstract

Vocational training is a crucial component of rural sustainable development, but its success largely depends on the financing models applied. This paper explores alternative financing scenarios for rural workforce training programs, using Brăila County as a representative case study within Romania's South-East Region. The research method includes a SWOT analysis of the Brăila County, complemented by economic impact simulations for three funding scenarios: EU structural funds (FSE+, PNRR), public-private partnerships (PPP), and local community grants. The results show that blended models involving local co-financing and engagement of economic stakeholders are the most effective in attracting and retaining young people in vocational programs. The paper concludes that flexible financing mechanisms, multisectoral partnerships, and continuous post-training support are essential for successful rural labor force development. Practical recommendations are provided for scaling these models at the regional level.

Keywords: vocational education financing, rural labor, public – private partnerships, South – East Region.

OP. 4.10

Mapping Future Rural Occupations: An Analysis of Skilled Labor Needs in Romania's South-East Region

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Abstract

Romania's South-East Region faces a development paradox: although it possesses significant agricultural, touristic, and industrial resources, the lack of adequately trained workforce limits the full capitalization of this potential. This study aims to identify the key occupations with high employment potential in rural areas and to propose tailored vocational training directions aligned with regional needs. The methodology combines statistical analysis of official data (INS, ANOFM, Eurostat) with semi-structured interviews conducted with local entrepreneurs, authorities, and training center representatives. The findings reveal a strong demand for skills in areas such as agricultural mechanics, green construction, food processing, social services, and Agri-tech (e.g., GIS and drone-based farming). However, current training offers, and infrastructure fall short of addressing these needs. The article proposes a prioritization matrix for vocational training, correlating employer demand with local demographic profiles. The study concludes that rural human capital development must be better integrated with regional economic strategies to foster sustainable growth and reduce socio-economic disparities.

Keywords: rural development, skilled labor, vocational training, human capital, South – East Region.

OP. 4.11

Adaptation of Sustainable Aquaculture Practices to Climate Change: The Role of Agropiscicultural Rotation in Preserving Biodiversity in Southeastern Romania

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Abstract

Climate change poses increasing challenges to sustainable food production systems, particularly those integrating aquaculture and agriculture. This study explores the role of agropiscicultural rotation—a land use strategy combining crop cultivation and fish farming—in enhancing the resilience of integrated systems to climate variability in Southeastern Romania. By analyzing environmental parameters, biodiversity indicators, and productivity data from agropiscicultural pilot areas, the research highlights the benefits of rotational practices in maintaining aquatic and terrestrial biodiversity, optimizing resource use, and mitigating the adverse effects of extreme weather events. The findings underscore the importance of adaptive management strategies that promote ecological balance and sustainability within agro-aquatic systems. Recommendations are made for the implementation of agropiscicultural rotation as a viable response to climate pressures in vulnerable regions.

Keywords: sustainable aquaculture, preserving biodiversity, Southeastern Romania.

OP. 4.12
Food Waste in Republic of Moldova in 2024: Causes, Impacts, and Policy Responses

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Abstract

Over the year 2024, food waste remained a severe problem in the Republic of Moldova, and it had both economic and social dimensions. The whole value of the food lost in 2024 was estimated at 20.5 billion lei, of which 7 billion lei were the food that was purchased and the consumers did not use. Moldovans threw away approximately 180,000 tons of food, which is approximately 70 kg per person per year. Starting from the 1st of January 2025, financial contributors are given tax deductions for safe food products that cannot be sold due to package or label mistakes. The activities of certain nongovernmental organizations such as EcoContact have risen public awareness of the environmental and social effects of food waste, emphasizing that 30% of the food in Moldova is thrown away at the time of purchase.

Keywords: Food Waste, economic impact, organizations, legislative action, food recovery.

OP. 4.13
Food Consumption, Media Promotion, and Population Health in the Republic of Moldova

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Abstract

This study explores the relationship between food consumption patterns, media promotion strategies, and public health outcomes in the Republic of Moldova. In recent years, increasing exposure to advertising for ultra-processed foods—especially through television, social media, and outdoor marketing—has significantly influenced dietary behavior, particularly among children and adolescents. These promotional campaigns often prioritize high-calorie, low-nutrient products, contributing to the rise in obesity, diabetes, and other non-communicable diseases. At the same time, limited nutritional education and weak regulation of food marketing create an environment where unhealthy choices are normalized. The research highlights the need for integrated policy responses, including stricter advertising regulations, public health campaigns, and support for healthier food environments. It also underlines the importance of media literacy and health education programs aimed at reducing the negative impact of commercial food promotion on population health.

Keywords: food consumption, media influence, public health, Republic of Moldova

OP. 4.14
Market Concentration and Territorial Asymmetries in the Moldovan Agri-Food Retail System

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Abstract

The Moldovan agri-food retail system exhibits a high degree of market concentration, with a few dominant chains controlling most of the distribution network. This concentration leads to reduced competition, limits the market access of small local producers, and influences consumer prices and product diversity. At the same time, significant territorial asymmetries are present: urban areas, especially the

capital region, benefit from modern retail infrastructure and a wide range of agri-food products, while rural and peripheral regions remain underserved. These disparities deepen socio-economic divides and hinder the development of resilient local food systems. The study explores the structural factors behind these imbalances and proposes policy interventions to promote fairer competition, territorial equity, and support for small-scale producers. Strengthening short food supply chains and investing in regional retail logistics are essential for improving access, affordability, and sustainability within Moldova's agri-food system.

Keywords: agri-food retail, market concentration, territorial disparities.

OP. 4.15

Analysis of Food Product Withdrawal and Recall Notifications in Romania, 2024

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Abstract

The paper analyzes voluntary food product withdrawals and recalls from the Romanian market during 2021-2023, aiming to highlight the main categories of affected foods and the causes of non-compliance. The study identified a total of 12,793 incriminated products, showing a slight downward trend of cases in recent years. Withdrawn products frequently originate from major global food retail chains, with causes ranging from labeling non-compliance to the presence of contaminants or suspicions of exceeding permissible limits for food additives. The information used in this study was collected from the platform of the National Sanitary Veterinary and Food Safety Authority. The results of the research are valuable for both the scientific community and the business sector, providing relevant insights into the quality and compliance of food products marketed in Romania.

Keywords: withdrawal, recall, food, Romanian Market, ANSVSA

OP. 4.16

Analysis of Food Product Withdrawal and Recall Notifications in Romania, 2024

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Abstract

The paper presents an analysis of food product withdrawal and recall notifications from the year 2024, both at the national and international level. The aim of the paper is to identify the quality of products that reached the end consumer, the types of notifications issued during the analyzed year, the origin of the products involved in withdrawals and recalls, and the number of notifications concerning products of animal and non-animal origin, both in Romania and internationally. It will be noted that in 2024, there were 4,856 notifications involving food products. Among these, 1,224 were alert notifications, 1,583 were border rejection notifications, and 2,049 were information and follow-up notifications. These notifications result from irregularities related to product quality, safety, and labeling. The study also examines the origin of the products involved in these alerts. The results of the study can be useful both to researchers and to the business sector. The research is part of the doctoral training stage and represents the foundation of a broader study on food safety in the South-East Region of Romania.

Keywords: Romania, imports, recalls, notifications

OP. 4.17.
Vocational Training as a Factor for Enhancing Human Resources in Agriculture

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Abstract

In the current context of rapid economic and technological transformation, vocational training plays a pivotal role in the effective enhancement of human resources within the agricultural sector. This study investigates the contribution of continuous training to improving labor productivity and enabling agricultural workers to adapt to evolving market demands. Particular attention is given to the development of key competencies essential for agricultural modernization, including digital proficiency, entrepreneurial capabilities, and sustainable resource management. The analysis also addresses the role of vocational education in reducing regional disparities by expanding access to education and fostering socio-economic integration in disadvantaged areas. Furthermore, vocational training is examined as a strategic lever for attracting and retaining young people in agricultural activities, thus contributing to workforce renewal and the revitalization of rural communities. The findings highlight the critical need for coherent public policies that support training programs tailored to regional and sectoral requirements, strengthen partnerships between educational institutions and agricultural organizations, and promote innovation as a catalyst for sustainable rural development.

Keywords: vocational training, agriculture, rural development, youth retention

OP. 4.18.
Human Resources Dynamics in the Agricultural Sector in Romania

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Abstract

The agricultural sector remains a cornerstone of economic and social stability, with major contributions to food security, rural employment, environmental sustainability, and technological progress. This study investigates the dynamics of human resources within Romanian agriculture, emphasizing structural transformations, labor productivity, and demographic trends. Drawing on official statistical data from the National Institute of Statistics and Eurostat, the research examines variables such as workforce age distribution, educational attainment, employment status, and regional disparities. Utilizing descriptive statistics and trend analysis, the study identifies critical factors influencing labor efficiency and sectoral competitiveness. Despite a substantial workforce engaged in agriculture, disparities in professional training and access to innovation persist, limiting productivity growth. Seasonal fluctuations and labor migration continue to destabilize workforce continuity, affecting both operational efficiency and long-term planning. Findings suggest that strengthening vocational education, promoting digital skills, and enhancing working conditions are vital measures for revitalizing the agricultural workforce. Moreover, aligning human capital development with technological innovation strategies emerges as a priority for boosting sustainability and resilience in Romanian agriculture. Although focused on Romania, the findings may have broader implications for countries experiencing similar challenges. These insights are critical for designing evidence-based agricultural policies and ensuring sustainable rural development.

Keywords: agricultural workforce, labor productivity, Romania, rural development

OP. 4.19

Funding Programs / Projects under Implementation (2021–2027 Financial Framework) with Impact on Rural Development

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Abstract

During the 2021–2027 financial framework, Romania benefits from a wide range of funding programs aimed at supporting sustainable rural development. The National Strategic Plan (NSP) under the Common Agricultural Policy (CAP) targets the modernization of agricultural infrastructure, support for young farmers, and the promotion of sustainable farming practices. In parallel, the National Rural Development Program (NRDP) focuses on diversifying the rural economy and improving quality of life in rural areas. The National Recovery and Resilience Plan (NRRP) provides substantial funding for the digitalization of rural services and the development of essential infrastructure. Additionally, Interreg and LEADER programs encourage cross-border cooperation and bottom-up development initiatives. Successful implementation requires coordinated efforts between national authorities, local administrations, and rural communities to ensure efficient fund absorption and maximize impact. This paper examines the structure, objectives, and expected outcomes of these programs in relation to rural development priorities in Romania.

Keywords: rural development, EU funding programs, Romania

OP. 4.20

European Perspective on Rural Development in Galați County: Challenges, Funding, and Regional Integration

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Abstract

This paper explores rural development in Galați County from a European perspective, highlighting key challenges, funding opportunities, and prospects for regional integration. As part of Romania's South-East Development Region, Galați faces structural issues such as depopulation, aging rural communities, underdeveloped infrastructure, and limited access to modern agricultural technologies. Through the 2021–2027 EU financial framework, significant funding is allocated to address these disparities via the Common Agricultural Policy (CAP), Cohesion Policy, and the National Recovery and Resilience Plan (NRRP). The study analyzes how European funds contribute to rural diversification, environmental sustainability, and improved living standards. It also examines cross-border cooperation initiatives and local stakeholder engagement in fostering regional integration and rural resilience. Despite persistent socio-economic gaps, Galați County shows potential to align more closely with EU rural development goals, provided that institutional capacity, project absorption, and strategic coordination are enhanced.

Keywords: rural development, EU funding, regional integration

OP. 4.21

Funding Opportunities for Small Farmers to Support Sustainable Rural Development in the Central Region of Moldova

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Abstract

The agricultural sector of the Republic of Moldova is a key component of the national economy, having a significant impact on the population in rural areas and contributing to the development of other economic sectors. Although it faces major challenges due to economic and political transformations, modernizing this sector is crucial for ensuring its proper functioning, improving efficiency and competitiveness, and enhancing the well-being of the population. In the context of EU integration and alignment with the Common Agricultural Policy (CAP), the Republic of Moldova can support farmers through financial measures that promote sustainability and the modernization of agriculture. The research aims to provide a comprehensive guide for farmers in the Central Region of Moldova to help them access funding sources dedicated to implementing sustainable solutions in their farms, thus contributing to the improvement of economic performance, environmental protection, and adaptability to climate change.

Keywords: modernization, agricultural sector, sustainability, funding, and farmers

OP. 4.22

Digital Transformation in The Agricultural Field 2023-2027

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Abstract

The influence of new technologies and digitalization in general on the agriculture sector is a topic of great discussion these days. Digitalization of agriculture and so-called precision farming appear to be the intended answers to several problems, like the need for higher output, the desire to become greener, or the declining population. There are difficulties in this transition process since there is a lot of demand to change and the expenses are comparable. The National Strategic Plans are a new tool that the EU is implementing in full compliance with the subsidiarity principle to provide each Member State with a framework for the transition that is tailored to their own national specificities. The EU is developing the necessary mechanisms to support this transition through the CAP post-2020. As more and more professionals see the value of utilizing the European toolbox in the field of CAP to support a timely and optimum digital transition toward modern agriculture, where no one is left behind, Romania is no longer a beginner to this process and the wheels of change are already in action.

Keywords: digitalization, new technologies, Common Agricultura Policy (CAP), National Strategic Plan

OP. 4.23

Comparative Analysis of the Stage of Application of the Agro-Environmental Measure at European Level, By Member States

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Abstract

This paper aims to carry out a comparative analysis of the state of implementation of agri-environmental measures within the European Union, with a focus on differences and similarities between Member States. Agri-environmental measures are an essential instrument of the Common Agricultural Policy (CAP), with the role of promoting sustainable agricultural practices, protecting biodiversity and conserving natural resources. The study assesses the level of implementation of these measures according to the degree of farmer participation, the agricultural area involved, financial allocations and the efficiency of the measures applied. By analysing recent data from reports by the European Commission and other relevant bodies, the paper highlights the variations between Member States, identifying economic, social and political factors that influence the success of implementation. The conclusions highlight good practices, but also the challenges encountered in the application of agri-environmental policies, offering recommendations for their improvement in the future European strategic framework.

Keywords: comparative analysis, Common Agricultural Policy, agri-environmental policies

OP. 4.24

Efficiency of Agricultural Crops under the Impact of Drought

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Abstract

The main objective of the research is to evaluate the efficiency of crops under the influence of drought. In the development of agriculture, a challenge is to obtain high yields under the action of climatic factors. During the research, numerous other secondary objectives were achieved, and starting hypotheses were established, which are verified at the end of the article. The objective of the research falls within the current guidelines of PAM 8, which aims at the efficiency of water use in Romania. The research is located at the Brăila county level, we aimed to evaluate the efficiency of the most vulnerable crops (maize, sunflower) under the impact of water shortage. The study was analyzed over the last 33 years, and the results suggested that the potential of crops is proven by the contribution to the turnover of over 8% that it has in the county's economy. Further research is needed to elaborate on these findings in other counties to have a comprehensive nationwide diagnosis for stakeholders.

Key words: maize, sunflower, efficiency, drought

OP. 4.25

The Use of Pedoclimatic Indicators in the Stability of Soil Quality in the Cernisoils Class in Tudor Vladimirescu Atu, Brăila County

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Abstract

This paper presents research on the use of pedoclimatic indicators in determining the quality of soils in the Cernisoils Class in the Tudor Vladimirescu ATU, Brăila County. The field of land evaluation has evolved in recent years, becoming increasingly complex and demanding for assessing the qualities (performances) of soils and lands for different purposes or uses. The data used in this study were obtained by collecting soil samples, which were analyzed and interpreted according to the working methodology (MESP, 1987). 17 pedoclimatic indicators are used to calculate the soil quality grades and classify the soil into quality classes. This study highlights the quality classes for soils in the Cernisoils Class (Chernozem and Faeozem), which occupy 66.75% (4,613.80 ha) of the total agricultural area (arable and pasture). Research of this type is extremely useful because it presents an overview of the soil cover, the productive potential of the land, the limiting factors of plant production and the main problems raised by the valorization of the soil resources of the studied territory.

Keywords: pedoclimatic indicators, soil quality, Cernisoils Class

OP. 4.26

Developments In the Theories of Motivation

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Abstract

This paper surveys the evolutionary landscape of motivational theories and traces the progression from classic models to contemporary models that incorporate cognitive, emotional and social dimensions. Early seed theories such as Maslow's Hierarchy of Needs and Herzberg's Two-Factor Theory provided fundamental insights into human behavior and motivation in the workplace. In contrast, modern theories such as Self-Determination Theory, Goal-Setting Theory, and Expectancy Theory emphasize the role of intrinsic motivation, individual influence, and contextual factors. Recent developments also consider the impact of neuroscience, cultural diversity, and digital environments on motivational processes. This vision highlights the way in which the integration of interdisciplinary research influences the way of understanding and makes it more nuanced and dynamic, thus determining human motivation in different fields.

Keywords: motivation, self-motivation, emotional intelligence, management, organisational behaviours

OP. 4.27
Challenges and Opportunities in the Certification and Labeling of Organic Wines

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Abstract

Ecosystem wine represents a new segment in the wine industry, driven by increasing interest in consumption that is socially and environmentally responsible. This paper analyzes organic wine production processes, exploring ecosystem consumption trends as they relate to legislation and certification, labeling, process, and quality control both from a producer and consumer perspective. Organic wines undergo fermentation without the application of synthetic herbicides or fertilizers within the boundaries of the European Union's framework, especially under the guidelines of IFOAM and Regulation (EU) 2018/848. Gaining an organic certification entails significant costs for producers, particularly if proper branding is applied, while fostering consumer trust, enhancing brand visibility, creating marketing opportunities, and ensuring increased and sustained customer loyalty. The lack of international uniformity regarding certification systems, regulatory differences between the EU and the United States, and consumer perception regarding the high costs of ecosystem wines are major hindrances. However, in both Europe and the United States, eco-labels are associated with high-quality goods, which is contributing towards the growth.

In addition to the positive effects on natural biodiversity and resources, organic wines invite innovations in packaging design, marketing strategies, and brand positioning. Surveys suggest that the millennial generation is more inclined to purchase authentic and sustainable products. Romania is facing limited markets, but there is an opportunity for growth if consumers and the government actively support organic farming initiatives.

Keywords: organic wine, certification, labeling, sustainability, consumer

OP. 4.28.
The Impact of COVID-19 on Tourism in Europe and Romania. The Agritourism and its Impact during the Pandemic

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Abstract

The COVID-19 pandemic had a profound impact on tourism across Europe and Romania, generating severe disruptions in international travel, hospitality, and related services. Lockdowns, travel restrictions, and changing consumer behaviors led to a drastic decline in tourism revenues and employment. However, agritourism emerged as a more resilient and adaptable form of tourism during the crisis. Offering open-air experiences, local food, and rural accommodation, agritourism attracted domestic tourists seeking safe, nature-based alternatives. In Romania, this niche sector provided economic relief to rural communities and small farms, supporting local development during periods of limited mobility. The study analyzes tourism trends before and during the pandemic, focusing on shifts in demand, adaptation strategies, and the role of EU recovery funds. Agritourism proved not only to be a buffer during the pandemic but also a sustainable model for future rural tourism development.

Keywords: COVID-19, agritourism, rural tourism

OP. 4.29
Online Hunting Maps as Modern Tools for Promoting Agrotourism Activities

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Abstract

This paper examines the role of online hunting maps as innovative tools for enhancing agrotourism development, especially in rural and forested regions. By integrating geospatial data, wildlife tracking, and land accessibility information, digital hunting maps offer tourists and hunters a safe, transparent, and interactive experience. These platforms contribute to the diversification of rural tourism services by connecting hunting activities with local accommodation, traditional food, and cultural heritage. In regions where hunting is part of rural identity, such tools support sustainable tourism models and seasonal tourism flow. The study explores the functionalities of various digital platforms, their accessibility, and their integration with mobile applications. Additionally, it highlights examples from European countries and Romania where such tools have already improved the visibility and attractiveness of agrotourism destinations. The findings suggest that digitalization, when combined with responsible tourism practices, can revitalize rural economies and promote biodiversity conservation.

Keywords: online hunting maps, agrotourism, rural digitalization

OP. 4.30
Professional Associations in Romanian Animal Husbandry: Current Landscape and Development Needs

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Abstract

Professional associations in Romanian animal husbandry play a crucial role in representing farmers' interests, facilitating knowledge transfer, and promoting sustainable practices. Despite their importance, many such associations face challenges including limited institutional capacity, fragmented representation, and insufficient engagement in policy-making processes. The historical legacy of centralized agricultural systems and a lack of trust in collective structures have hindered the development of robust professional networks. However, recent initiatives, such as the Association of Traditional and Ecological Producers in Maramureș and the APAVIE Valeni Association, demonstrate the potential of organized groups to enhance product quality, market access, and rural development. To strengthen the sector, it is essential to invest in capacity-building programs, encourage collaboration among stakeholders, and integrate professional associations into national and European agricultural frameworks. By addressing these development needs, Romania can foster a more resilient and competitive animal husbandry sector that benefits both producers and consumers.

Keywords: animal husbandry, professional associations, rural development

OP. 4.31
The Evolution of the Goat Sector in Romania: Trends, Challenges, And Opportunities

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Abstract

The goat farming sector in Romania has experienced notable growth in recent years, positioning the country among the top five goat producers in Europe. This expansion is driven by European support measures and increasing international demand for goat meat. However, domestic consumption remains low, primarily limited to festive occasions. Structural challenges, such as the lack of slaughtering and processing facilities, encourage live animal exports, which generate limited added value. Coupled payment support is crucial for sustaining goat farming activities, especially for large farms, while its absence increases the risk of small farm abandonment, threatening sector diversity and its contribution to the rural economy. To enhance domestic consumption and sector development, the study recommends targeted promotional campaigns on the nutritional benefits of goat products, infrastructure investments, and improved market organization. These measures aim to align Romania's goat farming sector with European best practices and unlock its full economic potential.

Keywords: goat farming, rural development, Romania

OP. 4.32
Enhancing the Competitiveness of Moldova's Agri-Food Sector: Challenges and Policy Options

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Abstract

The Moldovan agri-food sector is a vital component of the national economy, contributing significantly to GDP and employment. Despite its importance, the sector faces challenges in productivity and market integration. Factors such as fragmented land ownership, limited access to modern technologies, and inadequate infrastructure hinder productivity growth. Moreover, the sector's integration into international markets is constrained by non-tariff barriers and compliance with stringent quality standards. Efforts to enhance competitiveness include adopting digital solutions, improving supply chain management, and aligning with European Union regulations. The Deep and Comprehensive Free Trade Area (DCFTA) agreement with the EU offers opportunities for market expansion but requires substantial reforms and investments. Addressing these challenges through targeted policies and investments is crucial for the sustainable development of Moldova's agri-food sector and its successful integration into global markets.

Keywords: agri-food productivity, market integrationRepublic of Moldova.

OP. 4.33

Productivity and Market Integration of the Moldovan Agri-Food Sector

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Abstract

The agri-food sector in the Republic of Moldova holds strategic importance for the national economy, contributing significantly to employment, exports, and rural livelihoods. However, its competitiveness remains constrained by several structural and policy-related challenges. These include fragmented land ownership, outdated infrastructure, limited access to finance, and weak integration into international value chains. The sector also faces difficulties in meeting EU quality and safety standards, which hinders market expansion. This paper analyzes the current performance of Moldova's agri-food sector, identifies major constraints, and reviews policy options to enhance competitiveness. Emphasis is placed on improving agricultural education and extension services, supporting producer associations, investing in post-harvest infrastructure, and aligning national regulations with EU requirements. Strategic public–private partnerships and targeted government interventions are essential to modernize the sector and ensure long-term sustainability. Enhancing competitiveness would not only increase exports but also improve food security and rural development outcomes.

Keywords: agri-food sector, Republic of Moldova.

OP. 4.34

Research on the Implementation of AI Technologies in the Agro-Food Sector

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Abstract

The integration of Artificial Intelligence (AI) technologies into the agro-food sector is transforming traditional agricultural practices by enhancing productivity, sustainability, and supply chain efficiency. AI applications, including machine learning algorithms, predictive analytics, and computer vision, are being utilized for crop monitoring, yield prediction, pest detection, and resource optimization. These technologies enable farmers to make data-driven decisions, reduce input costs, and minimize environmental impact. In Moldova, the adoption of AI in agriculture is gaining momentum, supported by initiatives such as the e-Agriculture program and collaborations with tech providers like Farmonaut, which offers satellite-based farm management solutions. Despite these advancements, challenges persist, including limited digital infrastructure, the need for farmer training, and data privacy concerns. Addressing these issues through targeted policies, investment in digital infrastructure, and capacity-building programs is essential for the widespread adoption of AI in agriculture. Future research should focus on developing context-specific AI solutions that cater to the unique needs of different agricultural regions.

Keywords: Artificial Intelligence in agriculture, agro-food technology, precision Farming

OP. 4.35

The Alternative to Neonicotinoids: Premises for a Sustainable Agricultural Policy in the Romanian Context

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Abstract

The article analyzes the controversies generated using neonicotinoids in Romanian agriculture, in the context of successive derogations issued by the Ministry of Agriculture and Rural Development, in contradiction with European Union regulations on the protection of pollinators. The study starts from the case of the derogation of December 2024 and follows the legal, ecological and socio-economic implications of the administrative decisions, balancing the divergent positions of the actors involved: authorities, farmers, beekeepers and environmental organizations. By analyzing official documents and public positions of the authorities, the article highlights the tensions between the objectives of agricultural production and the need to protect biodiversity. The preliminary conclusions emphasize the need for a coherent public policy based on scientific data to facilitate the transition to sustainable agricultural practices, without compromising food security or ecosystem health.

Keywords: neonicotinoids, derogations, agricultural production, biodiversity.

OP. 4.36

The Wine Value Chain in Romania: An Integrated Approach to the Wine Sector

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Abstract

Romania benefits from favorable soil and climatic conditions for viticulture, occupying a significant place in the hierarchy of wine producers in Central and Eastern Europe. The article provides an analysis of the wine sector chain in Romania, with the main objective of highlighting the structural, economic and strategic characteristics of this traditional agricultural segment. The study follows the entire value chain – from the production of grapes and their processing in specialized units, to the distribution and consumption of wine on domestic and foreign markets. In addition to the technical and economic dimension, the analysis also highlights commercial aspects: market structure, consumption trends, the positioning of Romanian wines concerning international competition and the role of exports in strengthening the competitiveness of the sector. A special emphasis is placed on the national and European regulatory framework, the sources of financing available through the Common Agricultural Policy and the support policies for small producers. Finally, the major challenges facing this sector are identified, such as the fragmentation of production, climate change, but also emerging opportunities, such as the development of wine tourism, or the demand for organic wines. The conclusions underline the importance of a coherent strategy for sustainable development, based on innovation and efficient promotion of the image of Romanian wine internationally.

Keywords: wine value chain, wine production, sustainable viticulture.

OP. 4.37

Emerging Technologies as a Sustainable Solution to Agricultural Risks: Challenges and Prospects

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Abstract

Considering that the agricultural sector is one of the most important areas of activity worldwide, this article aims to analyze how existing technological tools in agriculture can support risk management on farms. Based on the existing specialized literature, we aim to examine three essential aspects: how technology has revolutionized traditional agriculture, specific technological tools for global risk management, the degree of farmers' adaptability to these changes, and the extent to which technology is implemented on farms.

The study shows that although there are numerous tools for improving and automating agricultural activities, there are still countries where the adoption of digital technologies is limited—mainly due to a lack of educational training, insufficient support, and farmers' reluctance to change. In this context, the use of technology becomes a key factor not only in reducing risks but also in promoting sustainability in modern agriculture.

The paper proposes an integrated framework that links risk identification with technological solutions and specific training modules.

Keywords: risk management, high-performance agriculture, technology, automation, sustainability, educational training.

OP. 4.38

Digital Solutions for Risk Management in the Public Sector That Improves the Efficiency and Accessibility of Internal Audit

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Abstract

The paper aimed to present an innovative tool of risk management, more precisely implementing the necessary information for risk assessment in a computerized data system, like a CRM software, exemplified by the risk analysis process within an internal audit mission, with applicability at the management of any public entity. Starting from the identification of the activities and risks associated with a public sector, implementing the risk matrix in a software, by quantifying the probability and impact, the risk exposure is established.

Given the fact that when preparing the audit mission, the risks associated with the domain are analyzed and that the time allocated to this aspect usually represents 50% of the total range of scheduled activities at this stage, the new way of data processing demonstrates that there is a solution that significantly reduces the period required to establish and address risks with major impact.

At the same time, the existing database is accessible and perfectable at any time and based on this information, reports and forecasts can be generated to improve the activity.

Keywords: Innovative, risk management, risk analysis, software, public sector

OP. 4.39

Romanian Food Producers and the Digital Market: Opportunities and Barriers to Online Trade

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Abstract

The digital transformation of Romania's agri-food sector presents both significant opportunities and notable challenges for local food producers. The expansion of e-commerce platforms and increased internet penetration have opened new avenues for producers to reach broader markets, enhance brand visibility, and engage directly with consumers. However, several barriers impede the full realization of these benefits.

Key challenges include limited digital literacy among producers, inadequate infrastructure in rural areas, and logistical hurdles related to distribution and supply chain management. Moreover, regulatory complexities and competition from established international brands further complicate online market entry.

To capitalize on digital market opportunities, Romanian food producers must invest in digital skills development, infrastructure enhancement, and strategic partnerships. Support from governmental and non-governmental organizations in the form of training programs, funding, and policy reforms is essential to facilitate this transition.

Addressing these challenges can lead to increased competitiveness and sustainability in Romania's agri-food sector.

Keywords: digital transformation, e-commerce, Romanian agri-food sector

OP. 4.40

Solar Energy Communities in Romania: A Solution for Prosumers, Grid Balancing and Rural Development

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Abstract

Solar energy communities represent an innovative solution for addressing energy and socio-economic challenges in rural areas of Romania. Through collective ownership of photovoltaic infrastructure, these communities enable prosumers to overcome individual financial and technical barriers, while optimizing energy production and consumption.

The community model, inspired by successful projects such as La CEL de Caldes in Spain, offers a viable alternative in the context of volatile energy prices and limitations in surplus energy compensation mechanisms in Romania.

These energy communities contribute to national grid balancing through intelligent systems, reduce individual costs, provide collective technical expertise, and stimulate rural development by creating jobs, diversifying income sources, and reducing the digital divide.

The integration of these communities with local data centers represents an innovative circular model, utilizing locally produced renewable energy and generating new economic opportunities [6]. With an evolving legislative framework and European support, solar energy communities can become a significant driver for sustainable and digital transformation of Romanian rural areas.

Keywords: solar energy, legislation, power grids, energy models, Romania

OP. 4.41

Smart Farming Technologies Existent IN SE of Romania

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Abstract

With the goal of improving both the quality and quantity of agricultural products, smart farming is the integration of contemporary information and communication technologies (ICT) into the agricultural sector. Internet of Things (IoT), data management, GPS access, soil scanning, and other smart technology are all part of smart farming. Romania should mechanize a sizable portion of the agricultural land to raise the value of its agricultural output.

Due to the highly scattered character of Romanian properties—farms typically span an area of 3.7 hectares—doing this is challenging.

Key words: smart farming, IoT, Crop management, Stakeholders

OP. 4.42

Common Agricultural Policy in Romania

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Abstract

The Common Agricultural Policy (CAP) is the main support mechanism of the European Union for agriculture, with a significant impact on the agricultural sector in Romania. This study analyzes the effects of CAP on Romanian agriculture, focusing on the evolution of subsidies, agricultural production, and farm structure.

The methodology used includes statistical analysis of agricultural indicators, comparison of national and European data, and a case study on the impact of CAP on small and medium-sized farms. Results show a steady increase in CAP subsidies from €600 million in 2010 to over €3.6 billion in 2024, along with an improvement in agricultural productivity, especially in cereal production. However, Romanian agriculture remains fragmented, with over 60% of farms under 10 hectares, limiting access to funding and modernization.

The conclusions highlight the need for more effective policies to integrate small farmers into competitive agri-food chains, reduce bureaucracy in accessing EU funds, and stimulate technological innovation in agriculture.

Keywords: Common Agricultural Policy, Romania, agricultural subsidies, small farms, agricultural production, European Union.

OP. 4.43

Biomass Energy: Management and Entrepreneurship Opportunities

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Abstract

In the current context of climate change and the transition toward sustainable energy sources, biomass is gaining an increasingly important role in the global energy mix. It represents an accessible, versatile, and efficient renewable resource, capable of significantly contributing to the reduction of greenhouse gas emissions and to sustainable economic development. Beyond its ecological benefits, biomass also offers numerous opportunities for efficient resource management and innovative entrepreneurial initiatives.

The Republic of Moldova has committed to several renewable energy targets aimed at reducing dependency on energy imports and promoting greater sustainability within the national energy system.

Green energy is now one of the most important solutions to the energy and environmental challenges of the 21st century. This term refers to the use of renewable sources such as solar, wind, and water to produce energy in a sustainable and environmentally friendly way. The adoption of such resources is not just a modern trend, but an urgent necessity given the depletion of conventional resources and the significant impact of pollution on ecosystems.

Keywords: biomass, green energy, versatile, greenhouse gas emissions, sustainable energy.

OP. 4.44

Sorghum-culture of the future in Europe

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Abstract

Sorghum is a safe alternative for farmers, having a good agricultural potential, a plant resistant to drought, uneven rainfall, a good precursor in the soil, with high biological potential.

Sorghum demand has increased to 30 million tons, on a global scale, in 2024.World sorghum production increased in 2024, but also at European level, but also the areas cultivated with sorghum, for example, France, show an increase of almost 89% over one year.

This study was based on the analysis of secondary data for a general approach, from a variety of sources, exploratory research, with large data, to allow the analysis and synthesis of current trends regarding the evolution of the sorghum cultivation space worldwide, in the E.U. and at national level.

Keywords: sorghum, sorghum crops, ecological and agricultural benefits, economic culture

OP. 4.45

A Bibliometric Evaluation of Security and Safety in Rural Areas

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Abstract

This article presents a bibliometric evaluation of international scientific literature concerning the safety of rural populations. Based on a systematic review of publications indexed in Scopus and Web of Science between 2000 and 2024, the study identifies major research themes, methodologies used, and key contributions in understanding crime, fear, and security in rural areas. The findings highlight a significant research gap in Eastern Europe, suggesting future directions relevant to the context of the Republic of Moldova, particularly in terms of community policing, perceived safety, agricultural crime, and gendered vulnerabilities.

Keywords: rural safety, bibliometric analysis, rural crime, fear of crime, community policing.

OP. 4.46

Main Sources of Funding for the Agricultural Sector in the Republic of Moldova: Trends and Challenges (2019-2024)

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Abstract

This article analyzes the main funding sources for the agricultural sector in the Republic of Moldova, examining both internal and external financial mechanisms. Based on data from the last five years (2019-2024), the paper explores government subsidies, international grants, and bank loans, as well as alternative funding solutions such as crowdfunding and agricultural cooperatives. The study highlights the importance of a well-structured financial system in supporting the modernization and sustainability of agriculture in the country.

Keywords: government subsidies, international grants, bank loans, Republic of Moldova.

SECTION 5
ADVANCED RESEARCH IN ELECTRICAL / ELECTRONIC ENGINEERING, SYSTEM ENGINEERING AND INFORMATION TECHNOLOGIES

OP. 5.1.

Advanced Control of Mineral Mixture Dosing for Process Technology Efficiency

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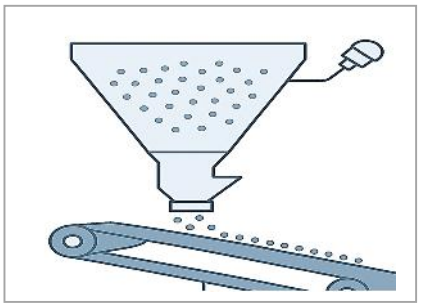
Abstract

This paper explores the development and implementation of an automated control system for the dosing of mineral mixtures in the sintering process, a critical stage in the metallurgical industry. The primary goal of the proposed system is to enhance the efficiency of the technological process by reducing energy and material consumption, as well as CO2 emissions. The automated control system utilizes advanced feedback-based control algorithms and precise measurement technologies to continuously and dynamically adjust the proportions of minerals in the mixture. By integrating high-performance sensors and real-time data analysis techniques, the system allows for rapid adaptation to the qualitative variations of raw materials. The results of implementing this system indicate a significant improvement in the quality of the produced sinter, alongside the optimization of resource consumption. The study also details the technical aspects of the control system, including its architecture, hardware and software components used, as well as the economic and environmental impact of the adopted solutions. In conclusion, the introduction of advanced control in the mineral dosing process opens new possibilities for increasing efficiency and sustainability in the sintering industry.



Keywords: advanced control algorithms, integration of high-performance sensors, real-time data analysis, energy and resource efficiency.

OP.5.2.

Improving the Efficiency of Hybrid Filtration Systems through Automation with Pneumatic Nitrogen

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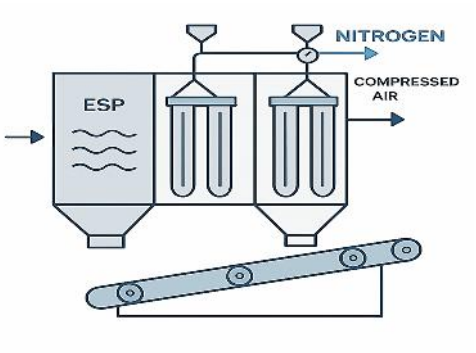
Abstract

This paper presents a comprehensive study on the enhancement of hybrid filtration systems by integrating pneumatic nitrogen automation. Hybrid filtration systems, which combine various filtration technologies, face challenges in maintaining high efficiency and operational stability.

The introduction of pneumatic nitrogen serves as a dynamic solution to these challenges, offering precise control over the filtration process and reducing the dependency on manual interventions. The research focuses on the application of pneumatic nitrogen to control and optimize the cleaning cycles of filter elements in hybrid systems, which include both electrostatic precipitators and bag filters. By automating the purge and cleaning processes, the system achieves a more consistent output and extends the lifespan of the filter materials. Additionally, the use of nitrogen, as opposed to compressed air, minimizes the introduction of moisture and other contaminants into the system, thus enhancing the overall filtration efficiency. The findings demonstrate that the automated nitrogen-based control system not only improves the operational efficiency of hybrid filtration units but also contributes to significant reductions in maintenance costs and energy consumption. This approach also aids in complying with stringent environmental regulations by limiting emissions and waste. In conclusion, the integration of pneumatic nitrogen into hybrid filtration systems presents a viable and effective strategy for improving filtration efficiency and sustainability. This advancement in filtration technology paves the way for more environmentally friendly and cost-effective industrial practices



Keywords: automation, pneumatic nitrogen,electrostatic.

OP. 5.3.

Systematic Comparison of Image Processing for Deep Learning-Based Pneumonia Diagnosis

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Abstract

This study presents a comparative analysis of various image pre-processing and processing techniques applied to chest X-ray data to improve the diagnostic accuracy of deep learning models for pneumonia detection. The main point is to compare and evaluate how different image processing strategies influence the diagnostic performance of a ResNet-18 convolutional neural network.

A labeled dataset from Kaggle is used as the experimental basis, with identical network architecture and training parameters across all experiments to ensure consistency. The investigated pre-processing pipelines include combinations of image resizing, intensity normalization, bone shadow suppression, and contrast enhancement. Additionally, to replicate clinical variability and improve the model's resilience and generalizability, a thorough data augmentation technique is used, which includes random rotations, translations, and scaling.

A ResNet-18 architecture, chosen for its balance between computational efficiency and representational capacity, is trained using the processed dataset. By training the ResNet-18 model separately on each pre-processed version of the dataset, the study quantitatively compares the resulting classification metrics (accuracy, precision, recall, F1-score, AUC). The findings aim to identify the most effective data conditioning approaches for improving the performance and robustness of neural networks in medical image analysis, with specific focus on pneumonia detection.

Keywords: Image Pre-processing, Pneumonia Detection, ResNet-18.

OP. 5.4.

Neural networks application in the context of edge classification

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Abstract

Neural networks (NNs) are correlated with the image processing filed, yielding interesting results in the classification of different diseases. This study examined the MRI data acquired from scanning human brain images to identify both stable and unstable disorders. By significantly decreasing the amount of data and filtering the information, the edge detection technique preserves both the essential structural components of an image and the necessary information. In this work, we used the Sobel filter, which is suggested because of its rapid detection speed and positive impact on edge identification. Two odd kernels are used by the Sobel filter to adjust for changes in both the horizontal and vertical directions. Relevant features that fed three NN were performed by projecting the edges into a horizontal and vertical histogram and analyzing it using the standard deviation, skewness, and kurtosis. In binary classification, the accuracy of the Cascade Forward, Feedforward, and Pattern Recognition NNs was 75.22%, 75.11%, and 75.9%, respectively.

Keywords: sobel filter; edge detection; neural netwok; image processing.

OP. 5.5.

Optimizing the operation of loopers in hot strip lamination

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Abstract

The hot rolling process of sheet metal in the finishing train uses loopers to take over the surplus material between the stands. The loopers ensure a constant tension of the laminating strip and a constant speed of it, balancing the operation of the entire installation.

During the rolling process, the mechanical and electrical stresses of the loopers have a very high dynamic to maintain the quality parameters of the finished product within accepted limits.

The main element driving the loopers is a direct current motor that operates at a maximum angular displacement of 90 degrees.

Optimizing the operation of the loopers requires analyzing the dynamic evolution of the parameters of the entire installation but also of the laminating strip and finding the best solutions for the optimal takeover of the material between the stands.

Keywords: Loopers, Constant tension of the strip, Dynamic evolution of the parameters

OP. 5.6.

Neural Network Control for Induction Motor Feed-Drives

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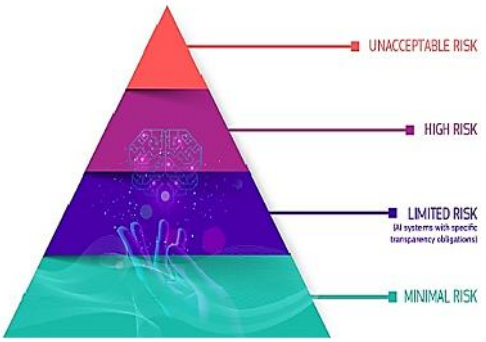
Abstract

The fast-pacing evolution of artificial intelligence (AI) in recent years represents a breakthrough in almost all domains. Thus, this rapid development of AI in different sectors needs to be regulated in order to eliminate discrimination and biases. This paper aims to review the everchanging legal framework in AI sector and to make an objective comparasion between the legislation in Europe, United States of America (USA) and in China. European Union (EU) and China implements a similar approach, a risk-based approach which defines different levels of risks in AI systems, from innaceptable risks to no risks at all.



On the other hand the USA is a approaching a more descentralized way of implementing regulations, with federal laws and each state can implement supplementary laws. The paradigm shift between USA an EU is that the USA laws impose that the USA remains the global leader in matters of AI development, and in EU laws impose user safety first. On the other side, China, implements two-pronged strategy, one for industry specific regulations and the second for the AI governange pilot projects. The authors of this paper investigated the incorporation of AI control in electric drive systems with three-phase asynchronous machines. In order to eliminate the disadvantages of conventional drive systems, the introduction of intelligent algorithms eliminates the dependence of motor parameters on variations in environmental conditions, resulting in better control performances with parameters decoupled from temperature or magnetization variations of the machine. The neural network-based control of the three-phase asynchronous machine is studied in this paper, and the obtained results show high performances of the intelligent drive system.

Keywords: Artificial Intelligence, reglementations, United States of America, European Union, China, three-phase asynchronous machine, Neural Network

OP 5.7.

Variable Speed Drives Integration into a Cyber-Physical Environment

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Abstract

Cyber-physical systems are systems that combine computing technologies with communication systems and control structures. Due to the communication channels in distributed control systems, random delays occur. The introduction of delays into the system can affect the performance and stability of the system. In this paper, a study for an industrial distributed control system is presented, in order to monitor and control remotely in real time the electric machine. The model of the variable speed system with speed estimator is presented, along with the numerical results obtained. Also, the random delay of the communication systems is taken into account. In this paper, the challenges of such a system, as well as the application areas, are presented.

Keywords: Cyber Physical System, Variable Frequency Drives, Observers.

SECTION 6
FUTURE OF ECO-NANOTECHNOLOGIES, FUNCTIONAL MATERIALS AND COATINGS

OP. 6.1.

The Influence of High Speed High Pressure Torsion (HSHPT) Parameters on the Mechanical and Thermal Properties Obtained on $Ni_{50.3}Ti_{49.7}/Ni_{49.6}Ti_{50.4}/Ni_{50.3}Ti_{49.7}$ (at.%) Multilayer Composite Module

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Abstract

An efficient severe plastic deformation (SPD) technique, High Speed High Pressure Torsion (HSHPT), is employed to produce shape memory alloy (SMA) active elements with revolution symmetry having ability to develop axial displacement. The active element (module), a truncated cone shape, was obtained from rings of nickel-titanium shape memory alloys. The manufacturing process of $Ni_{50.3}Ti_{49.7}/Ni_{49.6}Ti_{50.4}/Ni_{50.3}Ti_{49.7}$ (at.%) multilayer composite module is presented in this work. The shape characteristic ratio (SCR) was calculated based on the module's geometry characteristics. The module was tested using an INSTRON 3382 testing machine with a thermal chamber. It was subjected to five cycles of static compression at a strain rate of 0.5 mm/min, applied between flat surfaces at room temperature. The second test have involved compressing of the module at a constant stroke (about 0.5 mm), followed by heating at 180°C in a constrained state. The objective of these tests is to establish the force-stroke response of the $Ni_{50.3}Ti_{49.7}/Ni_{49.6}Ti_{50.4}/Ni_{50.3}Ti_{49.7}$ multilayer composite module under cyclic compression at ambient temperature, as well as the variation of stress with temperature and the determination of critical temperatures for the reverse martensitic transformation.

Keywords: Severe plastic deformation, HSHPT, Shape memory composites.

OP. 6.2.

The Influence of the Degree of Deformation on the Variation of Critical Points in Ni-Ti Multilayer Composites Obtained by High Speed High Pressure Torsion (HSHPT)

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Abstract

This study involved the fabrication of Ni-Ti multilayer composites through the application of High Speed High Pressure Torsion (HSHPT) a hot severe plastic deformation (SPD) method. The multilayered composite discs resulting by assembling Ni-Ti alloys with two compositions: $Ni_{49.6}Ti_{50.4}$ (at.%)(Ti-rich), and $Ni_{50.3}Ti_{49.7}$ (at.%), (Ni-rich). It was designed for the composites to have three layers of both alloys. The

layers were arranged in the configuration $Ni_{50.3}Ti_{49.7}/Ni_{49.6}Ti_{50.4}/ Ni_{50.3}Ti_{49.7}$ to improve shape recovery upon both heating and cooling. This work focuses on the manufacturing process of Ni-Ti multilayer composites and present shape memory properties and martensitic transitions of nickel-titanium multilayer composites with different degrees of deformation, using differential scanning calorimetry (DSC).

Keywords: Severe plastic deformation, HSHPT, Shape memory alloy, Composites, Ni-Ti.

OP. 6.3.
Structural Integrity Analysis of a Cryogenic O_2 Storage Vessel for Industrial Environments

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Abstract

This paper presents the development and evaluation process of a cryogenic storage system designed for liquid oxygen in industrial applications. Cryogenic tanks are used for storing materials at extremely low temperatures, and the present study focuses on a tank specifically engineered for oxygen storage.

The construction of the cryogenic tank employed the material X5CrNi18-10, selected for its superior resistance to intergranular corrosion, good cold formability, and excellent weldability, qualities that make it widely used in similar industrial applications.

The mechanical performance of the inner tank was assessed through the cold stretching procedure, involving hydraulic reinforcement testing of the structure, in accordance with the technique specified by the PED 2014/68/EU Directive.

Experimental data validation was carried out using finite element analysis, supporting the selection of both the materials and the fabrication methods employed. The obtained results demonstrate the viability and reliability of the prototype for use in industrial environments.

Keywords: Cryogenic storage system, Hydraulic reinforcement test, Finite element analysis.

OP. 6.4.
Development of Innovative Nanostructured Materials for Advanced Sensory Applications

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Abstract

This research explores new synthesis and applications of nanostructured materials specifically engineered for enhanced sensory systems. A range of nanomaterials, including metal and magnetic nanoparticles, graphene-based structures, nanoceramics, nanoemulsions, and cellulose-derived nanofibers, were prepared via new and eco-friendly methods. Nanostructures were integrated into high-performance sensory platforms with the anticipation of significantly enhancing sensitivity, selectivity, and real-time monitoring capabilities in numerous areas, including the food industry. Comprehensive

characterization using physicochemical methods and functional testing was done, confirming their efficiency in sensing critical analytes, such as spoilage gases, pathogens, toxins, and chemical toxins. The results show the remarkable improvement in the performance of the sensors, producing viable, fast, and cost-effective tools for monitoring food quality and safety. These state-of-the-art nanomaterials have the potential to significantly enhance sensory technologies, therefore positively impacting global food safety standards and sustainability efforts.

Keywords: Food safety, Nanosensors, Nanotechnology, Food contamination detection.

OP. 6.5.

Recent Developments and Perspectives of Coated Materials for Ballistic Protection

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Abstract

The continuous evolution of ballistic threats, along with the growing need for more efficient and lighter protective equipment, has led to the development of advanced materials capable of addressing these challenges. In this context, coatings applied to materials used in ballistic protection have become a key factor in enhancing their performance. This paper analyzes the influence of various types of coatings – ceramic, polymeric, metallic, and composite – on the mechanical behavior, impact resistance, durability, and energy dissipation capacity of ballistic materials. Through a review of the specialized literature and a comparison of existing experimental results, the study highlights how these coatings contribute to improving the functional characteristics of base materials such as aramid fibers (e.g., Kevlar), ultra-high molecular weight polyethylene (UHMWPE), metallic alloys, and hard ceramic layers. The paper also discusses the effects of coating thickness, adhesion, and structural properties on high-velocity impact behavior and stress distribution during collisions. The analyzed results show that the proper application of these coatings can reduce the total weight of the protective system while increasing resistance to wear, corrosion, and environmental factors without compromising safety.

Keywords: Materials, Ballistic protection, Coatings, Durability, Performance.

OP. 6.6.

Strategies for Reusing Construction Waste to Reduce Environmental Impact

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Abstract

The efficient management of construction waste is one of the major challenges facing the modern building industry, with a significant impact on the environment. This study investigates the importance of reusing waste generated from construction and demolition processes, proposing sustainable strategies for its valorization. By implementing methods for sorting, treating, and reintegrating materials, the volume of waste sent to landfills and the emissions associated with the production of new materials can be

significantly reduced. The study explores both technical solutions and supportive policies that encourage a circular economy in the construction sector. The research highlight the economic and environmental benefits of reusing construction waste, providing a framework of best practices for reducing environmental impact and promoting sustainable development.

Keywords: Construction Waste, Reuse, Sustainable Construction, Environmental Impact

OP. 6.7.

Innovative Materials Used for Medium-Caliber Ammunition

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Abstract

Medium-caliber ammunition plays a vital role in modern military operations, bridging the gap between small arms and heavy weapon systems. This paper explores the application of advanced materials-such as high-performance alloys, lightweight composites, and thermally stable polymers-in the design and production of medium-caliber projectiles and casings. Emphasis is placed on improving ballistic efficiency, armor penetration, weight reduction, and thermal resistance under extreme combat conditions. The study also examines recent developments in environmentally friendly ammunition and additive manufacturing techniques. The findings indicate that material innovation significantly contributes to the evolution of medium-caliber munitions, offering enhanced lethality, reliability, and logistical advantages on the battlefield.

Keywords: Medium-caliber ammunition, advanced materials, ballistic performance, lightweight alloys, defense technology, additive manufacturing.

OP. 6.8.

Corrosion Behavior Assessment of S275JR Steel with Polymeric Coatings in Natural Seawater

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Abstract

This study evaluate the corrosion behavior of S275JR steel with various polymeric coatings immersed in natural seawater (Black Sea, Port Constanta). The aims of this study is to evaluate the effectiveness of different protective coatings in enhancing the corrosion resistance of sandblasted S275JR steel. The samples were subjected to different treatments: sandblasted only, sandblasted with epoxy primer enriched with zinc, sandblasted with epoxy primer enriched with zinc and polyurethane paint, and sandblasted with epoxy primer, polyurethane paint in which kreutzonite particles were added. Corrosion tendency was conducted over a six weeks of exposure using electrochemical techniques, including open circuit potential (OCP), polarization resistance (R_p), and corrosion rate (V_{corr}). The resulted obtained indicate a significant improvement in the corrosion resistance of S275JR steel coated with epoxy primer

and polyurethane paint system demonstrating the highest protection against corrosion in natural seawater. The addition of kreutzonite particles to the polyurethane paint further improved the protective performance of S275JR, reducing the corrosion rate by approximately 40 times compared to the uncoated sample.

Keywords: Carbon steel, Polymeric coatings, Seawater, Corrosion, Electrochemical methods.

Acknowledgements: This work was funded by "Dunarea de Jos" University of Galati, Romania, grant research no. 7951/31.03.2025

SECTION 7
CHEMISTRY - ELECTROCHEMISTRY IN LIFE SCIENCES

OP. 7.1.

Electrochemical Detection of Melatonin Using Graphene and Graphene Oxide-Based Voltammetric Biosensors Modified with Horseradish Peroxidase

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Abstract

Melatonin is a neurohormone that plays a key role in regulating sleep-wake cycles and exhibits notable antioxidant activity, making it a growing focus in biomedical studies [1,2]. This study explores the use of graphene and graphene oxide-based biosensors for the electrochemical detection of melatonin via cyclic voltammetry. The electrodes were modified with horseradish peroxidase (HRP) at a concentration of 5 mg/mL. For each sensor type, two variants were prepared by depositing 10 µL and 20 µL of the enzyme, respectively. Melatonin was added to the electrochemical cell using the standard addition method. Both biosensor types showed effective electrochemical responses, achieving detection and quantification limits in the micromolar range. The results confirm the potential of these enzymatically modified sensors for accurate and sensitive melatonin measurement.

Keywords: graphene, biosensors, melatonin, horseradish peroxidase.

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OP. 7.2.

Iridium Particles Based Electrochemical Sensors for the Sensitive Detection of Phenylbutazone

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Abstract

Phenylbutazone (PBZ) is a non-steroidal anti-inflammatory drug that was widely used as a first-line therapeutic option for various types of arthritis for over three decades. However, its use has declined due to concerns over potential health risks. In this study, a sensitive electrochemical method for the detection of PBZ is presented, using two types of commercially available screen-printed electrodes modified with carbon and iridium particles. Cyclic voltammetry was employed exclusively to evaluate the electrochemical behaviour of the sensors. Preliminary studies in standard electrolytes—potassium chloride (KCl), catechol, and ferro/ferricyanide—were conducted to evaluate electrode performance and stability. To assess real-sample applicability, the method was applied to the detection of PBZ in commercial pharmaceutical cream formulations. Compared to the carbon-based electrode, the iridium-modified sensor exhibited superior electrochemical performance, with more well-defined and reproducible oxidation peaks, enhanced sensitivity, and improved selectivity across relevant concentration ranges.

These results highlight the potential of this approach for rapid, cost-effective PBZ detection in pharmaceutical quality control.

Keywords: phenylbutazone, cyclic voltammetry, screen-printed electrodes, iridium electrode, pharmaceutical analysis.

OP. 7.3.

Chemically Modified Sensors for the Analysis of Ascorbic Acid in Pharmaceutical Products

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Abstract

For the sensitive and selective of ascorbic acid in pharmaceutical products novel chemically modified electrochemical sensors based on polypyrrole dopped with electroactive compounds were developed. The sensitive layers of polypyrrole were successfully electrodeposited onto glassy carbon electrode. The microscopic characterization of the sensors has evidenced the different surface morphologies. From the preliminaries studies in ascorbic acid model solutions has proved that sensor based on polypyrrole dopped with nitroprusside ions has the best sensibility. The sensor was further used for the quantification of ascorbic acid in pharmaceutical products of different formulation type. The results were in agreement with the values indicated by the producers with errors lower than 2%.

Keywords: sensor, polypyrrole, vitamin C

OP. 7.4.

Detection of Antioxidant Compounds with Voltametric Sensors

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Abstract

Nowadays there is an emerging interest in the use of natural antioxidants in different fields of activity, from food preservation to the treatment of pathophysiologic actions, which is a point of interest for all researches worldwide. [1] One class of these antioxidant compounds are natural polyphenols, which can range from simple molecules (phenolic acids, flavonoids, phenylpropanoids) to more complex molecules (melanin, lignins), they are present in all plant organelles, therefore being an integrated part of the human diet [2] Phenolic compounds inhibit oxidative mechanisms responsible for the occurrence of degenerative diseases, thus the need for determining their antioxidant capacity (AOC) has increased. [3] The mechanism of action of an antioxidant with a free radical involves the loss of an electron so the molecule becomes unstable, oxidized, resulting in a free radical unable to carry out a new reaction. [4] Thus this process can be analyzed by electrochemical methods such as: cyclic voltammetry (CV), square wave voltammetry (SWV), differential pulse voltammetry (DPV), which provide a direct correlation of AOC with reactive species. [4] Further we can optimize this process using portable devices for the analysis and quantification of phenolic compounds present in food, pharmaceutical, cosmetic, environmental and medical environment. [5] Sensors and biosensors offer attractive features ranging from high sensitivity and selectivity to stability and advantageous response time. [6] Remarkable achievements in the field of nanotechnology and nanoscience have brought remarkable improvement in the sesnsibility and selectivity of electrochemical sensors and biosensors. [7]

Keywords: antioxidants, phenolic compounds, antioxidant capacity (AOC), electrochemical

methods, sensors, biosensors, nanotechnology.

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OP 7.5.

Evaluation of Antioxidant Activity of Microencapsulated Glutathione Using Electrochemical and Spectrophotometric Techniques

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Abstract

Oxidative stress is a significant factor in the development of various diseases, and antioxidants such as glutathione (GLUT) play a vital role in combating this stress. However, GLUT's stability and bioavailability are often limited by rapid degradation in oxidative environments[1]. To overcome this, the current study focuses on the determination of the antioxidant activity of glutathione, encapsulated in sodium alginate microcapsules. The microencapsulation process aims to protect GLUT from degradation and ensure its sustained release, enhancing its antioxidant effects[2].

Using electrochemical techniques, specifically cyclic voltammetry, the antioxidant activity of released GLUT was evaluated. This method offers a precise, direct, and sensitive approach to measuring the radical scavenging capacity of GLUT. The antioxidant potential was further confirmed through traditional spectrophotometric assays, such as the DPPH and ABTS radical scavenging tests. Preliminary findings indicate that encapsulation significantly enhances the stability of GLUT and maintains its antioxidant activity over time. The electrochemical results demonstrate a clear correlation between the release of GLUT and its radical scavenging efficiency, highlighting the potential of this delivery system for improving the effectiveness of GLUT in oxidative stress-related conditions.

This study provides new insights into the use of electrochemical methods for evaluating antioxidant activity and emphasizes the potential of microencapsulation in enhancing the therapeutic efficacy of antioxidants.

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OP. 7.6.

Harnessing the Pharmacological Potential of Piperine Through Semisynthesis – A Green Approach

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Abstract

Plants belonging to the Piperaceae family are cultivated and processed in the tropical regions of India and Sri Lanka, producing one of the most used spices worldwide: pepper. With a piperine concentration of up to 9%, *Piper nigrum* is a powerful source of natural medicine, contributing to increased apetite, improvement of blood circulation and possessing antibacterial activity [1]. Acknowledgement of its properties has led to further research, attempting to enhance the pharmacological profile of piperine through structural modifications. Therefore, this work focuses on the semisynthesis of bioactively potent compounds (piperine and derivatives) with pepper as a starting point. To achieve the desired products, piperine was first extracted from black pepper through diverse methods, such as ultrasound, Soxhlet and NADES extractions, also different compounds, and their efficiency was discussed. The crude extracts and pure piperine were processed simultaneously for an accurate comparison of the stages involved and the analogs of piperic acid were obtained through condensation with derivatives with amino groups. The results suggest a noteworthy level of reactivity and good yields.

Keywords: piperine, antibacterial activity, semisynthesis, piperic acid analogs

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OP 7.7.

Bioactive Compounds and Mineral Content in *Iris pseudacorus* from the Danube Delta: A Multi-Technique Approach

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Abstract

Iris pseudacorus is a perennial species widely distributed in wetlands, including ecosystems within the Danube Delta Biosphere Reserve. This study aims to characterize its chemical composition by analyzing bioactive compounds (flavonoids, polyphenols) and selected mineral elements, using analytical techniques such as HPLC-MS and ICP-MS [1]. Mercury was determined separately using a direct mercury analyzer [2]. Plant material was collected from the Danube Delta region and processed individually according to morphological parts. The findings are expected to contribute to a broader understanding of the phytochemical, nutritional, and environmental relevance of this species, in the context of local

biodiversity and its potential applications in alternative medicine, the food industry, and cosmetics.

Keywords: *Iris pseudacorus*, Danube Delta, bioactive compounds, mineral elements.

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OP. 7.8.

Study of Chemical Composition and Antineurodegenerative Effect of *Rumex acetosa*

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Abstract

Rumex acetosa, commonly called sorrel, is a perennial plant widely distributed and classified within the Polygonaceae family. Renowned for its distinctive tart flavor, it has served multiple purposes throughout history, including as a food source, medicinal herb, and dye agent. The plant's diverse biological activities stem from its rich phytochemical profile, which includes flavonoids, anthraquinones, tannins, and oxalic acid. Sorrel exhibits noteworthy properties, including potent antioxidant, anti-inflammatory, antimicrobial, antitumor, and antihypertensive effects. The presence of anthraquinones, naphthalenes, and polyphenolic compounds, such as flavan-3-ols, phenolic acids, and proanthocyanidins, has been linked to significant pharmacological actions. These effects encompass strong antiviral activity against herpes simplex virus type-1, inhibition of bacterial proliferation, antiproliferative effects on cancerous cells, and gastroprotective properties against gastric ulcers. This work aims to highlight the chemical composition of the *Rumex acetosa* by determining polyphenols and flavonoid content. Based on the main chemical compounds, the antioxidant and antineurodegenerative activity were determined. The obtained results are promising from both chemical and bioactive points of view, so that *Rumex acetosa* can be considered for future *in vivo* and *in vitro* testing.

Keywords: *Rumex acetosa*, antioxidant activity, antineurodegenerative effect.

Acknowledgments: This work was partially supported by ADER grant 5.2.1. – "Conservation and valorization of the genetic heritage of aromatic and medicinal species that can be cultivated on the territory of Romania" and the project 593 Cobil Ro-Fr Nr. 8BMFR/10.09.2024, Programme „Hubert Curien-Brancusi"-„Multitarget 594 compounds for Alzheimer and cancer treatment", 2024-2025.

OP. 7.9.

Comparative Phytochemical and Pharmacological Evaluation of *Perilla frutescens* and *Plantago major* Extracts Obtained via Green Extraction Using Deep Eutectic Solvents

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Abstract

Perilla frutescens and *Plantago major* are two medicinal plants widely recognized for their therapeutic potential in both traditional and modern phytotherapy. This comparative study aims to analyze the phytochemical composition and pharmacological activities of their extracts, with a particular focus on shared bioactive compounds and overlapping therapeutic effects. Both plants contain significant levels of flavonoids, phenolic acids, and polysaccharides, which contribute to their antioxidant, anti-inflammatory, and immunomodulatory properties. While *Perilla frutescens* has a long history of use in East Asian medicine, especially for respiratory and allergic conditions, *Plantago* species are traditionally used in European herbal medicine for treating inflammatory disorders and respiratory infections.

Extracts were obtained using green extraction techniques based on deep eutectic solvents (DES), which offer a non-toxic and environmentally friendly alternative to conventional solvents. The chemical profiles of the extracts were characterized by High-Performance Liquid Chromatography (HPLC), revealing the presence of key phenolic compounds and flavonoids. In addition, the antimicrobial activity of both extracts was assessed against selected bacterial strains, demonstrating promising inhibitory effects.

Keywords: green extraction, HPLC, DES.

Acknowledgements: This work was partially supported by ADER grant 5.2.1. – "Conservation and valorization of the genetic heritage of aromatic and medicinal species that can be cultivated on the territory of Romania" and the bilateral project Ro-Fr, LAURENCE, PC Brancusi program, No 8BMFR/10/09/2024.

OP. 7.10.

Profiling and Quantification of Key Phytochemical Classes in *Cucumis metuliferus* Fruits

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Abstract

The chemical composition of plant extracts can be determined by various techniques and methods of analysis. Spectrophotometric methods are some of the analytical methods that are based on measuring the absorption or emission of electromagnetic radiation by chemical molecules, they can be successfully used in the dosage and quantification of various classes of organic compounds of interest. *Cucumis metuliferus* represents a species of the Cucurbitaceae family, with juicy fruits wrapped in a rigid shell with thorns, which can be consumed fresh or processed. Beyond its exotic appearance and delightful taste, this fruit has demonstrated a variety of therapeutic properties, including antioxidant, antimicrobial, anti-inflammatory, and antidiabetic effects[1], owing to its rich chemical composition.

The purpose of this study was the dosage and quantification of compounds with spectrophotometric methods such as saponins, polyphenols, flavonoids as well as the total content of

sugars and β-carotene.

In conclusion, the fruits of *C. metuliferus* are rich in a diverse range of bioactive compound classes, including phenolics, flavonoids, vitamins, and carotenoids, which contribute to their nutritional and therapeutic potential.

Keywords: *C. metuliferus* fruits, spectrophotometric methods, polyphenols, flavonoids, sugars, β-carotene

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OP. 7.11.

Tailoring Multifunctional Nanoplatforms Based on SPIONs and Graphene Oxide for Advanced Healthcare Applications

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Abstract

The development of multifunctional nanoplatforms is a key to advancing healthcare technologies, particularly in diagnostics and therapy. Recently, superparamagnetic iron oxide nanoparticles (SPIONs) coated with gold nanoparticles and functionalized with chelated gadolinium have been previously developed and thoroughly characterized, demonstrating high potential as dual T1/T2 MRI contrast agents and in magnetic hyperthermia. These nanoplatforms (A) showed favorable magnetic properties, efficient relaxivity profiles (B), and colloidal stability, positioning them as strong candidates for theranostic applications [1]. Pursuing these former studies, we are currently developing nanoplatforms based on SPIONs and gold nanoparticles (AuNPs) anchored on graphene oxide (GO) sheets. GO offers a versatile 2D layer that enhances dispersibility, surface functionality, and biocompatibility. SPION@GO nanoplatforms exhibit superparamagnetic behavior and are being tailored for applications in MRI and magnetic hyperthermia, while AuNP@GO systems provide enhanced plasmonic properties with potential use in radiosensitization. Full crystal, morphological and physical characterization is currently under progress as well as functionalization of these GO-based platforms with gadolinium chelates, aiming to soon enable tests to dual T1/T2 imaging capabilities in SPION@GO systems, thus expanding their diagnostic utility. Together, these nanoplatforms — from optimized gold-coated SPIONs to innovative GO-based composites — illustrate a materials-driven strategy to engineer hybrid systems for integrated diagnostic and therapeutic applications in oncology.

Keywords: Iron Oxide Nanoparticles, Theranostics, Magnetic resonance Imaging, Hyperthermia, Superparamagnetism.

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OP. 7.12.

Biochemical Characterization and Pharmacological Properties of Four Local Foods (*Phoenix dactylifera; Sesamum indicum; Cyperus esculentus; Anacardium occidentale*) Rich in Active Biomolecules and Fatty Acids

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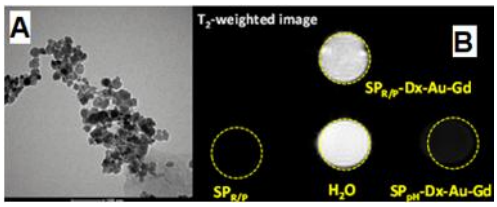
Abstract



The development of plant resources is essential to meet growing food and nutrition needs. However, some of these resources remain largely under-exploited, particularly in Benin. This study aims to determine the nutritional and phytochemical composition of four specific plant resources: *Anacardium occidentale* nuts, *Sesamum indicum* grains, *Cyperus esculentus* tubers and *Phoenix dactylifera* fruits.

By understanding the composition of these products, we are contributing to better use of these resources to improve food safety and promote public health. To achieve this, the methodology adopted includes a series of chemical and biological analyses, including bromatological evaluation, phytochemical screening and antioxidant activity tests to assess the free radical scavenging power of the fatty extracts. The results reveal disparities in the nutritional composition of these samples. TSRT and ST vary from 60.93 ± 0.69 mg/g to 1640.93 ± 2.57 mg/g. Dry matter, water and ash levels showed significant differences, with apparent correlations. Protein levels ranged from 3.19% to 20.31%, while fat yields were as high as 30%. Phytochemical analysis revealed specific profiles for phenolic compounds and alkaloids, with significantly different amounts of these compounds in each plant. In terms of antioxidant activity, the extracts demonstrated a dose-dependent ability to trap the DPPH radical, with a 50% inhibition concentration of around 0.5 mg/ml. The FRAP test showed significant reduction activity, with variations between samples. This study thus provides detailed information on the nutritional value of these plant products, highlighting their diversity and potential for food and medicinal applications. The results support the idea that the foods studied may have nutritional profiles with practical implications for their use in food and pharmacology. These data enhance our understanding of the intrinsic properties of these products, opening up promising prospects for their use in various fields and their industrial processing.

Keywords: Bromatological evaluation, phytochemical compounds, antioxidant activity, food safety.

OP. 7.13.

Formulation of an Antibacterial Ointment from Extracts of Four Plants Used in Benin to Treat Skin Diseases

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Abstract

The incidence of bacterial and fungal infections in humans has significantly increased in recent years. This study aims to formulate an antimicrobial ointment based on medicinal plants (*Citrus sinensis, Phyllanthus amarus, Syzygium aromaticum*, and *Zingiber officinale*) traditionally used in Benin to treat skin diseases. The secondary metabolites of these plants were identified through coloration and precipitation reactions, and the contents of phenolic compounds were evaluated by estimating total flavonoids, tannins, and total phenols using the aluminum chloride, butanol-HCl, and Folin-Ciocalteu methods, respectively. The antioxidant activity of the plant extracts (hydroethanolic and essential oils) was assessed using the DPPH method. The ointment was formulated from the extracts with carefully selected excipients, followed by physicochemical and organoleptic characterization. The results revealed that the plants contain metabolites such as tannins, flavonoids, anthocyanins, anthraquinones, sterols, and terpenes, with high levels of phenolic compounds. The plant extracts exhibited antioxidant activity ranging from 0.1µg/µL to 45µg/µL. The ointment formulated from *Citrus sinensis, Syzygium aromaticum, Zingiber officinale*, and *Phyllanthus amarus* was semi-solid, yellow in color, with a pleasant smell, good homogeneity, a pH of 6.10, and a moisture content of around 5%.

Keywords: skin diseases, extracts of medicinal plants, secondary metabolites, characterization, antiseptic ointment.

OP. 7.14.

Antioxidant, Anti-Inflammatory and Antiulcer Potential of the Aqueous Extract of *Detarium microcarpum* Leaves Guill & Perr.

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Abstract

Gastric ulcers constitute a major public health problem worldwide. These ulcers can lead to hemorrhages, perforations and stenoses.The present study was initiated to evaluate the gastro-protective effect of the aqueous extract of *D. microcarpum* leaves. A decoction was made and the aqueous decoction obtained was used for the various tests. The characterization tests were carried out using tube tests for

the detection of secondary metabolites. The quantification of phenolics, flavonoids and total tannins was done respectively with Folin Ciocalteu reagent, aluminum trichloride and polyvinyl polypyrrolidone. Antioxidant activities were evaluated by three methods (ABTS$^{\bullet+}$, DPPH$^{\bullet}$ and FRAP). The *in vitro* anti-inflammatory activity was performed using the lipoxygenase inhibition test and the gastroprotective potential was performed on MNRI mice using ethanol as ulcerogenic agent. Concerning the antioxidant activities, the aqueous decoctions of *D. microcarpum* presented good activity by the three methods (ABTS$^{\bullet+}$, DPPH$^{\bullet}$ and FRAP). Regarding the inhibition of lipoxygenase, a good percentage was obtained (41.61% at the concentration of 100µg/mL. The evaluation of the acute toxicity of the extracts showed no sign of toxicity in the mouse With regard to antiulcer activity, the greatest protection (69.99%) was provided at the dose of 400 mg/kg with a very reduced ulceration index 0.47±0.20 compared to the control group (3.95 ± 0.44). The antiulcer potential of the aqueous decoction of the species could be due in part to its antioxidant and anti-inflammatory properties.

Keywords: Antioxidant, anti-inflammatory potential and antiulcer activity.

OP. 7.15.

Traditional Uses and Secondary Metabolite Composition of *Boscia senegalensis* (Pers) Lam. Ex Poir. Capparaceae Harvested in Mali

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Abstract

Medicinal plants have been used since ancient times to relieve and cure human diseases in developing countries where access to modern care is limited. *Boscia senegalensis* is a versatile plant that adapts to Sahelian, desert and potentially unexplored areas. The objective of this work was to study the traditional use and phytochemistry of the plant. The material used consisted of a survey sheet, leaves and stems of *Boscia senegalensis*. These organs were harvested in their natural habitat on April 17, 2023 in Niono, circle of the Segou region in Mali. An ethnobotanical survey was carried out among traditional health practitioners and herbalists. Coloring reactions using specific reagents were used to determine the chemical constituents of the plant. Eighteen (18) diseases were listed during the ethnobotanical survey, the main ones being urinary infections, headaches, aches and pains, etc. Alkaloids, saponins, tannins and triterpenes were identified in the plant by phytochemical screening. The data generated by this study reinforce the scientific recognition of Boscia senegalensis as a medicinal plant of interest. Further studies are needed to understand the mechanism of action of the bioactive compounds.

Keywords: *Boscia senegalensis*; traditional uses; secondary metabolites.

OP. 7.16.

Valorization of Two Ivorian Agricultural Waste Products (*Corchorus olitorius* and *Euphorbia heterophylla* Seeds) to Improve the Productivity and Nutritional Quality of Eggs from Eggs of Laying Quails (*Coturnix coturnix japonica*)

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Abstract

In Côte d'Ivoire, poultry farming is a fast-growing sector, especially the breeding of laying quails prized by the population for their eggs. However, eggs are notorious high levels of cholesterol and are susceptible to oxidation. With this in mind with a view to improving the nutritional quality of eggs while also improve the zootechnical parameters of laying quails that this work was carried out by incorporating *Corchorus olitorius* and *Euphorbia heterophylla* in laying quail feed. The trial was carried out at the animal house of the large production farm of the Institut National Polytechnique Félix-Houphouët Boigny (INP-HB) in Yamoussoukro (Côte d'Ivoire). Sixty (60) laying quails (*Coturnix coturnix japonica*), eight (8) months old with an average live weight of 203.56±7.55 g, were used in this study, randomly divided into three (3) groups of 20 laying quails. The first group received commercial layer feed (IVOGRAIN-ponte 20 SIPRA) (100%, control diet [R0]).

The second group received a 6% incorporation of *Corchorus olitorius* seeds with the commercial feed (RC) and the third group received 6% Euphorbia heterophylla seeds (RE). After two weeks of experimentation, the egg-laying rate was improved in the respectively by 70.83% for RC and 70.37% for RE, compared with R0 (63.33%). In addition, average egg weight was also improved for RC (10.09 g) compared to R0 (9.45 g). Biochemical analysis showed that RC improved the vitamin A content of the egg yolk (109.50 µg/100g) compared with R0 (88.50 µg/100g). Both RC and RE significantly reduced total cholesterol (TC) levels in egg yolk (RC = 10.65% and RE = 14.69%) and oxidative capacity (CO) (RC = 50.08% and RE = 44.27%) compared to R0 (CT = 23.02 and CO = 35.17%). These results show that the valorization of these two agricultural products (seeds of *Corchorus olitorius* and *Euphorbia heterophylla*) could be beneficial to the poultry industry in Côte d'Ivoire for the production of eggs with excellent nutritional qualities.

Keywords: *Coturnix coturnix japonica*, egg quality, *Corchorus olitorius*, *Euphorbia heterophylla* and Ivory Coast.

OP. 7.17.

Valorization of the Essential Oil of *Tetraclinis articulata* (Vahl) Masters as Antioxidant and Antibacterial Agents, and their Incorporation into Gummy Candies

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Abstract

Numerous novel medications derived from secondary metabolites of plants have been employed in the treatment and prevention of various diseases. Essential oils and plant extracts are widely used as antibiotics to address infectious diseases caused by bacterial contamination, and they are also utilized as antioxidants to tackle neurodegenerative disorders. The development of new food products incorporating natural ingredients rich in antioxidants has emerged as an intriguing marketing strategy for the industry, particularly for products seeking to emphasize health benefits, such as confectionery items like gummy candies. Thus, the aims of this study were to analyze the chemical compositions and assess the antioxidant and antimicrobial activities of *Tetraclinis articulata* essential oil and Jelly candies manufactured using this plant's essential oil. Essential oils were extracted via hydrodistillation using a Clevenger-type apparatus, and their chemical composition was determined through GC-FID and GC-MS. The gummy candies formula comprised sugar, glucose syrup, water, citric acid, agar, and essential oil. The essential oil's ability to inhibit microorganisms was tested using three different methods: disc diffusion, liquid macrodilution, and solid-state dilution. The antimicrobial activity results varied depending on the strain. Colorimetric evaluation of the antioxidant activity of essential oils and gummy candies was conducted using the DPPH and ABTS methods. The antioxidant test results indicate that both the essential oil and Jemmy Candies exhibit significant antioxidant power. These findings suggest that *T. articulata* essential oil can be regarded as a therapeutic tool in the healthcare and agri-food industries.

Keywords: *Tetraclinis articulata* (Vahl) Masters, gummy candies, antioxidant, antimicrobial.

OP. 7.18.

Detection of Glutathione with a Novel Chemically Modified Electrode

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Abstract

Glutathione is composed of three amino acids: cysteine, glutamic acid, and glycine and it is involved in eliminating toxins from cells, transporting vitamins and minerals, regulating the immune system, and, above all, providing antioxidant protection [1]. The oxidation of glutathione was studied at the surface of ferrocene-modified carbon screen-printed electrode. Cyclic voltammetry and square wave voltammetry

techniques were used to determinate the efficiency of deposition of ferrocene into carbon screen-printed electrode as a mediator for the electrochemical oxidation of glutathione in buffer solutions. Results showed that pH 7 is the most appropriate for the electrochemical detection of glutathione. In the optimal condition one oxidation peak at 0.510 V can be observed. From the kinetics studies the diffusion coefficient of glutathione was found to be 3.82×10^{-5} cm^2 s^{-1}. The anodic peak current of glutathione at the surface of the modified electrode was linearly dependent on the GSH concentration in wide ranges when cyclic voltammetry and square wave voltammetry techniques, respectively. The detection limits were in the micromolar range. Therefore, the electrochemical oxidation of glutathione at the sensor surface can be employed for the voltammetric determination of glutathione in real samples.

Keywords: ferrocene, glutathione, voltammetry

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OP. 7.19.

Detection of Acetaminophen with Ferrocene Modified Carbon Paste Electrode

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Abstract

Paracetamol, also known as acetaminophen, is a widely used medication for pain relief and fever reduction. It is one of the most common over-the-counter medications worldwide and is often recommended for a variety of conditions, including headaches, muscle aches, arthritis, backaches, toothaches, colds, and fever [1]. Carbon paste electrodes are a useful option to develop chemically modified electrodes to be used in the detection of pharmaceuticals [2]. In this work a novel sensor based on ferrocene modified carbon paste electrode was developed for the selective detection. One anodic peak was observed related to the oxidation of the paracetamol. The kinetics studies were demonstrated that the electrochemical process is controlled by the adsorption process. For the quantification of paracetamol in different pharmaceutical products a calibration linear model was developed. The detection limit was 1.1 mM. The paracetamol was successful quantified in different pharmaceutical products and the results obtained were in good agreement with the concentrations indicated by the producers.

Keywords: acetaminophen, ferrocene, voltammetry

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OP. 7.20.

Electrochemical Determination of Melatonin in Pharmaceutical Products Using a Gold Nanoparticle-Modified Graphene Sensor

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Abstract

Melatonin is a crucial regulator of the circadian rhythm, influencing sleep patterns, mood, and a variety of physiological processes, while also serving as a potent antioxidant that helps protect cells from oxidative damage [1]. This study presents the development and application of a graphene-based sensor modified with gold nanoparticles for the electrochemical detection of melatonin. The sensor's quantification limits for pure melatonin were determined using cyclic voltammetry. Subsequently, the sensor was employed to measure the practical concentration of melatonin in two pharmaceutical products: a 5 mg melatonin supplement from Rotta Natura and a 5 mg pure melatonin product from ESI. The same cyclic voltammetry method was applied to both products, allowing for accurate determination of melatonin concentrations. The results highlight the significance of practical melatonin determination in ensuring the quality and efficacy of pharmaceutical products, emphasizing the potential of this sensor for real-world applications in pharmaceutical analysis.

Keywords: melatonin, gold nanoparticle-modified graphene sensor, cyclic voltammetry.

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OP. 7.21.

Detection of Phenylbutazone in Pharmaceuticals with Carbon Screen-Printed Electrodes

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Abstract

Phenylbutazone is an anti-inflammatory used to reduce pain and inflammation in arthritis and acute attacks of gout [1]. Phenylbutazone, due to its high toxicity, is not recommended as initial therapy for any rheumatic, inflammatory or painful process, only when the patient does not respond to other less toxic treatments and after a benefit-risk assessment [2]. Therefore, the detection of phenylbutazone in pharmaceuticals and medical samples is of great interest. The methods based on chromatography have the disadvantages of complexity, long time for analysis, and high costs. As complementary method of analysis in this study was developed an electroanalytical method based on carbon screen-printed electrodes and cyclic voltammetry. In optimal condition a well defined peak related to the oxidation of phenylbutazone was observed. The current of the anodic peak was proportional with the concentration of phenylbutazone in analysed samples. Based on the calibration model the electrode was used for the succesfull detection and quantification of phenylbutazone in pharmaceutical products with errors lower than 1%.

Keywords: phenylbutazone, electrode, pharmaceutical

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OP. 7.22.

Capture of Pharmaceutical Substances in Metal Azolate Frameworks

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Abstract

The drug delivery system (DDS) in biomedical materials science is an extremely fascinating and dynamic sector in the healthcare industry. When it comes to delivering medications to the human body, one of the biggest challenges is finding safe materials that can efficiently transport drugs [1,2]. The large surface area, remarkable porosity, distinct chemical composition, adaptable size and form, and simple surface modification capabilities of metal-organic frameworks (MOFs) have made them interesting candidates for drug delivery[3,4]. While the MOFs built up with polycarboxylate-type ligands are the most studied materials for the capture, storage and release of pharmaceutical substances, the MOFs built up with azolyl-type ligands, also called metal azolate frameworks (MAFs), are very few in such studies. Therefore, the aim of the present work is to contribute to the development of the research direction towards the application of MAFs in drug delivery systems. As such, the synthesis, characterization and preliminary studies regarding the capture of some pharmaceutical substances in three microporous MAFs built up with Zn(II), Co(II) and Cu(II) ions, and a pyrazolyl-type ligand, are presented.

Keywords: metal azolate frameworks, pyrazolyl-type ligands, microporosity, drug capture

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OP. 7.23.

Zinc Oxide Nanoparticles Modified with Halogenosilanes

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Abstract

Surface modification of inorganic nanomaterials through functionalization with organic capping agents may be regarded as a very useful and hand-on strategy to avoid particle agglomeration, thus improving the current properties and even to design new ones [1]. In this context, we here report a simple and low-cost method for the preparation of semiconductor zinc oxide nanoparticles (ZnO NPs) by chemical precipitation, using the organosilane surface modifiers which bear chlorine, bromine and iodine atoms. Powder X-ray diffraction (PXRD), scanning electron microscopy with energy dispersive X-ray spectroscopy (SEM-EDX), transmission electron microscopy (TEM) and Fourier transform infrared spectroscopy (FTIR) were employed to morpho-structurally characterize the obtained halogenosilane-modified ZnO NPs. In fact, the size and shape varied, depending on the type of halogenosilane used for

surface modification. Thus, the unmodified ZnO NPs are larger and have a regular, predominantly spherical shape, while the ZnO NPs modified with halogenosilane species are smaller and have a diversified morphology, which suggests both an efficient surface modification and different nucleation and growth mechanisms. These morpho-structural features are considered crucial in view of applying them into potential biomedical applications, such as antitumor properties [2].

Keywords: zinc oxide nanoparticles, halogenosilanes, surface modification, size control

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OP. 7.24.

Electrochemical Sensors for Histamine Detection in Foods

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Abstract

The aim of this paper is to review recent advances in the detection of histamine, a nitrogenous organic compound of the biogenic amines class, which can be found in fermented foods such as cheese, wine, fish and meat products [1]. High levels of histamine can cause health problems such as hypotension, headaches, flushing, and, in severe cases, even death [2]. Therefore, its detection is extremely useful in the field of food safety. In practice, conventional methods for histamine detection (chromatography, fluorimetry, colorimetry) require expensive equipment, laborious sample preparation, and a highly specialized analyst [3]. To overcome the limitations of traditional methods, new methods for histamine analysis have been developed over time such as electrochemical sensors. Advances in science have shown that electrochemical methods using nanomaterial-based electrochemical sensors offer the desired sensibility, adaptability, efficiency and ease of operation in histamine detection. In this review, we discussed the detection of histamine using various electrochemical sensors, where the detection is mainly based on voltammetric methods. These methods show very high sensitivity in the detection of the target analyte, with detection limits in the micromolar and nanomolar range.

Keywords: histamine, electrochemical sensor, nanomaterial, food.

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OP. 7.25.

Assessment of the Compounds with Antioxidant Properties in Nutraceuticals Using Cyclic Voltammetry

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Abstract

Nutraceuticals are food supplements that contain biologically active molecules (antioxidants, phytochemicals and vitamins) with a nutritional and therapeutic role [1]. Over time, nutraceuticals have

been shown to prevent and treat several diseases such as cancer, cardiovascular diseases, neurological disorders, obesity management, diabetes, as well as for the proper functioning of the human body [2]. Therefore, the analysis of these substances is of great interest. The aim of this study was to analyze compounds with antioxidant properties from three dietary supplements used for stress management using graphene-based electrochemical sensors (GPH) by cyclic voltammetry. The results obtained are satisfactory, this demonstrates that GPH sensors are excellent devices for sensitive and selective determination of antioxidants in nutraceuticals. They are characterized by high sensitivity (LOD value in the micromolar to nanomolar range), selectivity, a wide linearity range and short analysis time.

Keywords: nutraceuticals, antioxidants, graphene-based electrochemical sensors, cyclic voltammetry.

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OP. 7.26.

Detection of Paracetamol Using Voltametric Techniques

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Abstract

Paracetamol (acetaminophen) is among the most widely used analgesic and antipyretic drug, requiring a growing need for reliable, rapid, and cost-effective detection methods across pharmaceutical, clinical, and environmental applications. Electrochemical methods, using commercial screen-printed electrodes (SPEs), glassy carbon and various modified electrodes emerged as a promising approach due to its portability and affordability [1], [2], [3]. This review explores recent developments in the electrochemical detection of paracetamol using commercial SPEs using voltametric techniques such as cyclic voltammetry, differential pulse voltammetry, and square wave voltammetry. The electrochemical behavior of paracetamol is discussed in relation to electrode type, surface modifications, and experimental parameters including pH and scan rate. The review discusses how different modifications can improve sensor performance and addresses key challenges like selectivity and analysis in complex samples. The poster offers a clear overview of current approaches and future directions in paracetamol detection using commercial SPEs.

Keywords: paracetamol, electrochemical methods, screen-printed electrodes, cyclic voltammetry

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OP.7.27.
Development of Electrochemical Methods for Determination of Phenolic Compounds

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Abstract

In a world with fast daily technological advances, the need to develop new methods for the determination of compounds of interest becomes a priority. The development of these methods is focused on low cost, high portability as well as ease of use [1]. Phenolic compounds occur naturally in plants as their secondary metabolites, consisting of flavonoid and non-flavonoid classes. Phenolic compounds are studied for their properties associated with flavor, color, fragrance, preservation as well as antioxidant properties and human health benefits. [2] Electrochemical methods offer attractive advantages, ranging from selectivity to high sensitivity, for the detection of phenolic compounds. [3] Some of these methods are cyclic voltammetry (CV), square wave voltammetry (SWV), differential pulse voltammetry (DPV), all being appropriate for the study of phenolic compounds because, as a chemical species, they are able to donate electrons acting as reducers [4]. The same techniques are capable of evaluating the antioxidant capacity, total natural antioxidant content, identification and quantification of important chemical compounds etc. [5].

Keywords: Phenolic compound, electrochemical method, cyclic voltammetry, antioxidant capacity

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OP.7.28.
Comparative Analysis of Chemical Profile and Biological Activity of Extracts from Leaves and Flowers of *Artemisia* spp.

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Abstract

Plants are widely recognized as sources of biologically active metabolites, such as antioxidant compounds. In this context, plants of the *Artemisia* species (family: Asteraceae) are attractive as potential sources of natural compounds that exhibit diverse bioactivities, such as antimalarial, anti-inflammatory, antiviral, antioxidant, antidiabetic, antimicrobial and cytotoxic [1-3]. To have an overview of the distribution, identification and quantification of phenolic compounds present in different aerial organs of three *Artemisia* species and to further elucidate the similarities and differences between their chemical constituents, chromatographic analysis and determination of their biological activity were pursued. Therefore, this study aimed to investigate, according to the methods in the specialized literature, three species of *Artemisia* in terms of their chemical composition (determination of total polyphenols and total flavonoids), antioxidant activity (DPPH, ABTS, TAC), enzymatic inhibition (α-amylase, β-glucosidase) and

anti-inflammatory activity (inhibition of thermal denaturation of HSA). The total polyphenol content of *Artemisia* extracts was correlated with the antioxidant potential and varied depending on the plant species, extraction solvent and analytical method used. The bioactive molecules identified in *Artemisia* extracts make them an attractive natural source for the development of pharmacological applications against prevalent diseases.

Keywords: *Artemisia*; plant extract; anti-inflammatory activity; antioxidant activity.

Acknowledgments: This work was partially supported by ADER grant 5.2.1. – *"Conservation and valorization of the genetic heritage of aromatic and medicinal species that can be cultivated on the territory of Romania"* and UDJG internal Grant *"Targeted therapeutic molecules, anti-inflammatory and antitumor, isolated from exotic plants acclimatized in Romania*", funding contract no. 7956/31.03.2025.

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OP.7.29.

Applications of Conventional and Green Methods in Synthesis of Aromatic *N*-heterocycles

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Abstract

The continued interest in heterocyclic chemistry is due to their remarkable applications. *N*-heterocyclic scaffolds are important in the process of drug design and development. These compounds are widely present in synthetic and natural products [1]. Many new *N*-heterocyclic derivatives with remarkable biological activity and extensive pharmaceutical applications are progressively developed. They are predominantly used as pharmaceuticals, agrochemicals or intermediates, finding applications as disinfectants, developers, dyes, antioxidant, neuroprotective and anticancer drugs. Since organic processes consume large amounts of solvents and metal catalysts, the use of less harmful solvents and catalytic conditions enhances the sustainability of these reactions [2]. Therefore, efficient classical synthetic protocols must adapt to modern requirements to address green and sustainable production. In this context, the present work reveals more environmentally friendly alternatives for direct access to *N*-heterocyclic derivatives. Environmentally friendly synthetic reactions for the synthesis of *N*-heterocyclic compounds proved to be of great utility in terms of yield, reaction time, costs and ecological conditions, compared to conventional reactions.

Keywords: N-heterocyclic compounds, conventional synthesis; green methods.

Acknowledgments: The authors would like to thank" Dunărea de Jos" University for technical support and project 593 Cobil Ro-Fr Nr. 8BMFR/10.09.2024, Programme „Hubert Curien- Brancusi"-„Multitarget 594 compounds for Alzheimer and cancer treatment", 2024-2025.

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OP.7.30.

Phytochemical study and pharmacological activities of methanolic extracts of Eclipta alba (L) Hassk. (Asteraceae) on the behavior of NMRI mice

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Abstract

Many plants of the Asteraceae family are used in the symptomatic treatment of several neuropsychiatric disorders. Among them is Eclipta alba (Linn.) Hassk, which is a plant of the Asteraceae family, also known as *Eclipta prostrata* well known in traditional medicine. In the present study, we evaluated the psychotropic and biological potency of *Eclipta alba* (L) Hassk extracts. An ethnobotanical survey was conducted using a structured questionnaire. Methanolic extraction using Soxhlet was performed after harvesting the whole plant. The extract was then used for spectrophotometric determination of total polyphenols and flavonoids. ABTS, DPPH, and FRAP methods evaluated antioxidant activities. Also, the determination of acute toxicity and psychotropic effect of the whole plant extract of *Eclipta alba* was done using standard methods. The results showed 22 diseases treated by *Eclipta alba*. Regarding the dosage of polyphenolic compounds, the methanolic extract of *Eclipta alba* (L) Hassk. allowed obtaining 18.85 ± 0.61 mg EAG/ 100 mg of extract and 6.38 ± 1.05 mg EQ / 100 mg of extract. The toxicity test of the methanolic extract of the whole plant of *Eclipta alba* in mice established an LD50 greater than 5000 mg/kg bw. Regarding the behavioral study, the methanolic extract of *Eclipta alba* shows antidepressant activity. This study showed that the extract of *E. alba* has a pharmacological effect and provides justification for its use in traditional medicine in Burkina Faso.

Keywords: *Eclipta alba* (L.) Hassk., traditional use, pharmacological capacity.

OP.7.31.

Radiobiology perspectives – past, present and future

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Abstract

Radiation therapy (RT) continues to be an important part of cancer management with approximately 50% of cancer patients needing radiotherapy at some point during the course of their disease. Physics and

biology are inextricably linked in daily practice of RT, and developments in both contribute to kill the tumors and to reduce the toxicity secondary normal tissue's irradiation. Radiobiology offers the knowledge on the biological effects of radiation and serves as a basis for radiotherapy and radiological protection. External radiotherapy (but not only) has provided most of the knowledge in radiobiology because it is the most used radiation therapy modality.
This presentation will provide the information regarding radiation chemistry, biochemistry, mutation and cancer induction, embryonic damage as well as the dependence of radiation response on radiation quality and temporal dose distribution (repair). Also, will be discussed physicochemical events, cellular and tissue effects, and the molecular mechanisms involved in radiation response.
Radiobiology offers the conceptual basis for radiotherapy, identifying mechanisms and processes that underlie the response of tumors and normal tissues to irradiation, helps in development of specific new approaches in radiotherapy and contributes on the choice of schedules for clinical radiotherapy.
Keywords: radiobiology, biological effects, molecular mechanism.

OP.7.32.

Green-synthesized gold-coated nanodiamonds as potential radiosensitizers for proton therapy

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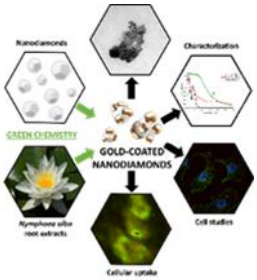
Abstract

Nanodiamonds (ND) possess unique properties, including high biocompatibility, tunable surface chemistry, and stable photoluminescence, that make them highly attractive for biomedical applications. In this study, we synthesized gold-coated nanodiamonds (NDAu) using a green chemistry route based on Nymphaea alba root extract as a natural reducing agent. The hybrids were produced from two types of ND with median diameters of 50 nm and 230 nm, which were subjected to different thermal treatments prior the gold coating to modulate their surface properties. The functionalized particles were comprehensively characterized using a combination of spectroscopic techniques (UV-Vis spectroscopy, ATR-FTIR spectroscopy, Raman spectroscopy, PIXE), Powder X-ray Diffraction (PXRD), electron microscopy (SEM and TEM), and zeta potential. These techniques evidenced the impact of the thermal treatments on the NDs, reported the influence of the plant extracts on the



final nanoparticles as well as confirmed and quantified the metallic gold presence in this material. Moreover, we carried out biological evaluation on A549 lung and PANC-1 pancreatic cancer cell lines to assess their cytotoxicity, cellular uptake, and impact on cell survival. Our results confirmed the efficacy of the gold-coating method, elucidating the modifications in particles structural, physical and chemical properties due to functionalization, and the interaction with cells. These nanoparticles could then be used for various biomedical applications, such as drug delivery or as potential radiosensitizers.

OP.7.33.
Phytochemistry and pharmacological properties of *Sida linifolia* fractions used in the treatment of diabetes in Togo

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Abstract

Diabetes is a disease characterized by chronic hyperglycaemia with acute and chronic complications. *Sida linifolia* is a plant traditionally used in Togo in the treatment of diabetes. Knowledge of the active compound composition of the plant would allow the development of new treatments for diabetes. The objective of this study was to conduct a phytochemical screening and evaluate the antihyperglycemic and antioxidant activity of Sida linifolia extract fractions. Fractionation was performed on the 80% hydroethanolic extract of the whole plant of Sida linifolia using solvents of increasing polarity. A phytochemical analysis was then performed on the fractions, as well as an evaluation of the in vitro oxidative activity and the effect on glucose absorption by rat muscle and jejunum. Phytochemistry revealed the presence of phenols, flavonoids, condensed tannins, sterols, triterpenes, and reducing sugars in the fractions. Phenol, flavonoid, and tannin contents were highest in the butanolic and aqueous fractions, which demonstrated the best in vitro antioxidant activity. The aqueous fraction had the best antihyperglycemic activity. The aqueous fraction reportedly contains the pharmacologically active compounds of the 80% hydroethanolic extract of the whole plant of Sida linifolia, used in the treatment of diabetes and its complications.

Keywords: fractionation, antihyperglycemic, traditional therapy, ex vivo

III. POSTERS

SECTION 3
PROGRESS IN FOOD SCIENCE AND BIO-RESOURCES ENGINEERING

PP.3.1.

Physicochemical characterization and optimization of the extraction of bioactive compounds of Teff using ultrasound-assisted method

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Abstract

In this study, the physicochemical properties of teff (*Eragrostis tef*) grains were analysed, whereas an optimization of the bioactive extraction via solid-liquid ultrasonic-assisted extraction method was applied in order to estimate the optimum parameters for polyphenolic compounds extraction. Different parameters were tested for optimisation, such as ethanol concentration 50%, 70%, and 90% (v/v), extraction time (30, 45, and 60 minutes), and temperature (30, 45, and 60 °C), by applying a Box-Behnken design for optimization. The optimization parameters were established as follow: 70% ethanol concentration, 45 minutes extraction time, and 45 °C temperature, leading to a total phenolic content (TPC) of 0.45 g gallic acid equivalents (GAE)/100 g. The moisture content was recorded at 12.67%, protein content at 7.24 g/100 g, lipid content at 2.56 g/100 g, and ash content at 2.24 g/100 g. The method yielded a substantial increase in antioxidant activities, with significant DPPH radical scavenging capacities observed under the optimized conditions. These results not only contribute to a comprehensive understanding of teff's nutritional profile but also highlight its potential applications as a functional ingredient in health-promoting food products.

Keywords: Teff (*Eragrostis tef*), antioxidant activities, physiochemical properties, optimize, phenolic

PP.3.2.

HPLC Profiling and Prebiotic Activity of Teff

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Abstract

This research focused on the high-performance liquid chromatography (HPLC) profiling of teff (*Eragrostis tef*) extracts obtained by solid-liquid ultrasound assisted extraction and the potential of to

enhance the metabolic activity of *Lactobacillus plantarum* by testing the its prebiotic activity.

The HPLC analysis exhibited a rich composition of phenolic compounds, with epigallocatechin identified as the most abundant at 2960.30 mg/g, followed by epicatechin at 113.55 mg/g and hesperidin at 163.64 mg/g. Additionally, the teff extract contained a high concentration of ferulic acid (41.79 mg/g).

The prebiotic activity of teff flour was evaluated by monitoring the growth of *Lactobacillus plantarum* in teff-based substrates over a 21-day period, where teff supported the proliferation of *L. plantarum*, demonstrating strong prebiotic potential. The bacterial counts (CFU/mL) indicated a significant increase from day 7th to day 14th in specific teff samples, confirming teff's ability to enhance gut microbiota. These results suggest that teff extract not only contributes essential bioactive compounds but also plays a pivotal role in promoting digestive health and overall well-being, positioning it as a valuable addition to functional foods aimed at enhancing gut health.

Keywords: teff, phenolic compounds, *L. plantarum*, prebiotic activity

PP.3.3.

Preliminary Studies on the Lactic Fermentation of Hemp Seeds

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Abstract

Novel lactic acid bacteria strains were isolated in pure cultures from various types of hemp seeds. These strains were morphologically characterized by evaluating colony characteristics (appearance, color) and microscopic features (staining affinity, shape, and size of the cells). As a result of the evaluations, four isolates belonging to the *Lactobacillus* genus were obtained. These were coded and criopreserved at temperature of -80°C, in 10% glycerol, in Collection microorganism the acronyum MIUG, to be tested in future research. Six fermentative media were formulated containing hemp seeds (*Cannabis sativa* L.) in different forms, whole, hulled, coarsely ground, flour, sprouted and at a ratio of 1:8 (g/g). The initial pH of the media was determined to be 6.50. The media were then sterilized at 121°C for 15 minutes. The sterilized media were inoculated with 2 % inoculum (DO_{600} of suspension of cells - 2.0) of *Lactobacillus plantarum* MIUG BL 21 strain. Fermentation was carried out under stationary conditions at temperature of 30°C for 48 hours.

The fermented products were analyzed for analysing the pH, acidity, antioxidant activity (using the DPPH method) and antimicrobial activity (both antibacterial and antifungal). The results indicated fermentative activity in all tested samples, associated with a decrease of pH and an increase of the acidity. The antioxidant and antimicrobial activities were influenced by the processing method of the hemp used as substrate. The best results were obtained in the sample containing ground hemp seeds (*Cannabis sativa* L.). This preliminary study suggests the potential use of *Cannabis sativa* L. hemp seeds as fermentation susbtrate for the development of products or ingredients with functional properties.

Keywords: hemp seeds; *Cannabis sativa* L.; lactic acid fermentation; *Lactobacillus plantarum* MIUG BL 21; bioactive properties.

PP.3.4.

Fermentation of hulled hemp seeds (*Cannabis sativa* L.) with kefir grains

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Abstract

The potential use of water and milk kefir grains for the fermentation of hulled hemp seeds (*Cannabis sativa* L.) was studied with the aim of obtaining ingredients with enhanced bioactive characteristics. The fermentation medium was prepared by mixing 10 g of hulled hemp seeds with 90 mL of tap water. The initial pH of the two fermentation media was determined to be 6.50 and 6.51, respectively. These values were considered suitable for the fermentation process, so no further adjustment was made. The samples were then sterilized by autoclaving at 121 °C for 15 minutes. The media were inoculated with 0.3% water kefir grains and milk kefir grains, respectively, and fermentation was carried out under stationary conditions at room temperature for 48 and 72 hours, respectively. During fermentation, pH and total titratable acidity were monitored. The results revealed significant differences between the samples depending on the starter culture used. Fermentation was faster when milk kefir grains were used, taking 48 hours, compared to 72 hours for the sample inoculated with water kefir grains. In both cases, the fermented products demonstrated functional potential (antioxidant activity, antimicrobial activity, prebiotic effect, and inhibition of certain metabolic enzymes). The study demonstrates the adaptability of kefir grains in the fermentation of hulled hemp seeds and the potential for diversifying products and ingredients with bioactive properties derived from hemp seeds.

Keywords: Hemp seeds (*Cannabis sativa* L.); fermentation; water kefir grains; milk kefir grains; functional products.

PP.3.5.

Physical, pomological, nutritional and phytochemical properties of some plum (*Prunus domestica* L.) cultivars grown in a collection orchard from South-West Romania

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Abstract

Geometrical and physical properties, moisture content, soluble solids content, titratable acidity, total phenolic content and DPPH radical scavenging activity were investigated in the fruits of six plum (*Prunus domestica* L.) cultivars ('Centenar', 'Minerva', 'Carpatin', 'Dobrowica', 'Čačanska Lepotica', and 'Mirabelle de Nancy') and two local plum selections ('Păscoaia' and 'Gogoșele Otăsău') grown in an experimental plum orchard collection established in 2016 in Orodel, Cornu village, Dolj county (South-Western Romania). In addition, phenolic compounds, organic acids and vitamin C contents were determined in fruit flesh and peel by high-performance liquid chromatography and the correlation between the measured values was investigated. Analysis of phenolic compounds indicated that chlorogenic acid and catechin hydrate were the predominant phenolic acid and flavonoid, respectively, in the flesh of most of the

investigated cultivars. Higher contents of phenolic compounds were found in the peel, where the phenolic profile was dominated by vanillic and chlorogenic acids among phenolic acids and by rutin among flavonoids. In the peel, the highest total phenolic content was measured in the peel of 'Centenar' cultivar (575.64 mg GAE/100 g fw) followed by 'Čačanska Lepotica' (536.55 mg GAE/100 g fw), while the flesh of 'Mirabelle de Nancy' (218.36 mg GAE/100 g) and 'Gogoşele Otăsău' (152.02 mg GAE/100 g) cultivars were the richest in phenolic compounds and antioxidant activity. A significant ($p < 0.05$) and positive correlation was found between DPPH radical scavenging activity and total phenolic content both in flesh and peel of the plum cultivars.

Keywords: plum cultivars, local selections, flesh, peel, phenolic acids, flavonoids, organic acids, antioxidant activity

PP.3.6.

Antioxidant activity and bioactive compounds in carrot pomace extracts obtained through various extraction methods

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Abstract

Carrot pomace, a by-product of carrot (*Daucus carota* L.) juice production, serves as a rich source of valuable phytochemicals, such as carotenoids, polyphenols, and dietary fibers. This study presents a comparative analysis of various extraction methods aimed at optimizing the recovery of bioactive compounds. Conventional techniques, including solvent extraction, were compared to advanced methods like ultrasound-assisted extraction (UAE). The solvents used in this study were a hexane: acetone mixture (3:1, *v/v*) and 70% ethanol, with extraction times set at 30 and 60 minutes. Key analyses, including the determination of bioactive compound content (total carotenoids, flavonoids, and total phenolics) and antioxidant activity, were performed spectrophotometrically.

Results show that UAE significantly outperforms traditional methods in terms of phytochemical extraction efficiency. The highest yield of total carotenoids was achieved using UAE with a hexane:acetone 3:1 mixture at 30 minutes at a temperature of 40 °C and 40 kHz, yielding approximately 35.72±1.21 mg/100g dw. The study concludes that the ultrasound-assisted extraction of phenolic compounds from carrot pomace is an efficient method with potential for industrial use, providing a sustainable approach for extracting natural antioxidants.

The findings highlight the value of selecting optimal extraction methods for enhancing the phytochemical yield from carrot pomace, fostering waste valorization in food processing, and expanding the use of carrot pomace in functional food and nutraceutical industries.

Keywords: carrot pomace; carotenoids; phenolic compounds; solvent extraction, phytochemicals.

PP.3.7.

Exploring the Nutritional Enhancement Potential of Carrot By-Products in Food Formulations

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Abstract

Carrots (*Daucus carota* L.), a commonly consumed root vegetable, are noted for their substantial levels of antioxidants, vitamins, and dietary fiber. The food industry is increasingly exploring the incorporation of carrot by-products into various food items to enhance their nutritional value and appeal. This study examines the possibilities of employing carrot by-products, particularly carrot pomace, to improve the nutritional composition of food compositions. Carrot pomace, a prevalent by-product of juice manufacturing, comprises substantial quantities of bioactive components, including carotenoids, polyphenols, and dietary fibers, recognized for their health advantages. The research examines the integration of carrot pomace powder into diverse food matrices (muffins, fondant, macarons, and cheeses) to assess its effects on nutritional composition, color attributes, and sensory qualities. The highest concentrations of carrot extract of total carotenoids (34.81±1.19 g/100g), β-carotene (30.76±0.57 g/100g), and lycopene (5.95±0.21 g/100g) were obtained when extracted with hexane:acetone/ (3:1). The findings demonstrated that including carrot pomace powder raised both the antioxidant capacity and the fiber content, as well as the profiles of bioactive compounds in the food compositions. Sensory assessments indicated favourable consumer approval of the supplemented food products. The results highlight the potential of carrot by-products as a sustainable supply of bioactive chemicals, presenting a viable strategy for minimizing food waste and enhancing the nutritional content of processed foods.

Keywords: carrot pomace; carotenoids; phytochemicals, food formulations; nutritional enhancement.

PP.3.8.

Valorization of red grape pomace inoculated with lactic acid bacteria by drying: evidences on phytochemicals profile

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Abstract

Due to the need of becoming more sustainable, a new trend among almost all production industries is increasingly growing, mainly to reuse the resulting by-products as raw materials for other processes and products. In winery, the main by-products is grape pomace (GP), obtained in huge solid waste produced in extensive amounts during the juice and wine making process. The main objective of this study was to obtain a GP dried powder, inoculated with 9.1 log CFU/mL of *L. casei* 431® with enhanced phytochemical profile and cells viability. The results showed that the fresh red GP showed a TPC of 2.81±0.14 GAE mg/g DW, wheareas when drying, different TPC were found in CA (12.88±0.31 mg GAE/g DW and IR (16.46±1.28 mg GAE/g DW) samples, respectively. The content of flavonoids increased from fresh GP (2.93±0.47 mg CE/g

DW) to 6.08±1.36 mg CE/g DW and 9.03±0.48 mg CE/g DW for CD and IR drying, respectively. TAC increased also, from 73.78±4.76 mg C3G/g DW to 154.17±29.15 mg C3G/g DW and 388.71±5.40 mg C3G/g DW for CD and IR drying, respectively. Further studies are currently developed to establish physico-chemical properties, the bioaccesibility of lactic acid bacteria, polyphenols, flavonoids, anthocyanins and antioxidant activity *in vitro*.

Keywords: red grape pomace; drying; phytochemical profile; polyphenols.

PP.3.9.

Alternative extraction solvents for a more pronounced protective effect of polyphenols in red grape pomace extracts: a comparative study

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Abstract

Currently, awareness within both the industrial sector and among consumers regarding the negative environmental and economic impacts of food loss and waste has significantly increased, as a result of the consequences triggered by climate change and the growing scarcity of natural resources. Thus, the efficient implementation of a sustainable model for by-products valorization, such as red grape pomace (RGP), can contribute to achieving key objectives including sustainability, efficient resource management, extraction of bioactive compounds, development of high value-added products, economic growth, and environmental protection. The present study aims to optimize the ultrasound-assisted green extraction and compare the efficiency of polyphenolic compounds from red grape pomace from *Feteasca Neagră* and *Merlot* varieties using a natural deep eutectic solvent (NaDES), obtained from choline chloride, lactic acid and water (1:2:1), compared to a conventional solvent (ethanol). By applying the Response Surface Methodology (RSM) with a Central Composite Design (CCD), the effects of three independent variables: temperature (°C), time (min) and solvent (ethane/water, % or NaDES volume, mL) on the following response variables were analyzed: total anthocyanin content (TAC), total polyphenol content (TPC), total flavonoid content (TFC) and antioxidant activity (DPPH).

Analysis of the perturbation plots for TAC indicated that this variable was most sensitive to the solvent factor in both extraction methods. According to the 2D contour plots for the second-order model applied to conventional extraction, the maximum TPC yield was obtained at 70% ethanol and an extraction time of 22.5 min, with a predicted value of 461.82 mg EAG/100 g DW. Beyond this point, a decrease in compound concentration was observed due to degradation caused by the high alcohol concentration and prolonged extraction time. For extraction with NaDES, the maximum predicted TPC value according to the 2D contour plots was 451.01 mg EAG/100 g DW, achieved using 10 mL of solvent and an extraction time of 60 min. The high viscosity of the NaDES composition appears to have provided enhanced thermal protection for these compounds compared to conventional extraction. In this study, the two solvents exhibited distinct behaviors in the extraction of bioactive compounds, attributed to the specific characteristics of their composition. Identifying optimal extraction conditions enables the recovery of extracts rich in stable polyphenolic compounds, which may subsequently be employed in future assessments of bioaccessibility as well as anti-diabetic and anti-obesity properties.

This work was supported by a grant of the **Ministry of Research, Innovation and Digitization, CNCS-UEFISCDI, project number PN-IV-P1-PCE-2023-0129, within PNCDI IV.**

Keywords: extraction, polyphenols, valorization, sustainability, NaDES

PP.3.10.

Comparison of Conventional and Emerging Techniques for the Extraction of Bioactive Compounds from Rosemary

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Abstract

Rosemary (*Rosmarinus officinalis L*) is a perennial plant which belongs to the Laminaceae family. Rosemary is widely used in medicine to treat different dysfunctions and disorders, such as: memory related disorders, hypertension, insomnia, headache and respiratory problems. Rosemary therapeutic effects have been associated with its phytochemical constituents, such as phenolic acids, flavonoids and terpenoids. The present study aimed to compare the enzyme assisted extraction with the conventional method based on the use of alcoholic solutions for the extraction of the biologically active compounds from rosemary. Moreover, the phytochemical profile and antioxidant properties of the extracts from rosemary leaves and stems were considered in the study. In case of the conventional method, the results of the extraction dynamics revealed that the highest recovery of the total phenolic content is achieved after 3 h of incubation at 50°C. Extending the extraction time up to 24 h, resulted in no significant increase of the DPPH and ABTS radicals scavenging activity. Slightly lower extraction yields of the bioactive compounds were registered in case of using a mixture of cellulases and hemicellulases for breaking the vegetal cell walls of both rosemary leaves and stems. The highest antioxidant activity was observed in case of the extracts collected after 3 h of enzyme assisted hydrolysis. The studies regarding rosemary phytochemical profile are quite limited, and they are mostly focused on the alcoholic extracts. The emerging extraction method proposed in the present study allowed avoiding the used of organic solvents for the extraction of the bioactive compounds while being rather efficient and time effective.

Keywords: phenolic compounds, antioxidant activity, aromatics herbs.

PP.3.11.

Study upon the influence low sodium environment on quality characteristics of pickled unripe tomatoes during storage

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Abstract

Pickled unripe tomatoes represent a part of the Romanian culinary heritage. Traditionally, they are manufactured during autumn, with the purpose to be stored throughout the winter. This is the main reason for the use of natrium chloride as a preservative. On the other hand, in the latest decades, sodium consumption has been related to a high risk of cardiovascular diseases. Thus, as a strategy of lowering sodium intake, the possibility to replace it with other salts was investigated. The aim of the present work was to assess the influence of sodium chloride replacing with magnesium or potassium chlorides on the quality characteristics of pickled unripe tomatoes, during storage.

Preliminary studies reveled that in fermented pickles manufacturing, the fermentation process ends in about 28 days, the next interval being considered storage of the vegetables in fermented state. Therefore physico-chemical characteristics (dry matter, lactic acid content), lactic bacteria number, texture and color parameters were determined at 28, 56, 94 and 120 days after the initiation of the fermentation process. For

the dry matter an increase with 19.95…44.48% was noticed, as a result of the mass transfer between the solution and the vegetal material. The lactic acid concentration decreased for all the samples, with a maximum of 51.17% for the tomatoes fermented with $MgCl_2$, due to its consumption by the lactic bacteria. Similar reduction was noticed for the lactic bacteria count. From textural point of view, despite the previous decrease in firmness during fermentation process, no significant variations were noticed during storage. The lowest values of firmness were determined for the KCl samples (3.20±0.39...3.97±0.55N), while the highest values were noticed for the $MgCl_2$ samples (4.55±0.61... 4.66±0.38N). Studies presented in literature explain the highest values of firmness in magnesium samples as a result of the interactions between the carboxyl groups in pectin which are facilitated by this ion. As in the case of texture parameters, the color parameters did not significantly vary during storage. The main conclusion of the study is that the magnesium and potassium chlorides could successfully replace the sodium chloride in pickles storage.

Keywords: fermentation, unripe tomatoes, low sodium environment, storage

PP.3.12.

Coaxial Electrospinning Applications for Obtaining PLA Fibers with Microencapsulated Thyme Essential Oil: - a Method to Develop Active Composite Materials

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Abstract

This study explores the development of a bioactive composite material with potential antimicrobial activity for food in an effort to support the transition toward sustainable and functional food packaging. Coaxial electrospinning was used to encapsulate thyme essential oil, known in nature for its antimicrobial activity, within polylactic acid (PLA)-based nanofibers. The electrospun fibers were deposited onto the film of whey protein isolate (WPI) and chitosan obtained by casting, while crosslinking between the composite layers was promoted through 1% citric acid solution spraying onto the film surface prior to fiber deposition. The multilayer composite, thus formed, offer mechanical protection to food while allowing for controlled release of active compounds through diffusion. These preliminary studies involved the evaluation of the mechanical properties including tensile strength, elongation at break, and elastic modulus to assess the influence of the active fiber layer on the structural integrity of the WPI-chitosan film.

The approach considers the potential of using biopolymers and essential oils combined through advanced structuring techniques for producing new bio-based antimicrobial packaging materials applicable as food contact materials. This study furthers aims to develop sustainable eco-friendly packaging systems able to extend shelf life of the food while reducing environmental impact.

Keywords: biopolymers, coaxial electrospinning, antimicrobial packaging, thyme essential oil, PLA, WPI, chitosan, multilayer materials

PP.3.13.

Assessment of OCP and PCB contamination transfer from Black Sea aquatic environments to fish

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Abstract

Organochlorine pesticides and polychlorinated biphenyls have been banned by the Stockholm Convention. Due to their toxic, persistent, bioaccumulative and toxic properties, their presence is felt in the marine environment. During 2021-2023, water, sediments and a commercially important fish species, the turbot, were sampled from the Romanian Black Sea coast. The OCPs and PCBs concentrations obtained in water, sediment and turbot were compared with the maximum permissible limits and threshold values existing in the legislation. The aim of this work is to assess the transfer of OCP and PCB contaminants from the marine environment to fish, highlighting exceedances of the threshold values existing in the legislation from the point of view of the ecological status of the environment and for human consumption.

Keywords: organochlorine pesticides, polychlorinated biphenyls, turbot, Black Sea, sediments, seawater

PP.3.14.

Influence of heat treatment on the stability of biological active compounds recovered from purple carrot peels

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Abstract

In the food industry vegetables and fruits can be consumed either fresh or thermally prepared, in this way increasing the stability of the foods that contain them. Some studies attest that the advantages of applying thermal treatment are related to the improvement of the color, texture and the increase of the microbiological stability.

The objective of the current experimental study was to evaluate the influence of temperature on the biological compounds (total monomeric anthocyanins, total flavonoids, total polyphenols and antioxidant activity) from purple carrot peels extracted by the ultrasonically assisted solvent method. The total anthocyanins content revealed a decrease of 20% after 20 minutes of treatment at temperature of 80°C, while after the same time of treatment at temperature of 160°C the decrease was higher (75%). Our study shows that the content of total flavonoids decreased by 50% after 20 minutes of heat treatment at 40°C, and at 140°C the decrease was at 45%. Otherwise, polyphenols suffered a smaller decrease, by 12% at the heat treatment of 120°C, after which, at 160°C, their content increased by 75% compared to the control. The antioxidant activity decreased in the range of 40-120°C by approximately 50%, and in the range of 140-160°C, it increased to 102% compared to the control. The biological active chemicals are significantly impacted by the thermal treatment methods utilized in the food business, which also have a significant impact on their bioavailability and bioactivities.

Keywords: purple carrot peels, biological active compounds, heat treatment

PP.3.15.

Biodegradable mulch films: economic and environmental advantages

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Abstract

Mulching films are increasingly used around the world due to their numerous benefits for vegetable crops. These include reducing evaporation and conserving soil moisture, suppressing weeds and their seeds, accelerating seed germination, regulating soil temperature, and retaining heat to support young plant growth. Additionally, they help minimize fertilizer usage by accelerating humus formation, limit soil erosion and degradation, create a balanced soil environment through a protective barrier, reduce gas exchange with the atmosphere, and ultimately enhance crop quality. However, most mulch film manufacturers have primarily focused on producing non-biodegradable, petroleum-based options such as polyethylene (PE), polypropylene (PP), polyvinyl chloride (PVC), ethylene vinyl acetate (EVA), polymethyl methacrylate (PMMA), and polycarbonate (PC). These materials have caused widespread ecological issues. A major concern arises at the end of their lifecycle, as these films are often improperly disposed of, creating environmental pollution and occupying valuable storage space. To address these environmental concerns, attention is shifting toward the development and adoption of biodegradable mulch films based on biopolymers. These eco-friendly alternatives offer a promising solution to the negative impact of synthetic polymers. Given the many agronomic benefits of mulching films, this paper aims to emphasize both the economic and environmental advantages of replacing traditional mulch films with biodegradable ones in vegetable production systems.

Keywords: biodegradable mulch film, environmental protection, economic advantages

PP.3.16 .

Food-educated preschoolers of today, healthy eaters of tomorrow

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Abstract

Analyses of data from around the world show that the prevalence of obesity and overweight in children and adolescents has risen. The predictions for the future are not encouraging, with some global estimates suggesting that 660 million children aged 5–19 years will be overweight or obese by 2030. Overweight and obesity are risk factors for diabetes, cardiovascular diseases, certain forms of cancer, joint problems, sleep apnea, and social and psychological problems. Preschool age is essential for the development of eating and life skills. From the perspective of physical development, this is the period in which the child accumulates bone and muscle capital, grows, on average, 5–6 cm per year, develops teeth, and gains strength and mobility. Nutritional needs due to growth are high, while the child's stomach is still small. At this age, the child needs concentrated but nutritionally balanced foods rich in minerals and vitamins. In Romania, there are sporadic official data on the dietary intake of preschoolers. Although nutritional guides have been developed, they are not sufficiently popularized and are not accessible to parents in terms of information and language. Parents, family, teachers, doctors, and the community have to guide children towards a healthy lifestyle. Since general eating habits are formed in the first years of life, adults must encourage children to eat nutritious foods and be an example.

Keywords: preschoolers, obesity, food education.

PP.3.17.

The Benefits of Finning Agents in Producing Quality White Wines

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Abstract

Sarba is a Romanian variety of white grapes obtained at the Research-Development Station for Viticulture and Winery Odobești by crossing two very valuable varieties: Tâmăioasă Românească and Italian Riesling. The purpose of this study was to highlight the effectiveness of the treatment with the fish-based fining agent for clarifying the young white wines (Șarba variety). Experiments were carried out on Șarba wines produced in Odobești vineyard, Vrancea county, in the climatic conditions of 2023, using the classical technology. The wine samples were aged on the yeast sediment for a period of 4 months and then clarified by treatment with fish-based fining agent (1 g/hl), treatment with milk casein at a dose of 25 g/hl and treatment with egg albumin using a dose of 3 g/hl. Each variant (including the control) was treated with 20 g/hl bentonite product. To highlight the effectiveness of the treatment, the turbidity of the wine was measured using the turbidimeter and the value of the colour intensity of the wine measured by the value of the optical density at wavelength λ = 420 nm. The efficiency of the white wine treatment with Ichtyocolle is observed for the sample treated with Ichtyocolle compared to the variants treated with milk casein and egg albumin. The tendency of white wine to browning is very low in the sample treated with fish-based fining agent at a dose of 1 g/hl and by 20 g/hl bentonite, compared to the control sample and the variant treated with egg white, but being very close to the casein-treated variant which is recognized for its superior ability to protect white wines against oxidation.

Keywords: white wines; finning agents, turbidity, browning.

PP.3.18.

Ulva lactuca Supplementation in Common Carp Diets: A Study of Growth Response in RAS with Varying Hydraulic Conditions

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Abstract

In recent years, recirculating aquaculture systems (RAS) have gained significant atraction due to their reduced environmental impact and enhanced control over water quality and production parameters. However, maintaining high stocking densities in RAS poses significant challenges to fish health, primarily due to stress associated with crowding and the concomitant decline in water quality. In the past decade algae have garnered attention as potential dietary additives in aquaculture, owing to their bioactive composition, with the aim of mitigating the adverse effects of stress on fish. This study aimed to evaluate the effects of a green algae *Ulva lactuca* extract—obtained through supercritical CO_2 extraction—on the growth performance of common carp (*Cyprinus carpio*) reared in RAS under three different water regimes:

high water quality maintained by practicing an exchange rate of 7.5 l/kg/day (ER1), medium water quality where the exchange rate was 3.75 l/kg/day (ER2), and poor water quality where the exchange rate was as low as 2.5 l/kg/day (ER3). Over a 50-day trial, fish were fed three types of diets: a control diet (C), and two experimental diets supplemented with 50 mg/kg^{-1} (EU50) and 100 mg/kg^{-1} (EU100) of algae extract. Key water quality parameters (nitrate, nitrite, ammonia, pH, oxygen and temperature) were continuously monitored throughout the study.

The results demonstrated a general improvement in growth performance in all groups receiving the extract, with significant differences depending on the water exchange rate and the concentration of the supplement. These findings highlight the potential of *Ulva lactuca* extract as a functional feed additive in promoting sustainable aquaculture practices.

Keywords: feed additive, growth performance, waste accumulation

PP.3.19.

Assessing Wine Quality and Authenticity: Enzymatic Measurement of Citric Acid Levels

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Abstract

Citric acid is a monohydroxy tricarboxylic acid, and is naturally present in wine, must, and grapes. Only a tiny portion of it is also created in the leaves; the majority is formed in the vine's roots, from where it moves into the grapes. Compared to tartaric and malic acids, citric acid accumulates in grapes in smaller amounts (0.1–0.8 g/L). The highest concentration of citric acid, which can occasionally surpass 1.5 g/L, is seen in botrytized grapes. The grapes' citric acid concentration either stays constant or slightly rises during the ripening process. For this reason, is regarded as the wine's most stable acid. These days, adding citric acid to the wines with lower acidity is considered as a remedy by OIV, but the final concentration should not exceed 1 g/L. This study's primary goal was to develop an enzymatic technique for measuring citric acid in wines that might detect potential frauds in the wine samples that were gathered. A particular enzyme called citrate lyase (CL) catalyzed a reaction that converted citric acid (citrate) into oxaloacetate and acetate (the basis of the enzymatic technique). Comparing the results to the traditional method of determining citric acid, which is based on the reaction of acetic anhydride in a basic solution to generate a product whose maximum absorbance was measured at 363 nm. Following analysis of 27 wine samples (white, red, and rose), the findings showed that there was less than 1% variation between the citric acid values determined by the two methods. The citric acid concentration of only two wine samples exceeded the suggested limit of 1 g/L.

Keywords: citric acids, wine authentication, enzymatic method.

PP.3.20.

Integrating the spirulina biomass and wild consortia of microorganisms from artisanal cultures to obtain metabiotic ingredients for aquaculture

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Abstract

Nutrients play a crucial role in fish growth, reproduction, and health by supplying energy and essential substances for growth and the immune system. Macronutrients (proteins, fats, and carbohydrates) support metabolism, tissue repair, and energy production, while micronutrients (minerals and vitamins) regulate metabolic processes and enhance immunity. Proteins are key for growth, and fats provide essential fatty acids (omega-3, omega-6), vitamins, and minerals, such as calcium, iron, zinc, and bioactive compounds (peptides, short-chain fatty acids, polyphenols, etc.) that promote overall health and quality in aquatic environments [1]. A balanced diet tailored to the species and environment is essential for the fish's optimal development and safety. Combining biotic-rich sources like spirulina biomass and wild microorganisms from starter cultures, such as kombucha membranes (SCOBY) and kefir grains, could lead to the production of new metabolites known as postbiotics. SCOBY membranes and kefir grains are natural sources of probiotics (bacteria and yeasts) that metabolize spirulin biomass to obtain a complex of metabiotics (pre-, pro-, and postbiotics). This complex can help enhance the health of fish and crustaceans by providing protection against pathogens and stimulating their immune systems. These probiotics and their postbiotics can improve food digestibility and promote faster growth in aquatic organisms [2-3]. Specific substrates for artisanal culture fermentation are tea, herbal infusions, animal and plant milk, whey, water, fruit, and vegetable juices. Testing other unconventional substrates can enhance the functional properties of fermented products. These substrates can offer significant benefits. *In vivo*, they can boost fish immunity, increase survival rates, and optimize digestion. *In vitro*, they can reduce pathogens and improve water quality through antimicrobial properties, contributing to a balanced microbiome in aquatic ecosystems [4]. The biomass of spirulina microalgae is a valuable source of essential nutrients, including proteins, lipids, vitamins, and minerals. It can be used as a dietary supplement for aquatic organisms, improving the food-to-body conversion rate and reducing the risks associated with infectious diseases.

Microalgae can also enhance water quality by lowering excessive nutrient concentrations (nitrogen and phosphorus) through photosynthesis. Therefore, there are valuable opportunities to supplement conventional fermentation media with dried spirulina biomass and fermentation by artisanal starter cultures to obtain innovative functional ingredients with metabiotic characteristics. These ingredients could then be incorporated into fish feed formulations, enhancing the life quality and safety assurance in the aquatic environments.

Keywords: wild microbial consortia, spirulina biomass, fermentation, metabiotic ingredients

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PP.3.21.

The Impact of Neurotoxic Compounds on the Nervous System of Zebrafish

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Abstract

Aquatic pollution with neurotoxic compounds poses a major threat to aquatic ecosystems, significantly impacting the health of aquatic organisms, particularly fish. This article examines the effects of such pollutants on the nervous system of zebrafish (*Danio rerio*), a species widely used in toxicology studies due to its small size, short life cycle, ease of genetic manipulation, rapid reproduction, and notable genomic similarities with humans. In recent years, this animal model has attracted increasing attention from researchers. Consequently, the neurotoxic effects of various pollutants—such as heavy metals, pesticides, pharmaceuticals, microplastics, and other emerging contaminants—have been extensively investigated. These compounds can impair neuronal development, neurotransmission, the function of the hypothalamic–pituitary–adrenal axis, as well as motor activity, feeding, and reproductive behaviors in fish. The aim is to enhance water monitoring and strengthen regulations concerning the release of toxic substances into the environment, ultimately reducing their impact on aquatic ecosystems.

Keywords: neurotoxicity, zebrafish, aquatic pollution, pharmaceutical contaminants, heavy metals, pesticides, microplastics, neurodevelopment, behavioral toxicity, ecotoxicology.

PP.3.22.

Effects of Extraction Parameters on Ultrasound-Assisted Recovery of Carotenoids from Pumpkin Peels

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Abstract

Pumpkins (*Cucurbita máxima* L.) are widely cultivated across Europe, grown extensively and consumed all over the globe, and hold significant value as a vegetable crop. Pumpkin peels, a by-product of pumpkin processing, are rich in bioactive compounds, including carotenes, phenols, vitamins, terpenes, flavonoids, and plant steroids, offering various health benefits. These pigments not only enhance the visual appeal of food but also provide nutritional advantages. This study focuses on optimizing carotenoid extraction from pumpkin peels using ultrasound-assisted extraction. A central composite design with three independent variables—solvent ratio (0.23–50.23 v/v), incubation temperature (6–99 °C), and incubation time (14–129 min)—resulted in carotenoid yields ranging from 53.01 to 106.01 mg/100g dry weight. The model's regression analysis, with an F-value of 705.14 and p-value < 0.0001, accurately described carotenoid extraction. Optimal conditions for maximum extraction were identified as a solvent ratio of 10 mL, an incubation temperature of 80 °C, and an incubation time of 100 minutes, yielding 97.01 mg/100g DW of carotenoids.

Keywords: carotenoids, ultrasound-assisted extraction, pumpkin peel, central composite design, food pigments, extraction optimization

PP.3.23.

Kinetics of convective air and infrared drying of apple snacks infused in *Hibiscus sabdariffa* extract

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Abstract

In this study, apple (*Malus domestica* variety) were sliced and infused in aqueous *Hibiscus sabdariffa* extract, then dried by hot air convection (CD) and infrared (IR) to obtain highly functional snacks. The infusion time was 30 min, followed by drying at temperatures varying between 50°C to 70°C. In order to study the kinetics of drying data were analyzed based on higher value of R^2 and lower *SSR* values and fitted to the Page model. The effective moisture diffusivity were higher for infused samples. For drying methods, the increase of temperatures resulted in reduction of the drying times, leading to a continuously decreases of moisture ratio values, as a function of drying time. It was observed that the drying time varied between 180 and 390 min for CD and between 150 and 330 min for IR. Compared to CD, the dehydration time of the IR drying was with about 25% lower when compared with control and with approximately 17% for the hibiscus extract infused samples. Two distinct drying periods were observed, the first one known as warming-up stage, when the drying rates reached the maximum values after 30 min (0.007 – 0.0115 g water/g DW for CD and 0.0048 – 0.0092 g water/g DW for IR drying). The second one period was characterised by significantly low drying rate. The Page model has the best match for all drying temperatures and methods, with the highest R2 values varying from 0.990 to 0.996 and the lowest SSR values varying from 0.0037 to 0.149.

Keywords: apple; drying; hibiscus; mathematical models.

PP.3.24.

Evolution of physico-chemical parameters during the ripening of Fetească regală grapes in the Dealu Bujorului vineyard

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Abstract

Determining the optimal harvest time is essential for obtaining quality wines. In the case of the Fetească Regală variety, the balance between sugar content, total acidity and berry weight defines the technological maturity of the grapes and directly influences the final quality of the wine. The present study aim was to monitorize the evolution of these parameters for the fetească regală grapes variety during the period 2021–2023, in the Dealu Bujorului vineyard. Samples were taken from 200 marked vine plants, and one berry was selected from each to form a representative sample. Analyzes were performed every 5 days, using laboratory press, refractometer and chemical titration. he results shown that full maturity was reached around the date of 10th September, with average values of 196 g/L sugar, 7.5 g/L acidity and 159 g/100 berries in 2021. At harvest of Fetească Regală grapes in 2021 the values were 215 g/L sugar, 6.0 g/L

acidity and 157 g/100 berries. During the three years, the sugar content at harvest varied between 204–218 g/L and the acidity between 4.4–6.2 g/L H_2SO_4. The mass of 100 grains fluctuated between 132–161 g, with the highest values in 2022 vintage. These observations confirm the influence of climatic conditions on the dynamic of ripening and underline the importance of physico-chemical parameters monitoring for establishing the ideal harvest time.

Keywords: white grapes; sugar content; acidity; ripening.

PP.3.25.

Use of a natural deep eutectic solvent (NaDES) for the development and optimization of ultrasound-assisted green extraction of polyphenolic compounds from red and white grape pomace

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Abstract

The oenological sector aims to align its activities with the principles of the circular economy. One of the primary objectives is the valorization of by-products generated during the technological process of grape processing. Grape pomace is one of the plant matrices often used in research due to its phytochemical composition. Various specialized studies focus on identifying the most efficient solvent and optimal extraction conditions in achieve maximum yield of polyphenolic compounds (PC). However, many conventional methods are used on toxic organic solvents and are time- and cost- consuming. Thus, ultrasound-assisted solid-liquid extraction, in combination with the use of a natural eutectic deep solvent (NaDES), can lead to the achievement of important goals: the use of a fast and economical extraction technique, and the use of an eco-friendly solvent. In this work, the efficiency of a solvent obtained from choline chloride, lactic acid and water, in molar ratio 1:2:1, was tested for the extraction of polyphenolic compounds (PC) from red grape pomace (RGP) from *Merlot* and *Feteasc*ă *Neagr*ă varieties, respectively white grape pomace (WGP) from *Feteasc*ă *Alb*ă variety. A Two-Levels Full Factorial Design with three replicates was applied to study the impact of three factors: temperature (40 and 60°C, respectively), extraction time (30 and 60 minutes, respectively) and solvent volume (10 and 20 mL, respectively). The Pearson correlation coefficient (r) indicates the existence of a positive or negative linear correlation between two variables. At a 95% confidence level, a high and very high negative linear correlation was observed between the solvent volume and the response variables, confirmed by the r values obtained: for total anthocyanin content (TAC), r=-0.818, for total polyphenol content (TPC), r=-0.656, for total flavonoid content (TFC), r=-0.819, and for antioxidant activity (DPPH), r=-0.819. These results were further confirmed by Pareto chart and regression equations obtained for both types of grape pomace. This effect may be explained to the fact that in a smaller volume of solvent allow obtaining an extract rich in polyphenolic compounds. The optimal conditions for extracting PC from RGP, identified by maximizing the TAC, TPC TFC and DPPH responses was 60°C, 60 min and a solvent volume of 10 mL, with a desirability value of 0.997. For WGP, the best solution was 60°C, 30 minutes and a NaDES volume of 10 mL, with a desirability value of 0.991. In conclusion, NaDES can be considered a viable, efficient and sustainable alternative for the green extraction of polyphenolic compounds from grape pomace, due to its high efficiency and low volume requirement.

This work was supported by a grant of the **Ministry of Research, Innovation and Digitization, CNCS-UEFISCDI, project number PN-IV-P1-PCE-2023-0129, within PNCDI IV.**

Keywords: green, NaDES, grape pomace, Full Factorial Design, polyphenols

SECTION 4
ADVANCES IN ENGINEERING AND MANAGEMENT IN AGRICULTURE AND RURAL DEVELOPMENT

PP. 4.1
Rural Development in Romania's South-East Region through Skilled Workforce Financing Scenarios

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Abstract

The paper explores rural development opportunities in Romania's South-East Region by examining financing scenarios for training a skilled workforce. The authors propose a methodological framework that enables both regional generalization and local contextualization, thereby increasing the transferability of the findings. Emphasis is placed on the coordinated sequence of interventions—from funding and vocational training to economic stability—required to stimulate long-term development in rural areas. Through data analysis and projections of training program impacts for the period 2024–2030, the study highlights the importance of aligning public funding with the real needs of rural communities. The conclusions underline that sustainable rural development depends on institutional cooperation, the active involvement of local actors, and efficient use of resources provided by the National Recovery and Resilience Plan (NRRP) and other public funding mechanisms.

Keywords: rural development, skilled workforce, South-East Romania, financing scenarios, National Recovery and Resilience Plan (NRRP)

PP. 4.2
Fish Farming in the Moldova Region of Romania: Challenges and Opportunities in the Current Context

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Abstract

Fish farming in the Moldova region of Romania has experienced significant transformations in recent decades, influenced by environmental changes, economic fluctuations, and evolving regulatory frameworks. This study analyzes the current state of aquaculture activities in the region, focusing on production systems, species cultivated, water resource management, and the socio-economic role of fish farms in rural communities. Particular attention is given to the challenges faced by producers, including climate variability, limited access to modern technology, and market instability. At the same time, the paper

identifies emerging opportunities, such as the implementation of recirculating aquaculture systems (RAS), access to European funding, and increased consumer interest in locally sourced, sustainable fish products. The findings highlight the need for integrated policies and adaptive strategies to support the development of a resilient and competitive aquaculture sector in Moldova, Romania.

Keywords: Fish farming, recirculating aquaculture systems (RAS), economic fluctuations.

PP. 4.3

The Role of the Food Bank in the Republic of Moldova in 2024

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Abstract

In 2024, the Food Bank of the Republic of Moldova reported a lot of progress in the fight against food waste and in the assistance of the underprivileged sector. The cooperation with 64 economic agents made it possible for the Food Bank to salvage 211 tons of food products, which were then passed to 81 social services located in each corner of the country. The Food Bank's deal with Kaufland Moldova in the year 2024 appeared sufficient and they were able to step further. In the previous year, the collaboration led to the recovery of 64 tons of goods from Kaufland stores, which were then converted into 128,000 portions of cooked food for over 8,500 beneficiaries.

The Food Bank of the Republic of Moldova showed a constant commitment to the issue of food waste reduction and the help of the local community in their fight against social inequality by these activities, and as a result, they have been portrayed as a main figure in the social solidarity and food sustainability fields.

Keywords: Food Bank, food products, social services, Kaufland Moldova, benecifiaries.

PP. 4.4

Food Marketing and Its Impact on Obesity Rates in Moldova: A 2024 Perspective

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Abstract

The study analyzes the influence of food marketing strategies on obesity rates in the Republic of Moldova, offering a 2024 perspective grounded in recent data and policy developments. With rising concerns about public health and nutrition, the research examines how aggressive advertising of ultra-processed and high-calorie foods—particularly toward children and adolescents—contributes to unhealthy dietary behaviors. The paper highlights the role of media channels, promotional pricing, and packaging tactics in shaping consumer choices. It also evaluates current regulatory frameworks and public awareness campaigns, identifying gaps and proposing targeted interventions. Special attention is given to urban–rural disparities and socioeconomic factors influencing exposure to marketing messages. The findings suggest that while Moldova has made progress in aligning with international health standards, stronger enforcement mechanisms and cross-sector collaboration are needed to mitigate the impact of unhealthy food marketing. Ultimately, the study advocates for comprehensive strategies to promote healthier eating habits and curb the growing obesity trend.

Keywords: food marketing, obesity, Republic of Moldova

PP. 4.5

Market Concentration and Regional Disparities in the Agri-Food Supply Chain of the Republic of Moldova

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Abstract

The agri-food supply chain in the Republic of Moldova faces significant challenges due to both market concentration and regional disparities. A small number of large processors dominate key sectors such as cereals, sunflower seeds, and sugar, creating an imbalanced power dynamic that limits opportunities for small and medium-sized producers. At the same time, substantial regional differences in natural resources, infrastructure, and market access further exacerbate inequality. Northern Moldova benefits from fertile soils and higher productivity, while southern regions face climatic limitations and infrastructure deficits. These structural imbalances reduce the efficiency, inclusiveness, and resilience of the agri-food chain. The study highlights the need for targeted policy measures to support cooperative development, enhance infrastructure in underserved regions, and encourage fair competition. Greater integration among producers, better logistics, and regional investment could help balance the system and promote sustainable rural development across all areas of the country.

Keywords: agri-food supply chain, market concentration, regional disparities, Republic of Moldova

SECTION 5
ADVANCED RESEARCH IN ELECTRICAL / ELECTRONIC ENGINEERING, SYSTEM ENGINEERING AND INFORMATION TECHNOLOGIES

PP.5.1.
Optimizing energy consumption in the sintering process through advanced water flow control

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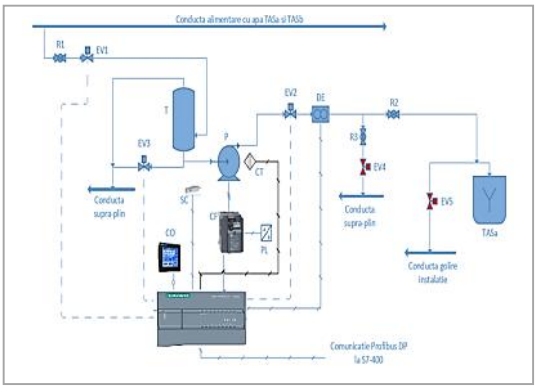
Abstract

This paper investigates the impact of advanced water flow control on energy efficiency in the ore sintering process. Utilizing an integrated automation system with PID regulation and a frequency converter to efficiently manage water flow, the study demonstrates how optimizing process parameters can lead to a significant reduction in electrical energy consumption. Detailed analysis of system behavior under various operational conditions reveals that precise water flow adjustments not only enhance the quality of the final product but also contribute to decreased CO2 emissions and increased industrial process sustainability. The results suggest that integrating advanced control technologies into traditional industrial processes is essential for achieving energy efficiency and environmental protection objectives. By implementing these techniques, the sintering process becomes not only more energy-efficient but also better adapted to current ecological requirements.



Keywords: energy efficiency, automated control, industrial sustainability.

PP.5.2.
Optimizing the operation of a Profibus network by using a Profibus MOLEX card

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Abstract

The project focuses on optimizing the performance and reliability of the new subnetwork by ensuring timely and error-free data transmission, enabling rapid detection and resolution of communication issues and transitioning from a linear to a star topology to enhance overall system uptime and stability.

The main objective is to ensure the optimal operation of consumers on the new subnetwork by delivering data packets promptly and error-free. The second objective is to quickly identify communication errors and resolve them efficiently. The third objective is to transform the linear communication network into a star topology to enhance overall system uptime and minimize failures.

Keywords: Profibus network, electric drive system, Profibus Analyzer, variable frequency converter

PP.5.3

Electrical System Analysis for Battery-Operated Electric Ships

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Abstract

This paper presents an in-depth analysis of the electrical systems used on battery-operated electric ships. With the growing demand for sustainable and environmentally friendly maritime transport, electric ships powered by advanced battery technologies are becoming increasingly relevant. The study focuses on the key components of the onboard electrical installation, including energy storage systems, power distribution networks, propulsion systems, and control architectures. Special attention is given to the challenges associated with battery management, energy efficiency optimization, load balancing, and ensuring system reliability under various operating conditions. The analysis also considers safety aspects, such as protection against overcurrent, thermal runaway, and emergency response strategies specific to battery-powered vessels. Furthermore, the paper explores the integration of renewable energy sources, such as solar panels and wind turbines, into the ship's electrical system to extend operational autonomy and reduce dependence on shore charging infrastructure. Case studies and simulations are used to illustrate practical design solutions and performance improvements. In conclusion, the development of robust and efficient electrical installations is essential for the advancement of battery-operated electric ships, contributing to a cleaner and more sustainable maritime industry.

Keywords: battery management, electric propulsion, power distribution, energy efficiency.

PP. 5.4.

DC Motor Parameters Estimation based on Neuronal Network

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Abstract

Taking into account the current evolution of artificial intelligence in every main domain, such as electrical engineering, autonomous driving, medical field and algorithms and the most popular among users, large language models, the need for laws and legal framework to protect users from biases, discriminations and false or incorrect answers, is an essential step for the evolution and mass adoption in AI fields. Every big economic power such as European Union, United States of America and China take different paths regarding the AI implementation and developments. Thus the European Union is taking a more reserved approach, prioritizing the user safety, putting first non biased decisions and good ethics, implementing a risk based classification system. On the other hand, the United States of America

is implementing a more descentralized approach, such as general federal laws, and every state is free to implement complementary legal framework, for example Colorado is taking the EU approach to categorise the AI based on risks. China is opting for targeted regulations, still sharing many similarities with the EU such as ethics and consumer security. As well as EU, the Chinese government is implementing a risk based framework, but little different, that Chinese policy is imposing rules for best practices and guidelines. The main objective of this paper is to review the everchanging legislative framework, and to make an objective comparasion between the different approaches in different continents. Due to the nonlinear behavior of the main components of machine tools, it is difficult to accurately determine the physical parameters. The property of artificial neural networks (ANN) to model nonlinear processes is exploited in this work, by implementing a neural parameter estimator. The principle was applied to a DC motor to estimate the mechanical and electrical parameters. The results of this test are presented.

Keywords: Artificial Intelligence, reglementations, United States of America, European Union, China, DC motor, estimator, mechanical and electrical parameters

PP. 5.5.

Numerical Results of an Operational Teleoperation System

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Abstract

The teleoperation system allows to the users to control the things remotely. In this paper, the authors proposed the study of a teleoperation system in the Matlab-Simulink development environment. The teleoperation system aims for the operator to feel the environment around the slave manipulator. It is shown how the slave device follows the behavior of the master device. Since the distance between these two devices is large, delays occur in the communication channels. These delays can cause instabilities in the teleoperation system. To avoid this, the variable wave method was used. The simulation results show a stabilization of the teleoperation system with delay.

Keywords: teleoperation, stability, delay, Matlab-Simulink, communication channels, master, slave.

PP. 5.6.

Omnidirectional Robot based on the Swedish Wheels

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Abstract

In this paper, the authors present kinematic and dynamic models, as well as direct and inverse kinematics of robots with two wheels, three omnidirectional wheels and four omnidirectional wheels. The dynamic model considers the mechanism of robot movement, taking into account the forces and torques that appear in the system. It allows describing the dependencies of the robot's position and orientation in relation to the applied forces and torques. It is used for the synthesis of automatic control systems, analysis of mechanical systems, simulation of robot movements. The most popular methods for describing the dynamic model of robots are the Newton-Euler method, the Euler-Lagrange equations. Simple dynamics solves the following problem: if we know the applied forces and moments, we also determine the positions, angular velocities. Inverse dynamics solves the following problem: if we know the positions, velocities and acceleration of the joints, we can calculate the corresponding forces and moments

of rotation. The kinematic model considers the mechanism of robot movement, neglecting the forces and torques that appear in the system. It allows the calculation of the robot's position and orientation and is used to formulate the relationship between the reference system of the workspace and the system of wheel motion variables. The kinematic model is the basic method for describing the position and orientation of the mobile robot, as well as the motion variables of all wheels. The method for describing the kinematic model of robots is the Denavit-Hartenberg Notation. Simple kinematics solves the following problem: if we know the positions, velocities, and angular acceleration of the wheels, we can calculate the current position, velocity, and acceleration of the robot relative to the initial position (i.e., linear and angular velocity). Inverse kinematics solves the following problem: if we know the positions, velocities, and acceleration of the robot in the workspace, we can calculate the angular velocity and acceleration of the wheels. The study in this paper is related to a four-wheeled robot with Mecanum wheels. The solutions of simple and inverse kinematics with respect to the coordinate system associated with the robot are presented. Kinematic model of a Swedish four-wheeled robot. The results of inverse kinematics and odometry are represented graphically.

Keywords: mobile platform, omnidirectional, 4 wheels

PP. 5.7.

Optimal nonlinear control of a mobile robot with differential wheels

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Abstract

In this paper, optimal control for an electric vehicle with differential wheels is proposed, compared to the classical cases of kinematic control. The dynamic system to be controlled is nonlinear, with time-varying parameters. Based on the formulation of the optimal control problem, the solution of the problem is determined based on the solution of the Riccati differential equation (SDRE) with infinite final time, imposed final state. In the formulation of the problem, the complete model with holonomic and non-holonomic constraints is used, respectively with the inclusion of the wheel rotation and the Center of Mass of the robot in the state vector. Under these conditions, the system is uncontrollable. However, the SDRE solution assumes that the dynamic system is controllable and observable. By using a change of variables, the system satisfies these conditions. Kinematics and dynamics of differential wheels mobile robots contain two constraint non-holonomic equations and one holonomic. In order to highlight the high performance offered by this type of control, the solution is implemented and obtained numerically in Matlab.

Keywords: mobile platform, optimal control, differential wheels.

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2025

SCDS-UDJG 2025
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THURSDAY – 12 of June 2025

10:00 - 19:00	Invited pelnaru lectures/Invited lectures/Oral presentations

FRIDAY – 13 of June 2025

9:00 - 13:00	Oral presentations/Poster session in concurrent sections
11:00 - 13:00	Workshop
13:00 - 14:00	Awarding Ceremony. Closing ceremony
14:00 - 15:00	Lunch

PLENARY LECTURES (all sections)

PERSPECTIVES AND CHALLENGES IN DOCTORAL SCHOOLS

PL.1.

Artificial Intelligence for Energy efficiency: Towards Sustainable Development Goals

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Abstract

This study aims to explore the integration of artificial intelligence (AI) in sustainable energy solutions, highlighting the crucial role of AI in accomplishing the United Nations and Sustainable Development Goals (SDGs). This talk explores the integration of AI technologies with sustainable energy practices, presenting a comprehensive analysis of how AI can be utilized to create more efficient, cost-effective, and environmentally friendly energy solutions. It covers a wide range of topics, starting with the introduction of Sustainable Development Goals and their relevance to global energy needs. Then, the role of energy in sustainable development, the potential of AI in enhancing sustainability, and specific applications of AI in providing affordable and clean energy are explored. Furthermore, it examines the application of AI in energy management and addresses ethical concerns about AI adoption in the energy industry. The major goal of this talk is to give an in-depth overview of how AI may help achieve sustainable energy solutions. It attempts to address the knowledge gap and provide practical insights into integrating AI to accomplish sustainable energy goals.

PL.2.

Humour in Linguistics presentation overview

Selma Đuliman

University of Sarajevo, Faculty of Philosophy

Abstract

University of Sarajevo, Faculty of Philosophy Abstract Humor has been extensively discussed in recent linguistic research. Humor, as part of the universal human transcultural trait, occurs in people's everyday lives, either as a conscious linguistic expression or as a spontaneous reaction to phenomena that surround us, which are not necessarily caused by the actions of human beings. The aim of the presentation is to offer an insight into different aspects of linguistic research of humor, primarily Raskin's Semantic Script theory, and Raskin and Atardo's seminal General Theory of Verbal Humor, as well as the interconnectedness of linguistic research of humor with other disciplines.

PL.3.

3,3'-Bisindolylmethane Derivatives as Antibiotic Resistance Disruptors

Victoria Lipson[a],[b]*, Mikola Lyapunov[a], Olena Bezugla[a], Anna Lyapunova[a], Igor Zinchenko[a], Volodymir Vakula[a], Svitlana Dzhoraieva[c]

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Abstract

Resistance to antibacterial drugs and the emergence of multi-resistant strains of microorganisms is a problem of global importance that require a rapid response from a wide range of researchers [www.who.int/health-topics/antimicrobial-resistance]. The proposed report examines the current trends in the search for antibacterial agents. Particular attention is paid to the opportunities opened up by the combined use of substances of both natural and synthetic origin that do not have antibiotic properties, but in combination with known drugs can significantly increase their effectiveness in the fight against multi-resistant strains of pathogens. Our own results on the synthesis of such substances, in particular new derivatives of 3,3'-bisindolylmethane (BIM), as potential components of drugs capable of increasing the effectiveness of representatives of various classes of antibiotics in the fight against bacteria of the ESKAPE group (Enterococcus faecium, Staphylococcus aureus, Klebsiella pneumoniae, Acinetobacter baumanii, Pseudomonas aeruginosa, Enterobacter spp.) - the main cause of nosocomial infections and increased mortality - are presented. The results of microbiological screening of the obtained compounds on standard and clinical strains of the indicated microorganisms, as well as Escherichia coli and Candida albicans fungi are presented. Pharmaceutical compositions are proposed, which include an active pharmaceutical ingredient with antibacterial properties, a certain BIM and excipients. The effect of these compositions on the biofilm formation of pathogens is determined. Part of this work was carried out with the financial support of the National Research Foundation of Ukraine, grant No. 2022.01/0087.

Keywords: antibiotic resistance, 3,3'-bisindolylmethanes, pharmaceutical compositions, antibiofilm properties.

PL.4.

Metabolic Labeling of Cancer Cells Using Glycodendrimers to Stimulate Immune-Mediated Cytotoxicity

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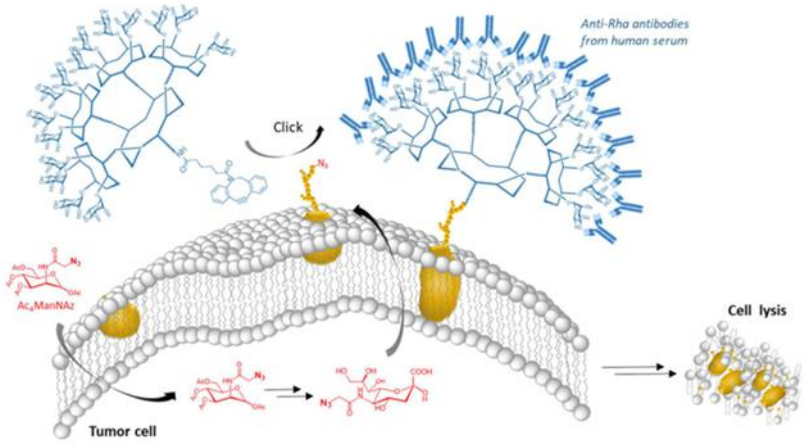
Abstract

The recruitment of immune actors, particularly, antibodies naturally present in the human serum on the surface of cancer cells, has proved to be a promising immunotherapy strategy to fight cancer. Antibody recruitment molecules (ARMs) combining tumour-antibody binding modules were developed for this purpose,[1-3] however the formation of the ternary complex between these bimodal molecules with both antibodies and cells is difficult to optimize to stimulate immune-mediated cytotoxicity. To overcome this limitation, we have opted for a

more direct approach combining azido-sugar cell metabolism and biorthogonal click chemistry to conjugate glycodendrimers structurally well defined as antibody binding module (ABM) to the cell glycocalyx. We have shown that this strategy not only allows the recruitment of natural antibodies on the surface of isolated cells or solid tumor models, but also activates a cytotoxic response with human serum as a single source of immune effectors. [4]

Keywords: glycometabolism, bioorthogonal reaction, glycoconjugates, mutivalency, immunotherapy



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PL.5.

The Role of AI and VR in Advanced Sports Research

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Abstract

In contemporary sports, where athletic performance is often quantified in terms of milliseconds and millimeters, technology has emerged as a vital ally. Artificial Intelligence (AI) and Virtual Reality (VR) are increasingly integral to advanced sports research, fostering innovation in athlete training, injury prevention, and optimization of game strategies. AI facilitates precise and objective performance analysis by utilizing machine learning algorithms to process biometric and kinetic data derived from wearable sensors or smart cameras in real time. This data allows for an in-depth assessment of various performance metrics, including technique, endurance, speed, and injury risk, thereby providing coaches and researchers with a comprehensive overview of an athlete's condition. Conversely, VR is transforming the training landscape through realistic and interactive simulations that allow athletes to practice complex game scenarios without incurring physical risks. This technology aids in the development of strategic thinking, enhances performance under pressure, and improves decision-making capabilities. Furthermore, both AI and VR contribute significantly to injury prevention and rehabilitation. AI possesses the capability to identify unsafe movement patterns, while VR can facilitate rehabilitation by providing guided motor exercises that incorporate gamification elements. This approach not only increases efficiency but also enhances the engagement level of

the athlete during recovery.

Additionally, the integration of AI and VR presents novel opportunities within sports research. Virtual models that accurately replicate the physical behavior of real individuals are being developed, enabling the testing of training methods, equipment, and strategies without jeopardizing the safety of actual athletes. In summary, AI and VR technologies transcend mere technological trends; they serve as essential tools in high-performance sports. Their precision, interactivity, and capacity for personalization significantly contribute to the advancement of sports research, aiding athletes in attaining their maximum potential and challenging the limits of human performance.

PL.6.

Exploring the Frontiers of Rapid Technologies in Forensics

Anna Barbaro

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Abstract

The ability to determine the origin (human or animal) of a biological sample found at a crime scene, along with its nature and the time since deposition, is crucial for criminal investigations. This information is essential for accurately linking evidence to a crime. Additionally, the ability to quickly obtain a DNA profile from crime scene evidence or a suspect is vital for advancing the investigation. This presentation will explore the application of rapid methods, such as infrared (IR) spectroscopy for identifying bodily fluids and the RapidHit system for DNA typing. These technologies offer significant advantages by enabling investigators to swiftly identify and analyze critical evidence.

PL.7.

Bridging Disciplines in the Pursuit of Justice: Doctoral Research on Missing Persons in Post-Conflict Societies

Naim Uka

Head of Division for Identification, Coordination, and Support,
Institute of Forensic Medicine, Ministry of Justice, Kosovo

Abstract

The phenomenon of missing persons in post-conflict societies remains one of the most persistent humanitarian and legal challenges of the contemporary era. This presentation draws upon ongoing doctoral research centered on the Western Balkans, with a specific focus on Kosovo, to examine the intersection of international law, human rights, and forensic science in addressing this critical issue. Through a multidisciplinary lens, the research investigates how legal frameworks and forensic methodologies can be jointly mobilized to advance the fundamental right of families to know the fate of their missing relatives. The presentation identifies key legal ambiguities, political impediments, and institutional shortcomings that continue to obstruct progress in the resolution of missing person's cases. It further explores the pivotal role of forensic science in processes such as exhumation, identification, and the production of scientifically grounded documentation, while critically assessing instances of misidentification and the ethical responsibilities they invoke. By situating these findings within a broader academic and policy context, the presentation underscores the potential of doctoral research to inform legal reform,

strengthen institutional capacities, and enhance humanitarian practices. It highlights the transformative impact of bridging disciplinary boundaries to foster accountability, promote justice, and uphold the dignity of victims and their families in post-conflict settings.

Key words; Doctoral research, Forensics, Missing persons, International Humanitarian Law.

PL.8.

Redefining Solvent Systems in Pharmaceutical Research: The Role of Deep Eutectic Solvents

Maria Luisa Di Gioia

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Abstract

Deep eutectic solvents (DESs) represent a rapidly emerging class of green solvents with considerable potential in pharmaceutical science. Composed of hydrogen bond donors and acceptors, DESs are characterized by low volatility, non-flammability, biodegradability, and ease of preparation from readily available, often natural, components. In this presentation, I will explore the application of DESs as sustainable media throughout various stages of pharmaceutical development. Emphasis will be placed on their use as environmentally benign alternatives to conventional organic solvents in key organic transformations relevant to the synthesis of active pharmaceutical ingredients (APIs), as well as in formulation processes within the pharmaceutical industry. Particular attention will be given to natural deep eutectic solvents (NADES) and their growing role in enhancing the solubility and bioavailability of poorly water-soluble drugs. By aligning with the principles of green chemistry and the circular economy, DESs demonstrate exceptional versatility and hold the potential to redefine solvent paradigms in pharmaceutical research and manufacturing. Keywords: eutectic solvent, environmentally, synthesis, pharmaceutical compound

PL.9.

Social media facilitated sexual assault

José Darío Martínez Villarreal

Christus Muguerza Hospital High Specialty University of Monterrey Monterrey, Mexico

Abstract

Tropical dermatology is a specialized field focused on the study, diagnosis, and treatment of skin diseases prevalent in tropical and subtropical regions. The warm, humid climate characteristic of such areas creates a unique environment that contributes to the emergence and propagation of various dermatological conditions. More relevant is the world climate change that is causing these maladies to be more common, particularly in travelers.

Fungal Infections: Tinea corporis, tinea cruris, and pityriasis versicolor are common due to the constant moisture on the skin. Deep fungal infections are now more frequent in workers, travelers and immunocompromised patients. Bacterial Infections: Conditions such as impetigo, erisipela, ecthyma, and tropical ulcers are frequently observed. Systemic infections are now more prevalent due to climate change among other factors. Parasitic Diseases: Cutaneous larva migrans, myiasis, gnatosthomiasis, cutaneous leishmaniasis, and scabies are notable parasitic infections among travelers.

Preventative Measures: Maintaining good hygiene practices to reduce the risk of infections; Using broad-spectrum sunscreens to protect against UV radiation; Wearing loose, appropriate clothing to prevent insect bites; Use of insect repellents containing DEET.

Medical Treatments: Topical antifungal and antibacterial agents for infectious diseases; Oral medications when topical treatments are insufficient; Anti-parasitc drugs.

Tropical dermatology faces several challenges, including the accessibility to healthcare facilities, the availability of medications, and the socioeconomic conditions of affected populations. These maladies are more common these days due to climate change and the expanded range of vectors. Tropical dermatology is an essential field that addresses the unique skin health needs of populations living in tropical and subtropical regions. Travelers, migrants and refugees can carry these skin souvenirs, and it is very important for dermatologists to recognize these maladies. Understanding these common conditions, prescribing effective treatments, and recommend preventive measures is crucial for improving dermatological care in these areas.

PL.10.
New Phenomenological Constitutive Models for the Description of Material Behavior under Static and Dynamic Loads: Application to High-Speed Machining and Use of Inverse Methods

Adinel Gavrus

Department of Mechanical and Control Systems Engineering Laboratory of Civil and Mechanical Engineering LGCGM, INSA Rennes, France

Abstract

Machining process of titanium alloys requires challenging task especially regarding the reached high gradients of plastic deformations, plastic strain rates and temperatures during the material forming. Both static and rapid (dynamic) loadings conditions occur during the material chip formation during machining processes. On the other hand, despite the wide spread adoption of titanium alloys in a wide range of industrial applications, several problems are encounter during their machining: high plastic strain localization, segmented chips, accelerated local tool wear. Although the recent advances concerning the experimental devices, it is still difficult experimentally to investigate on a mesoscopic scale all these instantaneous phenomena. Therefore, to obtain a reliable numerical analysis in addition with some experimental tests is still an efficient alternative for a better understanding of cutting processes. The modeling reliability is dependent on the definition of an adequate work-piece material behavior based on physical phenomena. This research study is start from the general physically based material constitutive models proposed by Gavrus [1-3] adopted to reproduce isotropic plastic behavior of the Ti6Al4V titanium alloy for large plastic deformations. Based on the literature review [4–9], rheological models of Ti6Al4V alloy [10-11] are improved and identified starting from on iterative non-linear regression methods. The main goal is to allow a well description of both static & dynamic loading conditions for a wide range of plastic strains, plastic strain rates and temperatures together with use of a transition state identification. The adequacy of the proposed rheological models is discussed and comparisons with experimental results of literature [4-8] are presented. A general user material subroutine VUHARD© is implemented in the commercial code Abaqus®/Explicit. Numerical simulations of tensile/compression tests are performed. A 2D FE modeling of Ti6Al4V machining is carried out and adequacy of proposed constitutive models to predict local variables for both moderate and high kinematic speeds is examined.

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I. INVITED LECTURES

SECTION 4
ADVANCES IN ENGINEERING AND MANAGEMENT IN AGRICULTURE AND RURAL DEVELOPMENT

IL.4.1.
Academic Engagement in the Integration of Small Farmers into Urban Food Systems: A Case Study of Iași Municipality

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Abstract

The access of small agri-food producers from rural areas to urban food systems is jeopardized by a range of economic, social, cultural, and, not least, political factors. At the same time, recent years have seen growing interest from urban consumers in organic, traditional, and mountain agri-food products, as well as those made by small producers or processors. The valorization of agri-food products through the principles of short supply chains represents a viable way to facilitate the connection between the two main actors of the urban food system: the producer and the consumer. However, for this connection to be organized, legal, predictable, and cyclical, the involvement of all key actors in an urban food system is necessary. Academia plays an important role in these systems and can serve as a central pillar for participatory governance actions aimed at facilitating the access of small producers to urban agri-food markets. In this regard, Gust de Iași and Iașul în bucate are examples of good practices developed within the Food for Iași Living Lab, RoRuralia Living Lab, and Organic Food Living Lab, highlighting the potential of academia to actively contribute to the construction of resilient and inclusive urban food ecosystems.

Keywords: urban food systems, short food supply chains, participatory governance

IL.4.2.
Sustainable development in agritourism based on circular economy

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Abstract

Research in the field shows that the agritourism sector is a growing sector. Therefore, the connection between agritourism and sustainable development requires the identification of new

directions and models to support the development of this new field of activity. Circular economy in agritourism can lead to sustainable use of resources for generations actual and future and to realize a development sustainable in this domain. The problem is how to integrate the principles of the concept of economics circular economy in a management system based on agrotourism activities that also leads to a sustainable development from an environmental point of view. The paper is a contribution to the realization of ways in which agritourism can contribute to sustainable development with the influence of the circular economy through highlighting new types of agrotourism structures and by bringing of major benefits for local community. Some are proposed directions to follow for the creation of such an agrotourism structure: administrator refuse products and caution agreement improve to separate collection of garbage; the use of electricity and thermal, paying special attention possibility consumption and production from renewable sources; water resources management, especially in terms of what at looks reducing their consumption; pair behavior responsive of tourist and staff with efficiency technologies used.

Keywords: circular economy, rural development, environmental protection, agritourism

IL.4.3.

The Strategic Importance of Canola Crops in Romania

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Abstract

This paper presents the how rapeseed (brassica napus) has become a cornerstone crop in Romanian agriculture, with increasing significance due to its dual purpose as a food-grade oil and a key raw material for biodiesel production. Romania ranks among the top rapeseed producers in the European Union, leveraging its favorable climate and arable land. The expansion of rapeseed cultivation not only enhances crop rotation and soil health but also contributes substantially to the national economy through exports and domestic processing. Furthermore, rapeseed-derived biofuels support the country's renewable energy targets and reduce dependence on imported fossil fuels. This paper explores the agronomic, economic, and environmental benefits of rapeseed production in Romania, positioning it as a vital element of sustainable rural development.

Keywords: rapeseed, statistical methods, energetic crop.

IL.4.4.

Associative Forms in Romanian Agriculture: Opportunities for Enhancing Competitiveness and Rural Development

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Abstract

Associative forms in Romanian agriculture, such as cooperatives and producer groups, play a crucial role in improving the competitiveness of small and medium-sized farms and

fostering sustainable rural development. Despite the support provided through national and European policies, the level of association among Romanian farmers remains low, mainly due to historical distrust, lack of managerial skills, and weak institutional frameworks. However, associative models offer multiple benefits, including improved market access, reduced production costs, increased bargaining power, and better integration into agri-food chains. This paper explores the current state of agricultural associations in Romania, identifies the main obstacles to their development, and highlights successful case studies that illustrate their potential. Strengthening associative structures is essential for creating resilient rural communities, ensuring food security, and enhancing the economic performance of the agricultural sector. Policy recommendations focus on fiscal incentives, capacity building, and improved governance mechanisms to support the growth of agricultural cooperatives.

Keywords: agricultural cooperatives, rural development, farm competitiveness

IL.4.5.

Economic Measures of Sustainable Development

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Abstract

It is proposed to analyze the economic benchmarks of sustainable development in Romania through the lens of three essential indicators: GDP/capita, Human Development Index (HDI) and Gini coefficient. Through a comparative approach with the European Union (EU-27) average, the progress recorded by Romania in the last decade, as well as the persistent challenges, are highlighted. The results show a positive trend of convergence of GDP per capita with the EU average, as well as a constant increase in HDI, signaling improvements in the areas of health, education and income. However, the relatively high level of the Gini coefficient indicates the persistence of social and economic inequalities. The study emphasizes the need for coherent and balanced public policies, which promote social inclusion, regional cohesion and economic sustainability, to align Romania with the standards of authentic sustainable development in the European context.

Keywords: Common Agricultura Policy (CAP), National Strategic Plan, Romania, EU, sustainable development

SECTION 5
ADVANCED RESEARCH IN ELECTRICAL / ELECTRONIC ENGINEERING, SYSTEM ENGINEERING AND INFORMATION TECHNOLOGIES

IL.5.1.

Next Generation of Electric Drives

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Abstract

The use of artificial intelligence enhances the electric drives performances applied in real world. At the present, the industrial drives are based on the conventional control, in cascaded manner. The parameter variations in the harsh environment conditions of the industrial processes are a real challenge for the performances of the system. In this paper, the authors present a methodological approach to the use of artificial intelligence techniques in the control of electric drives. Due to the rapid development of this field, the real-time implementation of this technology in the various hardware structures or specialized platforms are envisaged. At the same time, taking into account the fast acceleration of the artificial neuro-controllers introduction in all development areas, the numerical results obtained by the authors in the industrial area of electric drives will be presented.

Keywords: artificial intelligence, reinforcement learning, machine learning, neuronal networks, speed control

SECTION 6
FUTURE OF ECO-NANOTECHNOLOGIES, FUNCTIONAL MATERIALS AND COATINGS

IL.6.1.
Energy Efficiency Assessment in Educational Institutions in the Republic of Moldova: Case Study Based on Energy Audit Reports Developed within the GIZ Project

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Abstract

This paper examines the impact of energy efficiency measures implemented in eight educational institutions in the Republic of Moldova, within the framework of the "Modernization of Local Public Services" project, supported by the German Agency for International Cooperation (GIZ). The study is based on the analysis of energy audit reports developed under the EU Action "Construction of Water and Sanitation Infrastructure and Energy Efficiency in Public Buildings." The research evaluates the main proposed interventions, energy consumption before and after implementation, and the extent to which energy performance indicators were achieved. The results highlight the significant role of energy audits in planning and optimizing investments for sustainable and energy-efficient public buildings.

Keywords: Energy efficiency, GIZ project, Energy audit reports, Republic of Moldova.

IL.6.2.
Modern Strategies in Fixed Implant Prosthodontics Using Zirconium Support

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Abstract

Zirconium-based materials have become a cornerstone in fixed implant prosthodontics due to their exceptional mechanical properties, biocompatibility, and aesthetic potential. This paper shows current strategies in the design and implementation of zirconium-supported fixed implant restorations, focusing on digital workflows, surface treatments for improved osseointegration, and material innovations that enhance both functional and esthetic outcomes. Emphasis is placed on clinical protocols, long-term performance, and the integration of CAD/CAM technology to ensure precision and predictability in treatment. The results highlight that zirconium-supported solutions offer a reliable and modern approach to implant prosthodontics, combining strength, biocompatibility, and esthetics to meet the demands of contemporary dental practice.

Keywords: Zirconium, Fixed implant prosthodontics, CAD/CAM technology, osseointegration.

SECTION 7
CHEMISTRY - ELECTROCHEMISTRY IN LIFE SCIENCES

IL.7.1.
In search of inhibitors of Tau amyloid fibers: synthetic peptide fragments as fibers models

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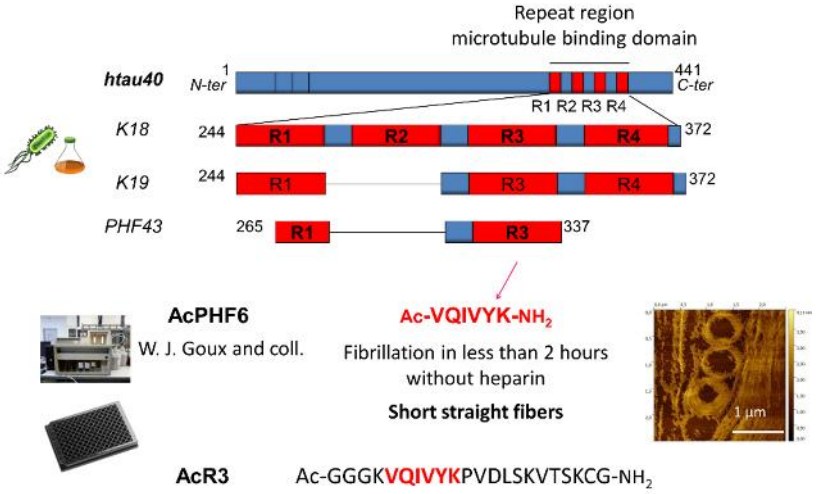
Abstract

Neurotoxic aggregates and fibers formed from abnormally phosphorylated tau protein are regarded as the main actors involved in the destruction of neurons in tauopathies such as Alzheimer's disease. Yet, only a few molecules have shown to efficiently prevent or detect the formation of those aggregates, and the identification of such molecules is still an ongoing interest in a therapeutic and diagnostic context. In line with this objective, we develop *in vitro* models of tau fibers to investigate the inhibitory effect of small library of molecules by means of thioflavin fluorescence assays, circular dichroism and microscopy techniques. In particular, the model based on the R3 repeat region of tau protein adopts a β-sheet structure as shown by CD experiments and forms fibrils that are very similar to those obtained with native tau protein



This work is supported by the French National Research Agency in the framework of the "France 2030" program ANR-17-EURE-0003 through the LabEx Arcane", and by the CerCoG Labex.

IL.7.2.

Voltametric data processing using genetic algorithms

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Abstract

The use of techniques for data processing before statistical analysis is of great interest and could improve the quality of the results obtained by multivariate data analysis [1,2]. In this study, an array of voltametric sensors was used to classify wines aged using two different techniques: aging in traditional oak barrels and using stainless steel tanks with oak chips inserted and micro-oxygenation. Models based on genetic algorithms with linear regressions were developed to identify the aging type of a given sample evaluated. This technique provides a reduction in variables for the final multivariate data analysis. A comparison was made between this new method and the use of all the variables recorded by the sensors array. The results showed that genetic algorithms are more accurate and also allow for the identification of areas where the recorded signal could impair the accuracy of a subsequent linear regression.

Keywords: sensor array, genetic algorithm, regression

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II. ORAL PRESENTATIONS

SECTION 3
PROGRESS IN FOOD SCIENCE AND BIO-RESOURCES ENGINEERING

OP 3.1.

Soy Protein Hydrolysates as Valuable Ingredient for Gluten-Free Muffins

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Abstract

Gluten-free products became very popular among people who are careful about their health, leading to the development of innovative gluten-free products in recent years. Due to their high carbohydrate content and lack of essential nutrients, the gluten-free diet might cause nutritional deficiencies. In order to provide balanced nutrition and a good digestion, it is crucial that diets based on gluten-free products include adequate sources of proteins. The aim of the present study was to investigate how the addition of soy protein isolate and hydrolysates influence the thermo-mechanical behavior of the gluten-free dough and the quality attributes of baked muffins. Soy peptide mixtures with enhanced bioactivity were prepared with three different endopeptidases. Among the tested hydrolysates, those obtained with trypsin exhibited the highest foaming capacity and emulsion stability, while the Neutrase-derived hydrolysates showed the strongest antioxidant activity. Composite flours consisting of rice and quinoa were used to develop gluten-free muffin formulations supplemented with 10% soy proteins or peptides. Rheological analysis revealed that the addition of soluble peptides delayed starch gelatinization, while the insoluble fraction led to increased dough consistency. The most notable improvements in dough behavior were observed in samples containing hydrolysates prepared with bromelain and trypsin. Baked muffins enriched with soy protein hydrolysates exhibited enhanced antioxidant activity and more intense crumb color. These results support the potential of soy protein hydrolysates as valuable ingredients in the development of gluten-free bakery products with enhanced health benefits.

Keywords: soy proteins, quinoa flour, rice flour, hydrolysates, rheological properties.

OP 3.2.

Investigation of the Inhibitory Mechanism of *Salvia officinalis* Supercritical Fluid Extract against *Listeria monocytogenes*

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Abstract

In this study, the extract of sage (*Salvia officinalis*), obtained from separator S45 of a supercritical CO_2 pilot-plant extractor (Natex, Prozesstechnologie GesmbH., Austria) belonging to the BioAliment-TehnIA research center, was tested for its antibacterial activity potential against *Listeria monocytogenes* ScottA employing different investigation methods. Initially, the phytochemical profile of the extract was analyzed for its polyphenolic and lipophilic compounds using High-Performance Liquid Chromatography. The analysis revealed that *α*-carotene, zeaxanthin, and cafestol exhibited the highest content among the identified compounds. The fatty acid profile was evaluated using a Perkin–Elmer gas chromatograph with flame ionization detection, identifying nonanoic, undecanoic, linolenic, and palmitic acid as the four main fatty acids present in the sage extract. Further, the Minimal Inhibitory Concentration (MIC) was determined through a microdilution assay, resulting in an MIC of 0.39 mg/mL.

The growth curve kinetics of *L. monocytogenes* was observed over a 10-hour period in the presence of sage extract, showing a significant difference between lag and exponential phase for the control and the cells treated with MIC and sub-inhibitory concentration. Scanning electron microscopy analysis showed that the treated bacterial cells were less translucent, highly distorted, partially disintegrated, and exhibiting damaged cellular aggregation. Additionally, the SDS-PAGE analysis indicated the effects of sage extract afeected protein synthesis, particularly those responsible for division and survival of *Listeria*. DNA cleavage evaluation demostrated the degradation of the genetic material in cells treated with the extract compared to the control DNA band. The fluorescence spectroscopy revealed that nonanoic acid had the highest affinity for binding DNA. Molecular docking tests, performed by using the Transcriptional Regulator PrfA as a receptor and the four main fatty acids as potential signalling molecules, suggested that the production of the virulence factor in *L. monocytogenes* may be influenced by these interactions.

Keywords: *Salvia officinalis,* Supercritical Fluid Extraction, *Listeria monocytogenes,* SDS-PAGE, DNA cleavage, molecular docking

OP 3.3.

Metabiotic ingredient obtained through the biotransformation of spirulina biomass with kombucha

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Abstract

Metabiotics (pre-, pro-, and postbiotics) are used in aquaculture for their beneficial effects in enhancing disease resistance, improving feed conversion, assimilation, and digestion, reducing oxidative stress, and supporting immune function [1]. As a natural probiotic source, kombucha beverages could serve as a starter culture for unconventional substrate fermentation to obtain innovative fermented products

with enhanced bioactive properties. Spirulina biomass provides essential nutrients, improves feed-to-body conversion rates, and enhances water quality by reducing excess nutrients. The biotransformation of dried spirulina biomass with a wild symbiotic consortium of bacteria and yeasts (SCOBY) from kombucha is a challenging opportunity to develop novel bioingredients for aquaculture, which can contribute to faster growth, improved health, and a more sustainable aquaculture environment [2-3]. The study aimed to obtain fermented products through the fermentation of black tea, kombucha beverage, and *Limnospira platensis* (spirulina) biomass (raised in controlled conditions at ICDEAPA Galați) with applications in aquaculture. The fermented products were analyzed in terms of functional properties: pH and total titratable acidity, color (CIE Lab system), soluble protein (Bradford method), protein profile (SDS-PAGE electrophoresis), total flavonoids ($AlCl_3$ method), total polyphenols (Folin-Ciocalteu method), polyphenol profile (HPLC), antioxidant activity (DPPH and ABTS methods), and antimicrobial activity. Three samples, coded KCS (black tea, 10% sugar, 10% kombucha, and 3.5% dried spirulina biomass), KS (water, 10% sugar, 10% kombucha, and 3.5% dried spirulina biomass), and M(K) (control) (black tea, 10% sugar, 10% kombucha) were obtained during 5 days of fermentation, at 30°C, followed by freeze-drying. The sample-coded KCS demonstrated high antioxidant potential, with 86.516% and 88.23% by the DPPH and ABTS, respectively. Additionally, this sample showed values of 15.88 mg/g dry weight in terms of soluble protein, 5.007 mg gallic acid/g dry weight for total phenolic content, and 3.21 mg catechin/g dry weight for total flavonoid content. Moreover, this fermented product showed antimicrobial activity against *Staphylococcus aureus* ATCC 25923. Additionally, the KCS sample revealed two peptide bands with molecular weights ranging from 15 to 20 kDa and a band with a molecular weight of approximately 100 kDa, demonstrating their bioactive potential. Moreover, gallic, chlorogenic, p-coumaric, and vanillic acids were detected in the KCS sample. Color parameters like L (32.3), a (-0.87), b (0.14), and E (32.31) were also detected.

The results demonstrate the potential of wild microbial consortium (lactic acid bacteria, acetic acid bacteria, and yeasts) from kombucha to transform spirulina biomass in unconventional fermentation conditions to obtain new metabiotic formulations with bioactive features. Future research will aim to assess these ingredients for improving fish feed and the quality of aquatic ecosystems, facilitating sustainable aquaculture methods.

Keywords: *Limnospira platensis* (spirulina), kombucha microbial consortium, unconventional fermentation, metabiotic ingredients

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OP 3.4.

Corn-Based Extruded Snacks Supplemented with Bilberry Pomace Powder: Physical, Chemical, Functional and Sensory Proprieties

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Abstract

Corn-based extruded snacks are tasty and very popular food products; however, they have high starch and oil and low bioactive content. The aim of the present study was to improve the functional value of corn-based extruded snacks by enrichment with bilberry pomace powder (BPP). Proximate composition, total phenolic content, antioxidant activity, physicochemical properties, including color and texture

properties, titratable acidity, expansion ratio, bulk density, water absorption, and water solubility index were evaluated in snacks supplemented with BPP at 2%, 4%, and 6% addition levels compared with the control. The results showed that protein, fiber, and ash content increased with increasing addition levels of BPP. The fiber content increased in the extruded products by about 2.7 times at the 6% BPP addition level compared to the control. The addition of 4% and 6% BPP did not worsen the expansion ratio and hardness of the snacks but significantly decreased their cohesiveness, gumminess, resilience, chewiness, and fracturability. Total phenolic content increased by about 54%, 86%, and 118% for the 2%, 4%, and 6% addition levels, respectively, compared to the control. Based on the results, enrichment with 6% BPP produced a new healthy and attractive snack, which could be recommended for commercial production.

Keywords: corn-based extruded snacks; bilberry pomace powder; expansion; texture; color; bioactive content

OP 3.5.

Synergistic Interactions Between Gut Microbiota and Short-Chain Fatty Acids: A Crucial Axis in Human Health and Chronic Disease Prevention

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Abstract

Short-chain fatty acids (SCFAs)-primarily acetate, propionate, and butyrate-are bioactive metabolites generated by the fermentation of dietary fibers by the gut microbiota. These compounds perform an essential role in sustaining host health by modulating metabolic, immune, and neurological functions. This presentation will provide a comprehensive overview of the synergistic relationship between gut microbiota and SCFAs, emphasizing their importance in preserving gastrointestinal integrity, promoting glucose and lipid homeostasis, and regulating systemic immune responses. Particular attention will be given to how alterations in gut microbiota composition (dysbiosis) can impair SCFA production and contribute to the onset and progression of chronic diseases such as obesity, type 2 diabetes, inflammatory bowel disease, and neurodegenerative disorders. Comprehending the intricate relationship between gut microbiota and short-chain fatty acids (SCFAs) paves the way for innovative therapeutic approaches. including the use of targeted prebiotics and probiotics to enhance SCFA production and restore host-microbe balance.This presentation will highlight recent advances in the field to emphasize the central role of the microbiota-SCFA axis in human health and disease, and to demonstrate its potential as a promising target for innovative preventive and therapeutic strategies.

Keywords: Gut microbiota, short-chain fatty acids, SCFAs, dietary fiber, dysbiosis, butyrate, acetate, propionate, metabolic health, immune regulation, chronic disease, microbiome, prebiotics, probiotics

OP 3.6.

Ripening Dynamics of Fetească Neagră Grapes in Response to Vintage Variability: A Three-Year Study from Southern Romania

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Abstract

The optimal harvest time of wine grapes is a pivotal factor in ensuring high-quality wine production, especially in regions facing increasing climatic challenges. This study investigates the technological and

phenolic maturity of *Vitis vinifera* L. var. Fetească Neagră grapes over three consecutive vintages (2021–2023) in the "Terasele Dunării" viticultural area - one of the driest wine-growing regions in Romania. The research involved detailed monitoring of physicochemical parameters (sugar content, total acidity, pH, and berry mass) and phenolic compounds (anthocyanins and total polyphenols) to understand the ripening process under variable climatic conditions. Data collection was performed through systematic sampling, followed by practical and time-efficient analyses, suitable for routine use in winemaking facilities. The results reveal significant interannual differences in ripening progression, largely attributed to variations in hydric stress and temperature regimes. The findings underline the importance of adaptive harvest strategies based on grape maturity type (technological vs. phenolic) and wine style objectives (rosé vs. red). This integrative approach provides practical insights for vineyard management and contributes to defining scientifically grounded harvest guidelines tailored to climate-resilient viticulture.

Keywords: Fetească Neagră, grape ripening, technological maturity, phenolic maturity, vintage variability, harvest timing, climate-resilient production.

OP 3.7.

Improvement of Gluten-Free Products through the Use of Sourdough

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Abstract

Sourdough-based breadmaking technology offers several advantages in terms of nutritional and sensory properties, especially in the case of the gluten free products. In order to obtain sourdough samples for the current study, different gluten-free flour blends based on quinoa and sorghum flours were used. Two distinct starter cultures, consisting of mixtures of lactic acid bacteria, were used to ferment the composite flours representing mixtures of quinoa (Q) and sorghum (S) of 100:0 (100Q), 75:25 (75Q), and 50:50 (50Q). The obtained sourdough samples were evaluated for physical and chemical characteristics, dough thermo-mechanical behavior, and bread making performance. The acidity of the sourdoughs made with starter culture of lactic acid bacteria was noticeably higher than that of the matching spontaneously fermented sample following 20 hours of fermentation at 30°C. Sourdoughs with a higher glycerol and lactic acid content and a lower ethanol and acetic acid content were produced by using the starter cultures. The fundamental rheological measurements indicated that both the sorghum level and the type of starter culture had an impact on viscosity of the gluten free dough. The use of sourdough allowed obtaining gluten-free bread rich in bioactive compounds and with pleasant texture. In conclusion, the quality of gluten-free bread products can be improved through the use of sourdough fermentation.

Keywords: sourdough, lactic acid fermentation, gluten free products

OP 3.8.

Biopolymers from renewable resources - sustainable raw materials with applications in agriculture

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Abstract

Given the current environmental requirements and the need to ensure the sustainability of products and global food security, the agricultural sector is under increasing pressure to identify innovative and

adaptive solutions. One of the promising innovations facilitating the sustainable transformation of agriculture is the use of biodegradable natural polymers (biopolymers), which are a key component in the transition toward sustainable agricultural practices. The advantages of using biopolymers go beyond environmental sustainability by reducing pollution; they also offer a practical solution to the problem of agricultural waste, while improving crop yields and reducing the use of synthetic plastic materials currently in use. Furthermore, biopolymers can serve as matrices for incorporating compounds with phytosanitary properties and controlled release mechanisms, helping to control pest attacks and acting as soil and plant amendments. Polysaccharides are the most widely used biopolymers in agricultural applications. Among them, cellulose and its derivatives (i.e.nanocellulose), hemicelluloses, starch, chitosan and alginates stand out as promising candidates due to their abundance, versatility, and valuable functional properties. This paper provides an overview of biopolymers as renewable resources for agriculture, with a particular emphasis on their use in the production of agricultural films (i.e. mulch). It is explored in detail the technical and environmental advantages they offer, along with the essential functional properties required for effective application in supporting plant growth and development.

Keywords: biopolymers, polysaccharides, sustainable agriculture

OP 3.9.

The Impact of Pumpkin Pomace Powder on the Quality and Antioxidant Activity of Gluten-Free Cake Products

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Abstract

Pumpkin (*Cucurbita* spp.) is a nutritious vegetable abundant in vitamins, minerals, and bioactive compounds, notably β-carotene, a precursor to vitamin A, which is vital for vision, skin health, and immunological function. This study investigates the impact of pumpkin pomace powder (PPP) on the nutritional composition and antioxidant activity of gluten-free cakes. Pumpkin pomace, a by-product of pumpkin processing, is rich in dietary fiber, carotenoids, minerals, and bioactive compounds, making it a promising ingredient for enhancing the nutritional profile of gluten-free baked goods. The gluten-free cakes were prepared by incorporating varying concentrations of PPP (8% and 16% *w/w*) into the cake batter. The physicochemical properties, such as texture, moisture content, and color, as well as the antioxidant activity, carotenoids of the cakes, were assessed. Results indicated that the addition of PPP significantly increased the antioxidant activity, as measured by ABTS radical scavenging and total phenolic content, in a dose-dependent manner. Sensory evaluation revealed that the cakes with 8% PPP received the highest ratings for taste, texture, and overall acceptance. The incorporation of PPP not only improved the antioxidant properties but also contributed to a higher nutritional value, offering a sustainable approach to utilizing pumpkin by-products in gluten-free food formulations. This study highlights the potential of PPP as a functional ingredient to enhance the quality and health benefits of gluten-free cakes.

Keywords: carotenoids, dietary fiber, sustainable food waste utilization, sensory evaluation, cake formulation.

SECTION 4
ADVANCES IN ENGINEERING AND MANAGEMENT IN AGRICULTURE AND RURAL DEVELOPMENT

OP. 4.2
Sustainable managerial practices in implementation of circular economy concepts in Romanian agriculture

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Abstract

The financing of rural development in Romania through the National Recovery and Resilience Plan (NRRP) represents a strategic opportunity to address persistent disparities between rural and urban areas and to support the sustainable transformation of the agri-food sector. Within the framework of the NRRP, key components such as the modernization of agricultural infrastructure, digitalization of rural services, support for young farmers, and environmental sustainability are prioritized. These funding instruments aim to enhance rural competitiveness, reduce poverty, and encourage demographic stability in disadvantaged areas. However, the actual implementation of the NRRP in rural Romania faces several challenges, including limited administrative capacity at the local level, insufficient digital infrastructure, and a lack of coordination among stakeholders. Moreover, the absorption rate of funds and the long-term impact of investments on rural resilience require continuous monitoring and evaluation. This paper analyzes the structure and objectives of the NRRP in relation to rural development priorities, assesses the current state of fund implementation, and explores policy recommendations for improving governance and ensuring inclusive growth. Emphasis is placed on the role of local actors, including public administrations, NGOs, and academia, in facilitating access to resources and promoting innovation in rural areas.

Keywords: rural development, national Recovery and Resilience Plan (NRRP), inclusive growth

OP. 4.6
Agri-Food Public Procurement in Romania: Policy Gaps and Potential for Rural Development

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Abstract

In the agri-food sector, public procurement can serve as a strategic instrument to support local producers, educate the population on healthy eating, and stimulate the growth of the rural economy. The Romanian legal framework allows for the inclusion of sustainability and local origin criteria; however, their application is often hindered by the fragmentation of supply, limited administrative capacity, and restrictive interpretations of European competition legislation.

The conducted research analyzes recent trends in public procurement for institutions such as schools, hospitals, and military units, highlighting the importance of cooperation between contracting authorities and farmers' associative structures. European best practices were examined, identifying ways to adapt them to the Romanian context: the development of intermediary platforms, the application of the best value for money principle, and the simplification of procedures for small and medium-sized producers. The findings emphasize the role of integrated public policies, as well as food education and the active involvement of civil society. Agri-food public procurement can become a driver of progress, contributing to the development of a more equitable, resilient, and sustainable food system in Romania.

Keywords: public procurement, agri-food sector, Romania

OP. 4.7

Cross-Border Agri-Food Trade: Romania–Moldova

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Abstract

Cross-border agri-food trade between Romania and the Republic of Moldova represents a strategic dimension of regional cooperation, economic integration, and food security in the Eastern European context. Despite shared linguistic and cultural ties, as well as a common agricultural heritage, the bilateral trade flows are often limited by infrastructural bottlenecks, regulatory asymmetries, and logistical inefficiencies. However, recent European integration efforts and cross-border cooperation programs have created new opportunities to harmonize standards, reduce trade barriers, and promote joint ventures in the agri-food sector. This paper analyzes the dynamics of agri-food trade between the two countries, focusing on key product categories, trade balance, and recent policy developments. It also highlights success stories and ongoing challenges, offering recommendations for enhancing competitiveness, transparency, and sustainability. Strengthening institutional collaboration and investment in modernizing agri-food value chains are essential for unlocking the full potential of this bilateral trade relationship.

Keywords: aquaponic agriculture, urban area, consumers

OP. 4.9

Financing Scenarios for Rural Vocational Training: A Case Study from Brăila County and insights for Romania’s South-East Region

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Abstract

Vocational training is a crucial component of rural sustainable development, but its success largely depends on the financing models applied. This paper explores alternative financing scenarios for rural workforce training programs, using Brăila County as a representative case study within Romania's South-East Region. The research method includes a SWOT analysis of the Brăila County, complemented by economic impact simulations for three funding scenarios: EU structural funds (FSE+, PNRR), public-private partnerships (PPP), and local community grants. The results show that blended models involving local co-financing and engagement of economic stakeholders are the most effective in attracting and retaining young people in vocational programs. The paper concludes that flexible financing mechanisms, multisectoral partnerships, and continuous post-training support are essential for successful rural labor force development. Practical recommendations are provided for scaling these models at the regional level.

Keywords: vocational education financing, rural labor, public – private partnerships, South – East Region.

OP. 4.10

Mapping Future Rural Occupations: An Analysis of Skilled Labor Needs in Romania's South-East Region

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Abstract

Romania's South-East Region faces a development paradox: although it possesses significant agricultural, touristic, and industrial resources, the lack of adequately trained workforce limits the full capitalization of this potential. This study aims to identify the key occupations with high employment potential in rural areas and to propose tailored vocational training directions aligned with regional needs. The methodology combines statistical analysis of official data (INS, ANOFM, Eurostat) with semi-structured interviews conducted with local entrepreneurs, authorities, and training center representatives. The findings reveal a strong demand for skills in areas such as agricultural mechanics, green construction, food processing, social services, and Agri-tech (e.g., GIS and drone-based farming). However, current training offers, and infrastructure fall short of addressing these needs. The article proposes a prioritization matrix for vocational training, correlating employer demand with local demographic profiles. The study concludes that rural human capital development must be better integrated with regional economic strategies to foster sustainable growth and reduce socio-economic disparities.

Keywords: rural development, skilled labor, vocational training, human capital, South – East Region.

OP. 4.11

Adaptation of Sustainable Aquaculture Practices to Climate Change: The Role of Agropiscicultural Rotation in Preserving Biodiversity in Southeastern Romania

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Abstract

Climate change poses increasing challenges to sustainable food production systems, particularly those integrating aquaculture and agriculture. This study explores the role of agropiscicultural rotation—a land use strategy combining crop cultivation and fish farming—in enhancing the resilience of integrated systems to climate variability in Southeastern Romania. By analyzing environmental parameters, biodiversity indicators, and productivity data from agropiscicultural pilot areas, the research highlights the benefits of rotational practices in maintaining aquatic and terrestrial biodiversity, optimizing resource use, and mitigating the adverse effects of extreme weather events. The findings underscore the importance of adaptive management strategies that promote ecological balance and sustainability within agro-aquatic systems. Recommendations are made for the implementation of agropiscicultural rotation as a viable response to climate pressures in vulnerable regions.

Keywords: sustainable aquaculture, preserving biodiversity, Southeastern Romania.

OP. 4.12
Food Waste in Republic of Moldova in 2024: Causes, Impacts, and Policy Responses

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Abstract

Over the year 2024, food waste remained a severe problem in the Republic of Moldova, and it had both economic and social dimensions. The whole value of the food lost in 2024 was estimated at 20.5 billion lei, of which 7 billion lei were the food that was purchased and the consumers did not use. Moldovans threw away approximately 180,000 tons of food, which is approximately 70 kg per person per year. Starting from the 1st of January 2025, financial contributors are given tax deductions for safe food products that cannot be sold due to package or label mistakes. The activities of certain nongovernmental organizations such as EcoContact have risen public awareness of the environmental and social effects of food waste, emphasizing that 30% of the food in Moldova is thrown away at the time of purchase.

Keywords: Food Waste, economic impact, organizations, legislative action, food recovery.

OP. 4.13
Food Consumption, Media Promotion, and Population Health in the Republic of Moldova

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Abstract

This study explores the relationship between food consumption patterns, media promotion strategies, and public health outcomes in the Republic of Moldova. In recent years, increasing exposure to advertising for ultra-processed foods—especially through television, social media, and outdoor marketing—has significantly influenced dietary behavior, particularly among children and adolescents. These promotional campaigns often prioritize high-calorie, low-nutrient products, contributing to the rise in obesity, diabetes, and other non-communicable diseases. At the same time, limited nutritional education and weak regulation of food marketing create an environment where unhealthy choices are normalized. The research highlights the need for integrated policy responses, including stricter advertising regulations, public health campaigns, and support for healthier food environments. It also underlines the importance of media literacy and health education programs aimed at reducing the negative impact of commercial food promotion on population health.

Keywords: food consumption, media influence, public health, Republic of Moldova

OP. 4.14
Market Concentration and Territorial Asymmetries in the Moldovan Agri-Food Retail System

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Abstract

The Moldovan agri-food retail system exhibits a high degree of market concentration, with a few dominant chains controlling most of the distribution network. This concentration leads to reduced competition, limits the market access of small local producers, and influences consumer prices and product diversity. At the same time, significant territorial asymmetries are present: urban areas, especially the

capital region, benefit from modern retail infrastructure and a wide range of agri-food products, while rural and peripheral regions remain underserved. These disparities deepen socio-economic divides and hinder the development of resilient local food systems. The study explores the structural factors behind these imbalances and proposes policy interventions to promote fairer competition, territorial equity, and support for small-scale producers. Strengthening short food supply chains and investing in regional retail logistics are essential for improving access, affordability, and sustainability within Moldova's agri-food system.

Keywords: agri-food retail, market concentration, territorial disparities.

OP. 4.15

Analysis of Food Product Withdrawal and Recall Notifications in Romania, 2024

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Abstract

The paper analyzes voluntary food product withdrawals and recalls from the Romanian market during 2021-2023, aiming to highlight the main categories of affected foods and the causes of non-compliance. The study identified a total of 12,793 incriminated products, showing a slight downward trend of cases in recent years. Withdrawn products frequently originate from major global food retail chains, with causes ranging from labeling non-compliance to the presence of contaminants or suspicions of exceeding permissible limits for food additives. The information used in this study was collected from the platform of the National Sanitary Veterinary and Food Safety Authority. The results of the research are valuable for both the scientific community and the business sector, providing relevant insights into the quality and compliance of food products marketed in Romania.

Keywords: withdrawal, recall, food, Romanian Market, ANSVSA

OP. 4.16

Analysis of Food Product Withdrawal and Recall Notifications in Romania, 2024

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Abstract

The paper presents an analysis of food product withdrawal and recall notifications from the year 2024, both at the national and international level. The aim of the paper is to identify the quality of products that reached the end consumer, the types of notifications issued during the analyzed year, the origin of the products involved in withdrawals and recalls, and the number of notifications concerning products of animal and non-animal origin, both in Romania and internationally. It will be noted that in 2024, there were 4,856 notifications involving food products. Among these, 1,224 were alert notifications, 1,583 were border rejection notifications, and 2,049 were information and follow-up notifications. These notifications result from irregularities related to product quality, safety, and labeling. The study also examines the origin of the products involved in these alerts. The results of the study can be useful both to researchers and to the business sector. The research is part of the doctoral training stage and represents the foundation of a broader study on food safety in the South-East Region of Romania.

Keywords: Romania, imports, recalls, notifications

OP. 4.17.
Vocational Training as a Factor for Enhancing Human Resources in Agriculture

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Abstract

In the current context of rapid economic and technological transformation, vocational training plays a pivotal role in the effective enhancement of human resources within the agricultural sector. This study investigates the contribution of continuous training to improving labor productivity and enabling agricultural workers to adapt to evolving market demands. Particular attention is given to the development of key competencies essential for agricultural modernization, including digital proficiency, entrepreneurial capabilities, and sustainable resource management. The analysis also addresses the role of vocational education in reducing regional disparities by expanding access to education and fostering socio-economic integration in disadvantaged areas. Furthermore, vocational training is examined as a strategic lever for attracting and retaining young people in agricultural activities, thus contributing to workforce renewal and the revitalization of rural communities. The findings highlight the critical need for coherent public policies that support training programs tailored to regional and sectoral requirements, strengthen partnerships between educational institutions and agricultural organizations, and promote innovation as a catalyst for sustainable rural development.

Keywords: vocational training, agriculture, rural development, youth retention

OP. 4.18.
Human Resources Dynamics in the Agricultural Sector in Romania

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Abstract

The agricultural sector remains a cornerstone of economic and social stability, with major contributions to food security, rural employment, environmental sustainability, and technological progress. This study investigates the dynamics of human resources within Romanian agriculture, emphasizing structural transformations, labor productivity, and demographic trends. Drawing on official statistical data from the National Institute of Statistics and Eurostat, the research examines variables such as workforce age distribution, educational attainment, employment status, and regional disparities. Utilizing descriptive statistics and trend analysis, the study identifies critical factors influencing labor efficiency and sectoral competitiveness. Despite a substantial workforce engaged in agriculture, disparities in professional training and access to innovation persist, limiting productivity growth. Seasonal fluctuations and labor migration continue to destabilize workforce continuity, affecting both operational efficiency and long-term planning. Findings suggest that strengthening vocational education, promoting digital skills, and enhancing working conditions are vital measures for revitalizing the agricultural workforce. Moreover, aligning human capital development with technological innovation strategies emerges as a priority for boosting sustainability and resilience in Romanian agriculture. Although focused on Romania, the findings may have broader implications for countries experiencing similar challenges. These insights are critical for designing evidence-based agricultural policies and ensuring sustainable rural development.

Keywords: agricultural workforce, labor productivity, Romania, rural development

OP. 4.19

Funding Programs / Projects under Implementation (2021–2027 Financial Framework) with Impact on Rural Development

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Abstract

During the 2021–2027 financial framework, Romania benefits from a wide range of funding programs aimed at supporting sustainable rural development. The National Strategic Plan (NSP) under the Common Agricultural Policy (CAP) targets the modernization of agricultural infrastructure, support for young farmers, and the promotion of sustainable farming practices. In parallel, the National Rural Development Program (NRDP) focuses on diversifying the rural economy and improving quality of life in rural areas. The National Recovery and Resilience Plan (NRRP) provides substantial funding for the digitalization of rural services and the development of essential infrastructure. Additionally, Interreg and LEADER programs encourage cross-border cooperation and bottom-up development initiatives. Successful implementation requires coordinated efforts between national authorities, local administrations, and rural communities to ensure efficient fund absorption and maximize impact. This paper examines the structure, objectives, and expected outcomes of these programs in relation to rural development priorities in Romania.

Keywords: rural development, EU funding programs, Romania

OP. 4.20

European Perspective on Rural Development in Galați County: Challenges, Funding, and Regional Integration

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Abstract

This paper explores rural development in Galați County from a European perspective, highlighting key challenges, funding opportunities, and prospects for regional integration. As part of Romania's South-East Development Region, Galați faces structural issues such as depopulation, aging rural communities, underdeveloped infrastructure, and limited access to modern agricultural technologies. Through the 2021–2027 EU financial framework, significant funding is allocated to address these disparities via the Common Agricultural Policy (CAP), Cohesion Policy, and the National Recovery and Resilience Plan (NRRP). The study analyzes how European funds contribute to rural diversification, environmental sustainability, and improved living standards. It also examines cross-border cooperation initiatives and local stakeholder engagement in fostering regional integration and rural resilience. Despite persistent socio-economic gaps, Galați County shows potential to align more closely with EU rural development goals, provided that institutional capacity, project absorption, and strategic coordination are enhanced.

Keywords: rural development, EU funding, regional integration

OP. 4.21

Funding Opportunities for Small Farmers to Support Sustainable Rural Development in the Central Region of Moldova

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Abstract

The agricultural sector of the Republic of Moldova is a key component of the national economy, having a significant impact on the population in rural areas and contributing to the development of other economic sectors. Although it faces major challenges due to economic and political transformations, modernizing this sector is crucial for ensuring its proper functioning, improving efficiency and competitiveness, and enhancing the well-being of the population. In the context of EU integration and alignment with the Common Agricultural Policy (CAP), the Republic of Moldova can support farmers through financial measures that promote sustainability and the modernization of agriculture. The research aims to provide a comprehensive guide for farmers in the Central Region of Moldova to help them access funding sources dedicated to implementing sustainable solutions in their farms, thus contributing to the improvement of economic performance, environmental protection, and adaptability to climate change.

Keywords: modernization, agricultural sector, sustainability, funding, and farmers

OP. 4.22

Digital Transformation in The Agricultural Field 2023-2027

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Abstract

The influence of new technologies and digitalization in general on the agriculture sector is a topic of great discussion these days. Digitalization of agriculture and so-called precision farming appear to be the intended answers to several problems, like the need for higher output, the desire to become greener, or the declining population. There are difficulties in this transition process since there is a lot of demand to change and the expenses are comparable. The National Strategic Plans are a new tool that the EU is implementing in full compliance with the subsidiarity principle to provide each Member State with a framework for the transition that is tailored to their own national specificities. The EU is developing the necessary mechanisms to support this transition through the CAP post-2020. As more and more professionals see the value of utilizing the European toolbox in the field of CAP to support a timely and optimum digital transition toward modern agriculture, where no one is left behind, Romania is no longer a beginner to this process and the wheels of change are already in action.

Keywords: digitalization, new technologies, Common Agricultura Policy (CAP), National Strategic Plan

OP. 4.23

Comparative Analysis of the Stage of Application of the Agro-Environmental Measure at European Level, By Member States

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Abstract

This paper aims to carry out a comparative analysis of the state of implementation of agri-environmental measures within the European Union, with a focus on differences and similarities between Member States. Agri-environmental measures are an essential instrument of the Common Agricultural Policy (CAP), with the role of promoting sustainable agricultural practices, protecting biodiversity and conserving natural resources. The study assesses the level of implementation of these measures according to the degree of farmer participation, the agricultural area involved, financial allocations and the efficiency of the measures applied. By analysing recent data from reports by the European Commission and other relevant bodies, the paper highlights the variations between Member States, identifying economic, social and political factors that influence the success of implementation. The conclusions highlight good practices, but also the challenges encountered in the application of agri-environmental policies, offering recommendations for their improvement in the future European strategic framework.

Keywords: comparative analysis, Common Agricultural Policy, agri-environmental policies

OP. 4.24

Efficiency of Agricultural Crops under the Impact of Drought

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Abstract

The main objective of the research is to evaluate the efficiency of crops under the influence of drought. In the development of agriculture, a challenge is to obtain high yields under the action of climatic factors. During the research, numerous other secondary objectives were achieved, and starting hypotheses were established, which are verified at the end of the article. The objective of the research falls within the current guidelines of PAM 8, which aims at the efficiency of water use in Romania. The research is located at the Brăila county level, we aimed to evaluate the efficiency of the most vulnerable crops (maize, sunflower) under the impact of water shortage. The study was analyzed over the last 33 years, and the results suggested that the potential of crops is proven by the contribution to the turnover of over 8% that it has in the county's economy. Further research is needed to elaborate on these findings in other counties to have a comprehensive nationwide diagnosis for stakeholders.

Key words: maize, sunflower, efficiency, drought

OP. 4.25

The Use of Pedoclimatic Indicators in the Stability of Soil Quality in the Cernisoils Class in Tudor Vladimirescu Atu, Brăila County

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Abstract

This paper presents research on the use of pedoclimatic indicators in determining the quality of soils in the Cernisoils Class in the Tudor Vladimirescu ATU, Brăila County. The field of land evaluation has evolved in recent years, becoming increasingly complex and demanding for assessing the qualities (performances) of soils and lands for different purposes or uses. The data used in this study were obtained by collecting soil samples, which were analyzed and interpreted according to the working methodology (MESP, 1987). 17 pedoclimatic indicators are used to calculate the soil quality grades and classify the soil into quality classes. This study highlights the quality classes for soils in the Cernisoils Class (Chernozem and Faeozem), which occupy 66.75% (4,613.80 ha) of the total agricultural area (arable and pasture). Research of this type is extremely useful because it presents an overview of the soil cover, the productive potential of the land, the limiting factors of plant production and the main problems raised by the valorization of the soil resources of the studied territory.

Keywords: pedoclimatic indicators, soil quality, Cernisoils Class

OP. 4.26

Developments In the Theories of Motivation

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Abstract

This paper surveys the evolutionary landscape of motivational theories and traces the progression from classic models to contemporary models that incorporate cognitive, emotional and social dimensions. Early seed theories such as Maslow's Hierarchy of Needs and Herzberg's Two-Factor Theory provided fundamental insights into human behavior and motivation in the workplace. In contrast, modern theories such as Self-Determination Theory, Goal-Setting Theory, and Expectancy Theory emphasize the role of intrinsic motivation, individual influence, and contextual factors. Recent developments also consider the impact of neuroscience, cultural diversity, and digital environments on motivational processes. This vision highlights the way in which the integration of interdisciplinary research influences the way of understanding and makes it more nuanced and dynamic, thus determining human motivation in different fields.

Keywords: motivation, self-motivation, emotional intelligence, management, organisational behaviours

OP. 4.27
Challenges and Opportunities in the Certification and Labeling of Organic Wines

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Abstract

Ecosystem wine represents a new segment in the wine industry, driven by increasing interest in consumption that is socially and environmentally responsible. This paper analyzes organic wine production processes, exploring ecosystem consumption trends as they relate to legislation and certification, labeling, process, and quality control both from a producer and consumer perspective. Organic wines undergo fermentation without the application of synthetic herbicides or fertilizers within the boundaries of the European Union's framework, especially under the guidelines of IFOAM and Regulation (EU) 2018/848. Gaining an organic certification entails significant costs for producers, particularly if proper branding is applied, while fostering consumer trust, enhancing brand visibility, creating marketing opportunities, and ensuring increased and sustained customer loyalty. The lack of international uniformity regarding certification systems, regulatory differences between the EU and the United States, and consumer perception regarding the high costs of ecosystem wines are major hindrances. However, in both Europe and the United States, eco-labels are associated with high-quality goods, which is contributing towards the growth.

In addition to the positive effects on natural biodiversity and resources, organic wines invite innovations in packaging design, marketing strategies, and brand positioning. Surveys suggest that the millennial generation is more inclined to purchase authentic and sustainable products. Romania is facing limited markets, but there is an opportunity for growth if consumers and the government actively support organic farming initiatives.

Keywords: organic wine, certification, labeling, sustainability, consumer

OP. 4.28.
The Impact of COVID-19 on Tourism in Europe and Romania. The Agritourism and its Impact during the Pandemic

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Abstract

The COVID-19 pandemic had a profound impact on tourism across Europe and Romania, generating severe disruptions in international travel, hospitality, and related services. Lockdowns, travel restrictions, and changing consumer behaviors led to a drastic decline in tourism revenues and employment. However, agritourism emerged as a more resilient and adaptable form of tourism during the crisis. Offering open-air experiences, local food, and rural accommodation, agritourism attracted domestic tourists seeking safe, nature-based alternatives. In Romania, this niche sector provided economic relief to rural communities and small farms, supporting local development during periods of limited mobility. The study analyzes tourism trends before and during the pandemic, focusing on shifts in demand, adaptation strategies, and the role of EU recovery funds. Agritourism proved not only to be a buffer during the pandemic but also a sustainable model for future rural tourism development.

Keywords: COVID-19, agritourism, rural tourism

OP. 4.29
Online Hunting Maps as Modern Tools for Promoting Agrotourism Activities

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Abstract

This paper examines the role of online hunting maps as innovative tools for enhancing agrotourism development, especially in rural and forested regions. By integrating geospatial data, wildlife tracking, and land accessibility information, digital hunting maps offer tourists and hunters a safe, transparent, and interactive experience. These platforms contribute to the diversification of rural tourism services by connecting hunting activities with local accommodation, traditional food, and cultural heritage. In regions where hunting is part of rural identity, such tools support sustainable tourism models and seasonal tourism flow. The study explores the functionalities of various digital platforms, their accessibility, and their integration with mobile applications. Additionally, it highlights examples from European countries and Romania where such tools have already improved the visibility and attractiveness of agrotourism destinations. The findings suggest that digitalization, when combined with responsible tourism practices, can revitalize rural economies and promote biodiversity conservation.

Keywords: online hunting maps, agrotourism, rural digitalization

OP. 4.30
Professional Associations in Romanian Animal Husbandry: Current Landscape and Development Needs

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Abstract

Professional associations in Romanian animal husbandry play a crucial role in representing farmers' interests, facilitating knowledge transfer, and promoting sustainable practices. Despite their importance, many such associations face challenges including limited institutional capacity, fragmented representation, and insufficient engagement in policy-making processes. The historical legacy of centralized agricultural systems and a lack of trust in collective structures have hindered the development of robust professional networks. However, recent initiatives, such as the Association of Traditional and Ecological Producers in Maramureș and the APAVIE Valeni Association, demonstrate the potential of organized groups to enhance product quality, market access, and rural development. To strengthen the sector, it is essential to invest in capacity-building programs, encourage collaboration among stakeholders, and integrate professional associations into national and European agricultural frameworks. By addressing these development needs, Romania can foster a more resilient and competitive animal husbandry sector that benefits both producers and consumers.

Keywords: animal husbandry, professional associations, rural development

OP. 4.31
The Evolution of the Goat Sector in Romania: Trends, Challenges, And Opportunities

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Abstract

The goat farming sector in Romania has experienced notable growth in recent years, positioning the country among the top five goat producers in Europe. This expansion is driven by European support measures and increasing international demand for goat meat. However, domestic consumption remains low, primarily limited to festive occasions. Structural challenges, such as the lack of slaughtering and processing facilities, encourage live animal exports, which generate limited added value. Coupled payment support is crucial for sustaining goat farming activities, especially for large farms, while its absence increases the risk of small farm abandonment, threatening sector diversity and its contribution to the rural economy. To enhance domestic consumption and sector development, the study recommends targeted promotional campaigns on the nutritional benefits of goat products, infrastructure investments, and improved market organization. These measures aim to align Romania's goat farming sector with European best practices and unlock its full economic potential.

Keywords: goat farming, rural development, Romania

OP. 4.32
Enhancing the Competitiveness of Moldova's Agri-Food Sector: Challenges and Policy Options

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Abstract

The Moldovan agri-food sector is a vital component of the national economy, contributing significantly to GDP and employment. Despite its importance, the sector faces challenges in productivity and market integration. Factors such as fragmented land ownership, limited access to modern technologies, and inadequate infrastructure hinder productivity growth. Moreover, the sector's integration into international markets is constrained by non-tariff barriers and compliance with stringent quality standards. Efforts to enhance competitiveness include adopting digital solutions, improving supply chain management, and aligning with European Union regulations. The Deep and Comprehensive Free Trade Area (DCFTA) agreement with the EU offers opportunities for market expansion but requires substantial reforms and investments. Addressing these challenges through targeted policies and investments is crucial for the sustainable development of Moldova's agri-food sector and its successful integration into global markets.

Keywords: agri-food productivity, market integrationRepublic of Moldova.

OP. 4.33

Productivity and Market Integration of the Moldovan Agri-Food Sector

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Abstract

The agri-food sector in the Republic of Moldova holds strategic importance for the national economy, contributing significantly to employment, exports, and rural livelihoods. However, its competitiveness remains constrained by several structural and policy-related challenges. These include fragmented land ownership, outdated infrastructure, limited access to finance, and weak integration into international value chains. The sector also faces difficulties in meeting EU quality and safety standards, which hinders market expansion. This paper analyzes the current performance of Moldova's agri-food sector, identifies major constraints, and reviews policy options to enhance competitiveness. Emphasis is placed on improving agricultural education and extension services, supporting producer associations, investing in post-harvest infrastructure, and aligning national regulations with EU requirements. Strategic public–private partnerships and targeted government interventions are essential to modernize the sector and ensure long-term sustainability. Enhancing competitiveness would not only increase exports but also improve food security and rural development outcomes.

Keywords: agri-food sector, Republic of Moldova.

OP. 4.34

Research on the Implementation of AI Technologies in the Agro-Food Sector

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Abstract

The integration of Artificial Intelligence (AI) technologies into the agro-food sector is transforming traditional agricultural practices by enhancing productivity, sustainability, and supply chain efficiency. AI applications, including machine learning algorithms, predictive analytics, and computer vision, are being utilized for crop monitoring, yield prediction, pest detection, and resource optimization. These technologies enable farmers to make data-driven decisions, reduce input costs, and minimize environmental impact. In Moldova, the adoption of AI in agriculture is gaining momentum, supported by initiatives such as the e-Agriculture program and collaborations with tech providers like Farmonaut, which offers satellite-based farm management solutions. Despite these advancements, challenges persist, including limited digital infrastructure, the need for farmer training, and data privacy concerns. Addressing these issues through targeted policies, investment in digital infrastructure, and capacity-building programs is essential for the widespread adoption of AI in agriculture. Future research should focus on developing context-specific AI solutions that cater to the unique needs of different agricultural regions.

Keywords: Artificial Intelligence in agriculture, agro-food technology, precision Farming

OP. 4.35

The Alternative to Neonicotinoids: Premises for a Sustainable Agricultural Policy in the Romanian Context

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Abstract

The article analyzes the controversies generated using neonicotinoids in Romanian agriculture, in the context of successive derogations issued by the Ministry of Agriculture and Rural Development, in contradiction with European Union regulations on the protection of pollinators. The study starts from the case of the derogation of December 2024 and follows the legal, ecological and socio-economic implications of the administrative decisions, balancing the divergent positions of the actors involved: authorities, farmers, beekeepers and environmental organizations. By analyzing official documents and public positions of the authorities, the article highlights the tensions between the objectives of agricultural production and the need to protect biodiversity. The preliminary conclusions emphasize the need for a coherent public policy based on scientific data to facilitate the transition to sustainable agricultural practices, without compromising food security or ecosystem health.

Keywords: neonicotinoids, derogations, agricultural production, biodiversity.

OP. 4.36

The Wine Value Chain in Romania: An Integrated Approach to the Wine Sector

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Abstract

Romania benefits from favorable soil and climatic conditions for viticulture, occupying a significant place in the hierarchy of wine producers in Central and Eastern Europe. The article provides an analysis of the wine sector chain in Romania, with the main objective of highlighting the structural, economic and strategic characteristics of this traditional agricultural segment. The study follows the entire value chain – from the production of grapes and their processing in specialized units, to the distribution and consumption of wine on domestic and foreign markets. In addition to the technical and economic dimension, the analysis also highlights commercial aspects: market structure, consumption trends, the positioning of Romanian wines concerning international competition and the role of exports in strengthening the competitiveness of the sector. A special emphasis is placed on the national and European regulatory framework, the sources of financing available through the Common Agricultural Policy and the support policies for small producers. Finally, the major challenges facing this sector are identified, such as the fragmentation of production, climate change, but also emerging opportunities, such as the development of wine tourism, or the demand for organic wines. The conclusions underline the importance of a coherent strategy for sustainable development, based on innovation and efficient promotion of the image of Romanian wine internationally.

Keywords: wine value chain, wine production, sustainable viticulture.

OP. 4.37

Emerging Technologies as a Sustainable Solution to Agricultural Risks: Challenges and Prospects

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Abstract

Considering that the agricultural sector is one of the most important areas of activity worldwide, this article aims to analyze how existing technological tools in agriculture can support risk management on farms. Based on the existing specialized literature, we aim to examine three essential aspects: how technology has revolutionized traditional agriculture, specific technological tools for global risk management, the degree of farmers' adaptability to these changes, and the extent to which technology is implemented on farms.

The study shows that although there are numerous tools for improving and automating agricultural activities, there are still countries where the adoption of digital technologies is limited—mainly due to a lack of educational training, insufficient support, and farmers' reluctance to change. In this context, the use of technology becomes a key factor not only in reducing risks but also in promoting sustainability in modern agriculture.

The paper proposes an integrated framework that links risk identification with technological solutions and specific training modules.

Keywords: risk management, high-performance agriculture, technology, automation, sustainability, educational training.

OP. 4.38

Digital Solutions for Risk Management in the Public Sector That Improves the Efficiency and Accessibility of Internal Audit

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Abstract

The paper aimed to present an innovative tool of risk management, more precisely implementing the necessary information for risk assessment in a computerized data system, like a CRM software, exemplified by the risk analysis process within an internal audit mission, with applicability at the management of any public entity. Starting from the identification of the activities and risks associated with a public sector, implementing the risk matrix in a software, by quantifying the probability and impact, the risk exposure is established.

Given the fact that when preparing the audit mission, the risks associated with the domain are analyzed and that the time allocated to this aspect usually represents 50% of the total range of scheduled activities at this stage, the new way of data processing demonstrates that there is a solution that significantly reduces the period required to establish and address risks with major impact.

At the same time, the existing database is accessible and perfectable at any time and based on this information, reports and forecasts can be generated to improve the activity.

Keywords: Innovative, risk management, risk analysis, software, public sector

OP. 4.39

Romanian Food Producers and the Digital Market: Opportunities and Barriers to Online Trade

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Abstract

The digital transformation of Romania's agri-food sector presents both significant opportunities and notable challenges for local food producers. The expansion of e-commerce platforms and increased internet penetration have opened new avenues for producers to reach broader markets, enhance brand visibility, and engage directly with consumers. However, several barriers impede the full realization of these benefits.

Key challenges include limited digital literacy among producers, inadequate infrastructure in rural areas, and logistical hurdles related to distribution and supply chain management. Moreover, regulatory complexities and competition from established international brands further complicate online market entry.

To capitalize on digital market opportunities, Romanian food producers must invest in digital skills development, infrastructure enhancement, and strategic partnerships. Support from governmental and non-governmental organizations in the form of training programs, funding, and policy reforms is essential to facilitate this transition.

Addressing these challenges can lead to increased competitiveness and sustainability in Romania's agri-food sector.

Keywords: digital transformation, e-commerce, Romanian agri-food sector

OP. 4.40

Solar Energy Communities in Romania: A Solution for Prosumers, Grid Balancing and Rural Development

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Abstract

Solar energy communities represent an innovative solution for addressing energy and socio-economic challenges in rural areas of Romania. Through collective ownership of photovoltaic infrastructure, these communities enable prosumers to overcome individual financial and technical barriers, while optimizing energy production and consumption.

The community model, inspired by successful projects such as La CEL de Caldes in Spain, offers a viable alternative in the context of volatile energy prices and limitations in surplus energy compensation mechanisms in Romania.

These energy communities contribute to national grid balancing through intelligent systems, reduce individual costs, provide collective technical expertise, and stimulate rural development by creating jobs, diversifying income sources, and reducing the digital divide.

The integration of these communities with local data centers represents an innovative circular model, utilizing locally produced renewable energy and generating new economic opportunities [6]. With an evolving legislative framework and European support, solar energy communities can become a significant driver for sustainable and digital transformation of Romanian rural areas.

Keywords: solar energy, legislation, power grids, energy models, Romania

OP. 4.41

Smart Farming Technologies Existent IN SE of Romania

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Abstract

With the goal of improving both the quality and quantity of agricultural products, smart farming is the integration of contemporary information and communication technologies (ICT) into the agricultural sector. Internet of Things (IoT), data management, GPS access, soil scanning, and other smart technology are all part of smart farming. Romania should mechanize a sizable portion of the agricultural land to raise the value of its agricultural output.

Due to the highly scattered character of Romanian properties—farms typically span an area of 3.7 hectares—doing this is challenging.

Key words: smart farming, IoT, Crop management, Stakeholders

OP. 4.42

Common Agricultural Policy in Romania

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Abstract

The Common Agricultural Policy (CAP) is the main support mechanism of the European Union for agriculture, with a significant impact on the agricultural sector in Romania. This study analyzes the effects of CAP on Romanian agriculture, focusing on the evolution of subsidies, agricultural production, and farm structure.

The methodology used includes statistical analysis of agricultural indicators, comparison of national and European data, and a case study on the impact of CAP on small and medium-sized farms. Results show a steady increase in CAP subsidies from €600 million in 2010 to over €3.6 billion in 2024, along with an improvement in agricultural productivity, especially in cereal production. However, Romanian agriculture remains fragmented, with over 60% of farms under 10 hectares, limiting access to funding and modernization.

The conclusions highlight the need for more effective policies to integrate small farmers into competitive agri-food chains, reduce bureaucracy in accessing EU funds, and stimulate technological innovation in agriculture.

Keywords: Common Agricultural Policy, Romania, agricultural subsidies, small farms, agricultural production, European Union.

OP. 4.43

Biomass Energy: Management and Entrepreneurship Opportunities

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Abstract

In the current context of climate change and the transition toward sustainable energy sources, biomass is gaining an increasingly important role in the global energy mix. It represents an accessible, versatile, and efficient renewable resource, capable of significantly contributing to the reduction of greenhouse gas emissions and to sustainable economic development. Beyond its ecological benefits, biomass also offers numerous opportunities for efficient resource management and innovative entrepreneurial initiatives.

The Republic of Moldova has committed to several renewable energy targets aimed at reducing dependency on energy imports and promoting greater sustainability within the national energy system.

Green energy is now one of the most important solutions to the energy and environmental challenges of the 21st century. This term refers to the use of renewable sources such as solar, wind, and water to produce energy in a sustainable and environmentally friendly way. The adoption of such resources is not just a modern trend, but an urgent necessity given the depletion of conventional resources and the significant impact of pollution on ecosystems.

Keywords: biomass, green energy, versatile, greenhouse gas emissions, sustainable energy.

OP. 4.44

Sorghum-culture of the future in Europe

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Abstract

Sorghum is a safe alternative for farmers, having a good agricultural potential, a plant resistant to drought, uneven rainfall, a good precursor in the soil, with high biological potential.

Sorghum demand has increased to 30 million tons, on a global scale, in 2024.World sorghum production increased in 2024, but also at European level, but also the areas cultivated with sorghum, for example, France, show an increase of almost 89% over one year.

This study was based on the analysis of secondary data for a general approach, from a variety of sources, exploratory research, with large data, to allow the analysis and synthesis of current trends regarding the evolution of the sorghum cultivation space worldwide, in the E.U. and at national level.

Keywords: sorghum, sorghum crops, ecological and agricultural benefits, economic culture

OP. 4.45

A Bibliometric Evaluation of Security and Safety in Rural Areas

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Abstract

This article presents a bibliometric evaluation of international scientific literature concerning the safety of rural populations. Based on a systematic review of publications indexed in Scopus and Web of Science between 2000 and 2024, the study identifies major research themes, methodologies used, and key contributions in understanding crime, fear, and security in rural areas. The findings highlight a significant research gap in Eastern Europe, suggesting future directions relevant to the context of the Republic of Moldova, particularly in terms of community policing, perceived safety, agricultural crime, and gendered vulnerabilities.

Keywords: rural safety, bibliometric analysis, rural crime, fear of crime, community policing.

OP. 4.46

Main Sources of Funding for the Agricultural Sector in the Republic of Moldova: Trends and Challenges (2019-2024)

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Abstract

This article analyzes the main funding sources for the agricultural sector in the Republic of Moldova, examining both internal and external financial mechanisms. Based on data from the last five years (2019-2024), the paper explores government subsidies, international grants, and bank loans, as well as alternative funding solutions such as crowdfunding and agricultural cooperatives. The study highlights the importance of a well-structured financial system in supporting the modernization and sustainability of agriculture in the country.

Keywords: government subsidies, international grants, bank loans, Republic of Moldova.

SECTION 5
ADVANCED RESEARCH IN ELECTRICAL / ELECTRONIC ENGINEERING, SYSTEM ENGINEERING AND INFORMATION TECHNOLOGIES

OP. 5.1.

Advanced Control of Mineral Mixture Dosing for Process Technology Efficiency

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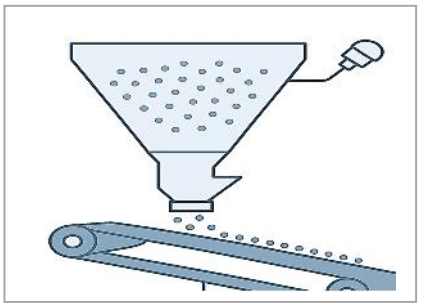
Abstract

This paper explores the development and implementation of an automated control system for the dosing of mineral mixtures in the sintering process, a critical stage in the metallurgical industry. The primary goal of the proposed system is to enhance the efficiency of the technological process by reducing energy and material consumption, as well as CO2 emissions. The automated control system utilizes advanced feedback-based control algorithms and precise measurement technologies to continuously and dynamically adjust the proportions of minerals in the mixture. By integrating high-performance sensors and real-time data analysis techniques, the system allows for rapid adaptation to the qualitative variations of raw materials. The results of implementing this system indicate a significant improvement in the quality of the produced sinter, alongside the optimization of resource consumption. The study also details the technical aspects of the control system, including its architecture, hardware and software components used, as well as the economic and environmental impact of the adopted solutions. In conclusion, the introduction of advanced control in the mineral dosing process opens new possibilities for increasing efficiency and sustainability in the sintering industry.



Keywords: advanced control algorithms, integration of high-performance sensors, real-time data analysis, energy and resource efficiency.

OP.5.2.

Improving the Efficiency of Hybrid Filtration Systems through Automation with Pneumatic Nitrogen

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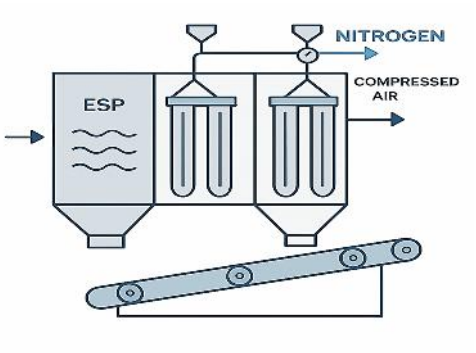
Abstract

This paper presents a comprehensive study on the enhancement of hybrid filtration systems by integrating pneumatic nitrogen automation. Hybrid filtration systems, which combine various filtration technologies, face challenges in maintaining high efficiency and operational stability.

The introduction of pneumatic nitrogen serves as a dynamic solution to these challenges, offering precise control over the filtration process and reducing the dependency on manual interventions. The research focuses on the application of pneumatic nitrogen to control and optimize the cleaning cycles of filter elements in hybrid systems, which include both electrostatic precipitators and bag filters. By automating the purge and cleaning processes, the system achieves a more consistent output and extends the lifespan of the filter materials. Additionally, the use of nitrogen, as opposed to compressed air, minimizes the introduction of moisture and other contaminants into the system, thus enhancing the overall filtration efficiency. The findings demonstrate that the automated nitrogen-based control system not only improves the operational efficiency of hybrid filtration units but also contributes to significant reductions in maintenance costs and energy consumption. This approach also aids in complying with stringent environmental regulations by limiting emissions and waste. In conclusion, the integration of pneumatic nitrogen into hybrid filtration systems presents a viable and effective strategy for improving filtration efficiency and sustainability. This advancement in filtration technology paves the way for more environmentally friendly and cost-effective industrial practices



Keywords: automation, pneumatic nitrogen,electrostatic.

OP. 5.3.

Systematic Comparison of Image Processing for Deep Learning-Based Pneumonia Diagnosis

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Abstract

This study presents a comparative analysis of various image pre-processing and processing techniques applied to chest X-ray data to improve the diagnostic accuracy of deep learning models for pneumonia detection. The main point is to compare and evaluate how different image processing strategies influence the diagnostic performance of a ResNet-18 convolutional neural network.

A labeled dataset from Kaggle is used as the experimental basis, with identical network architecture and training parameters across all experiments to ensure consistency. The investigated pre-processing pipelines include combinations of image resizing, intensity normalization, bone shadow suppression, and contrast enhancement. Additionally, to replicate clinical variability and improve the model's resilience and generalizability, a thorough data augmentation technique is used, which includes random rotations, translations, and scaling.

A ResNet-18 architecture, chosen for its balance between computational efficiency and representational capacity, is trained using the processed dataset. By training the ResNet-18 model separately on each pre-processed version of the dataset, the study quantitatively compares the resulting classification metrics (accuracy, precision, recall, F1-score, AUC). The findings aim to identify the most effective data conditioning approaches for improving the performance and robustness of neural networks in medical image analysis, with specific focus on pneumonia detection.

Keywords: Image Pre-processing, Pneumonia Detection, ResNet-18.

OP. 5.4.

Neural networks application in the context of edge classification

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Abstract

Neural networks (NNs) are correlated with the image processing filed, yielding interesting results in the classification of different diseases. This study examined the MRI data acquired from scanning human brain images to identify both stable and unstable disorders. By significantly decreasing the amount of data and filtering the information, the edge detection technique preserves both the essential structural components of an image and the necessary information. In this work, we used the Sobel filter, which is suggested because of its rapid detection speed and positive impact on edge identification. Two odd kernels are used by the Sobel filter to adjust for changes in both the horizontal and vertical directions. Relevant features that fed three NN were performed by projecting the edges into a horizontal and vertical histogram and analyzing it using the standard deviation, skewness, and kurtosis. In binary classification, the accuracy of the Cascade Forward, Feedforward, and Pattern Recognition NNs was 75.22%, 75.11%, and 75.9%, respectively.

Keywords: sobel filter; edge detection; neural netwok; image processing.

OP. 5.5.

Optimizing the operation of loopers in hot strip lamination

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Abstract

The hot rolling process of sheet metal in the finishing train uses loopers to take over the surplus material between the stands. The loopers ensure a constant tension of the laminating strip and a constant speed of it, balancing the operation of the entire installation.

During the rolling process, the mechanical and electrical stresses of the loopers have a very high dynamic to maintain the quality parameters of the finished product within accepted limits.

The main element driving the loopers is a direct current motor that operates at a maximum angular displacement of 90 degrees.

Optimizing the operation of the loopers requires analyzing the dynamic evolution of the parameters of the entire installation but also of the laminating strip and finding the best solutions for the optimal takeover of the material between the stands.

Keywords: Loopers, Constant tension of the strip, Dynamic evolution of the parameters

OP. 5.6.

Neural Network Control for Induction Motor Feed-Drives

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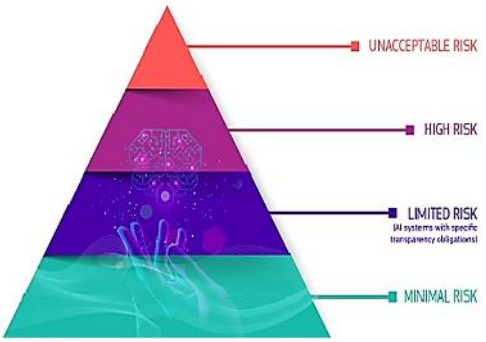
Abstract

The fast-pacing evolution of artificial intelligence (AI) in recent years represents a breakthrough in almost all domains. Thus, this rapid development of AI in different sectors needs to be regulated in order to eliminate discrimination and biases. This paper aims to review the everchanging legal framework in AI sector and to make an objective comparasion between the legislation in Europe, United States of America (USA) and in China. European Union (EU) and China implements a similar approach, a risk-based approach which defines different levels of risks in AI systems, from innaceptable risks to no risks at all.



On the other hand the USA is a approaching a more descentralized way of implementing regulations, with federal laws and each state can implement supplementary laws. The paradigm shift between USA an EU is that the USA laws impose that the USA remains the global leader in matters of AI development, and in EU laws impose user safety first. On the other side, China, implements two-pronged strategy, one for industry specific regulations and the second for the AI governange pilot projects. The authors of this paper investigated the incorporation of AI control in electric drive systems with three-phase asynchronous machines. In order to eliminate the disadvantages of conventional drive systems, the introduction of intelligent algorithms eliminates the dependence of motor parameters on variations in environmental conditions, resulting in better control performances with parameters decoupled from temperature or magnetization variations of the machine. The neural network-based control of the three-phase asynchronous machine is studied in this paper, and the obtained results show high performances of the intelligent drive system.

Keywords: Artificial Intelligence, reglementations, United States of America, European Union, China, three-phase asynchronous machine, Neural Network

OP 5.7.

Variable Speed Drives Integration into a Cyber-Physical Environment

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Abstract

Cyber-physical systems are systems that combine computing technologies with communication systems and control structures. Due to the communication channels in distributed control systems, random delays occur. The introduction of delays into the system can affect the performance and stability of the system. In this paper, a study for an industrial distributed control system is presented, in order to monitor and control remotely in real time the electric machine. The model of the variable speed system with speed estimator is presented, along with the numerical results obtained. Also, the random delay of the communication systems is taken into account. In this paper, the challenges of such a system, as well as the application areas, are presented.

Keywords: Cyber Physical System, Variable Frequency Drives, Observers.

SECTION 6
FUTURE OF ECO-NANOTECHNOLOGIES, FUNCTIONAL MATERIALS AND COATINGS

OP. 6.1.

The Influence of High Speed High Pressure Torsion (HSHPT) Parameters on the Mechanical and Thermal Properties Obtained on $Ni_{50.3}Ti_{49.7}/Ni_{49.6}Ti_{50.4}/Ni_{50.3}Ti_{49.7}$ (at.%) Multilayer Composite Module

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Abstract

An efficient severe plastic deformation (SPD) technique, High Speed High Pressure Torsion (HSHPT), is employed to produce shape memory alloy (SMA) active elements with revolution symmetry having ability to develop axial displacement. The active element (module), a truncated cone shape, was obtained from rings of nickel-titanium shape memory alloys. The manufacturing process of $Ni_{50.3}Ti_{49.7}/Ni_{49.6}Ti_{50.4}/Ni_{50.3}Ti_{49.7}$ (at.%) multilayer composite module is presented in this work. The shape characteristic ratio (SCR) was calculated based on the module's geometry characteristics. The module was tested using an INSTRON 3382 testing machine with a thermal chamber. It was subjected to five cycles of static compression at a strain rate of 0.5 mm/min, applied between flat surfaces at room temperature. The second test have involved compressing of the module at a constant stroke (about 0.5 mm), followed by heating at 180°C in a constrained state. The objective of these tests is to establish the force-stroke response of the $Ni_{50.3}Ti_{49.7}/Ni_{49.6}Ti_{50.4}/Ni_{50.3}Ti_{49.7}$ multilayer composite module under cyclic compression at ambient temperature, as well as the variation of stress with temperature and the determination of critical temperatures for the reverse martensitic transformation.

Keywords: Severe plastic deformation, HSHPT, Shape memory composites.

OP. 6.2.

The Influence of the Degree of Deformation on the Variation of Critical Points in Ni-Ti Multilayer Composites Obtained by High Speed High Pressure Torsion (HSHPT)

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Abstract

This study involved the fabrication of Ni-Ti multilayer composites through the application of High Speed High Pressure Torsion (HSHPT) a hot severe plastic deformation (SPD) method. The multilayered composite discs resulting by assembling Ni-Ti alloys with two compositions: $Ni_{49.6}Ti_{50.4}$ (at.%)(Ti-rich), and $Ni_{50.3}Ti_{49.7}$ (at.%), (Ni-rich). It was designed for the composites to have three layers of both alloys. The

layers were arranged in the configuration $Ni_{50.3}Ti_{49.7}/Ni_{49.6}Ti_{50.4}/ Ni_{50.3}Ti_{49.7}$ to improve shape recovery upon both heating and cooling. This work focuses on the manufacturing process of Ni-Ti multilayer composites and present shape memory properties and martensitic transitions of nickel-titanium multilayer composites with different degrees of deformation, using differential scanning calorimetry (DSC).

Keywords: Severe plastic deformation, HSHPT, Shape memory alloy, Composites, Ni-Ti.

OP. 6.3.
Structural Integrity Analysis of a Cryogenic O_2 Storage Vessel for Industrial Environments

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Abstract

This paper presents the development and evaluation process of a cryogenic storage system designed for liquid oxygen in industrial applications. Cryogenic tanks are used for storing materials at extremely low temperatures, and the present study focuses on a tank specifically engineered for oxygen storage.

The construction of the cryogenic tank employed the material X5CrNi18-10, selected for its superior resistance to intergranular corrosion, good cold formability, and excellent weldability, qualities that make it widely used in similar industrial applications.

The mechanical performance of the inner tank was assessed through the cold stretching procedure, involving hydraulic reinforcement testing of the structure, in accordance with the technique specified by the PED 2014/68/EU Directive.

Experimental data validation was carried out using finite element analysis, supporting the selection of both the materials and the fabrication methods employed. The obtained results demonstrate the viability and reliability of the prototype for use in industrial environments.

Keywords: Cryogenic storage system, Hydraulic reinforcement test, Finite element analysis.

OP. 6.4.
Development of Innovative Nanostructured Materials for Advanced Sensory Applications

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Abstract

This research explores new synthesis and applications of nanostructured materials specifically engineered for enhanced sensory systems. A range of nanomaterials, including metal and magnetic nanoparticles, graphene-based structures, nanoceramics, nanoemulsions, and cellulose-derived nanofibers, were prepared via new and eco-friendly methods. Nanostructures were integrated into high-performance sensory platforms with the anticipation of significantly enhancing sensitivity, selectivity, and real-time monitoring capabilities in numerous areas, including the food industry. Comprehensive

characterization using physicochemical methods and functional testing was done, confirming their efficiency in sensing critical analytes, such as spoilage gases, pathogens, toxins, and chemical toxins. The results show the remarkable improvement in the performance of the sensors, producing viable, fast, and cost-effective tools for monitoring food quality and safety. These state-of-the-art nanomaterials have the potential to significantly enhance sensory technologies, therefore positively impacting global food safety standards and sustainability efforts.

Keywords: Food safety, Nanosensors, Nanotechnology, Food contamination detection.

OP. 6.5.

Recent Developments and Perspectives of Coated Materials for Ballistic Protection

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Abstract

The continuous evolution of ballistic threats, along with the growing need for more efficient and lighter protective equipment, has led to the development of advanced materials capable of addressing these challenges. In this context, coatings applied to materials used in ballistic protection have become a key factor in enhancing their performance. This paper analyzes the influence of various types of coatings – ceramic, polymeric, metallic, and composite – on the mechanical behavior, impact resistance, durability, and energy dissipation capacity of ballistic materials. Through a review of the specialized literature and a comparison of existing experimental results, the study highlights how these coatings contribute to improving the functional characteristics of base materials such as aramid fibers (e.g., Kevlar), ultra-high molecular weight polyethylene (UHMWPE), metallic alloys, and hard ceramic layers. The paper also discusses the effects of coating thickness, adhesion, and structural properties on high-velocity impact behavior and stress distribution during collisions. The analyzed results show that the proper application of these coatings can reduce the total weight of the protective system while increasing resistance to wear, corrosion, and environmental factors without compromising safety.

Keywords: Materials, Ballistic protection, Coatings, Durability, Performance.

OP. 6.6.

Strategies for Reusing Construction Waste to Reduce Environmental Impact

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Abstract

The efficient management of construction waste is one of the major challenges facing the modern building industry, with a significant impact on the environment. This study investigates the importance of reusing waste generated from construction and demolition processes, proposing sustainable strategies for its valorization. By implementing methods for sorting, treating, and reintegrating materials, the volume of waste sent to landfills and the emissions associated with the production of new materials can be

significantly reduced. The study explores both technical solutions and supportive policies that encourage a circular economy in the construction sector. The research highlight the economic and environmental benefits of reusing construction waste, providing a framework of best practices for reducing environmental impact and promoting sustainable development.

Keywords: Construction Waste, Reuse, Sustainable Construction, Environmental Impact

OP. 6.7.

Innovative Materials Used for Medium-Caliber Ammunition

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Abstract

Medium-caliber ammunition plays a vital role in modern military operations, bridging the gap between small arms and heavy weapon systems. This paper explores the application of advanced materials-such as high-performance alloys, lightweight composites, and thermally stable polymers-in the design and production of medium-caliber projectiles and casings. Emphasis is placed on improving ballistic efficiency, armor penetration, weight reduction, and thermal resistance under extreme combat conditions. The study also examines recent developments in environmentally friendly ammunition and additive manufacturing techniques. The findings indicate that material innovation significantly contributes to the evolution of medium-caliber munitions, offering enhanced lethality, reliability, and logistical advantages on the battlefield.

Keywords: Medium-caliber ammunition, advanced materials, ballistic performance, lightweight alloys, defense technology, additive manufacturing.

OP. 6.8.

Corrosion Behavior Assessment of S275JR Steel with Polymeric Coatings in Natural Seawater

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Abstract

This study evaluate the corrosion behavior of S275JR steel with various polymeric coatings immersed in natural seawater (Black Sea, Port Constanta). The aims of this study is to evaluate the effectiveness of different protective coatings in enhancing the corrosion resistance of sandblasted S275JR steel. The samples were subjected to different treatments: sandblasted only, sandblasted with epoxy primer enriched with zinc, sandblasted with epoxy primer enriched with zinc and polyurethane paint, and sandblasted with epoxy primer, polyurethane paint in which kreutzonite particles were added. Corrosion tendency was conducted over a six weeks of exposure using electrochemical techniques, including open circuit potential (OCP), polarization resistance (R_p), and corrosion rate (V_{corr}). The resulted obtained indicate a significant improvement in the corrosion resistance of S275JR steel coated with epoxy primer

and polyurethane paint system demonstrating the highest protection against corrosion in natural seawater. The addition of kreutzonite particles to the polyurethane paint further improved the protective performance of S275JR, reducing the corrosion rate by approximately 40 times compared to the uncoated sample.

Keywords: Carbon steel, Polymeric coatings, Seawater, Corrosion, Electrochemical methods.

Acknowledgements: This work was funded by "Dunarea de Jos" University of Galati, Romania, grant research no. 7951/31.03.2025

SECTION 7
CHEMISTRY - ELECTROCHEMISTRY IN LIFE SCIENCES

OP. 7.1.

Electrochemical Detection of Melatonin Using Graphene and Graphene Oxide-Based Voltammetric Biosensors Modified with Horseradish Peroxidase

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Abstract

Melatonin is a neurohormone that plays a key role in regulating sleep-wake cycles and exhibits notable antioxidant activity, making it a growing focus in biomedical studies [1,2]. This study explores the use of graphene and graphene oxide-based biosensors for the electrochemical detection of melatonin via cyclic voltammetry. The electrodes were modified with horseradish peroxidase (HRP) at a concentration of 5 mg/mL. For each sensor type, two variants were prepared by depositing 10 µL and 20 µL of the enzyme, respectively. Melatonin was added to the electrochemical cell using the standard addition method. Both biosensor types showed effective electrochemical responses, achieving detection and quantification limits in the micromolar range. The results confirm the potential of these enzymatically modified sensors for accurate and sensitive melatonin measurement.

Keywords: graphene, biosensors, melatonin, horseradish peroxidase.

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OP. 7.2.

Iridium Particles Based Electrochemical Sensors for the Sensitive Detection of Phenylbutazone

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Abstract

Phenylbutazone (PBZ) is a non-steroidal anti-inflammatory drug that was widely used as a first-line therapeutic option for various types of arthritis for over three decades. However, its use has declined due to concerns over potential health risks. In this study, a sensitive electrochemical method for the detection of PBZ is presented, using two types of commercially available screen-printed electrodes modified with carbon and iridium particles. Cyclic voltammetry was employed exclusively to evaluate the electrochemical behaviour of the sensors. Preliminary studies in standard electrolytes—potassium chloride (KCl), catechol, and ferro/ferricyanide—were conducted to evaluate electrode performance and stability. To assess real-sample applicability, the method was applied to the detection of PBZ in commercial pharmaceutical cream formulations. Compared to the carbon-based electrode, the iridium-modified sensor exhibited superior electrochemical performance, with more well-defined and reproducible oxidation peaks, enhanced sensitivity, and improved selectivity across relevant concentration ranges.

These results highlight the potential of this approach for rapid, cost-effective PBZ detection in pharmaceutical quality control.

Keywords: phenylbutazone, cyclic voltammetry, screen-printed electrodes, iridium electrode, pharmaceutical analysis.

OP. 7.3.

Chemically Modified Sensors for the Analysis of Ascorbic Acid in Pharmaceutical Products

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Abstract

For the sensitive and selective of ascorbic acid in pharmaceutical products novel chemically modified electrochemical sensors based on polypyrrole dopped with electroactive compounds were developed. The sensitive layers of polypyrrole were successfully electrodeposited onto glassy carbon electrode. The microscopic characterization of the sensors has evidenced the different surface morphologies. From the preliminaries studies in ascorbic acid model solutions has proved that sensor based on polypyrrole dopped with nitroprusside ions has the best sensibility. The sensor was further used for the quantification of ascorbic acid in pharmaceutical products of different formulation type. The results were in agreement with the values indicated by the producers with errors lower than 2%.

Keywords: sensor, polypyrrole, vitamin C

OP. 7.4.

Detection of Antioxidant Compounds with Voltametric Sensors

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Abstract

Nowadays there is an emerging interest in the use of natural antioxidants in different fields of activity, from food preservation to the treatment of pathophysiologic actions, which is a point of interest for all researches worldwide. [1] One class of these antioxidant compounds are natural polyphenols, which can range from simple molecules (phenolic acids, flavonoids, phenylpropanoids) to more complex molecules (melanin, lignins), they are present in all plant organelles, therefore being an integrated part of the human diet [2] Phenolic compounds inhibit oxidative mechanisms responsible for the occurrence of degenerative diseases, thus the need for determining their antioxidant capacity (AOC) has increased. [3] The mechanism of action of an antioxidant with a free radical involves the loss of an electron so the molecule becomes unstable, oxidized, resulting in a free radical unable to carry out a new reaction. [4] Thus this process can be analyzed by electrochemical methods such as: cyclic voltammetry (CV), square wave voltammetry (SWV), differential pulse voltammetry (DPV), which provide a direct correlation of AOC with reactive species. [4] Further we can optimize this process using portable devices for the analysis and quantification of phenolic compounds present in food, pharmaceutical, cosmetic, environmental and medical environment. [5] Sensors and biosensors offer attractive features ranging from high sensitivity and selectivity to stability and advantageous response time. [6] Remarkable achievements in the field of nanotechnology and nanoscience have brought remarkable improvement in the sesnsibility and selectivity of electrochemical sensors and biosensors. [7]

Keywords: antioxidants, phenolic compounds, antioxidant capacity (AOC), electrochemical

methods, sensors, biosensors, nanotechnology.

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OP 7.5.

Evaluation of Antioxidant Activity of Microencapsulated Glutathione Using Electrochemical and Spectrophotometric Techniques

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Abstract

Oxidative stress is a significant factor in the development of various diseases, and antioxidants such as glutathione (GLUT) play a vital role in combating this stress. However, GLUT's stability and bioavailability are often limited by rapid degradation in oxidative environments[1]. To overcome this, the current study focuses on the determination of the antioxidant activity of glutathione, encapsulated in sodium alginate microcapsules. The microencapsulation process aims to protect GLUT from degradation and ensure its sustained release, enhancing its antioxidant effects[2].

Using electrochemical techniques, specifically cyclic voltammetry, the antioxidant activity of released GLUT was evaluated. This method offers a precise, direct, and sensitive approach to measuring the radical scavenging capacity of GLUT. The antioxidant potential was further confirmed through traditional spectrophotometric assays, such as the DPPH and ABTS radical scavenging tests. Preliminary findings indicate that encapsulation significantly enhances the stability of GLUT and maintains its antioxidant activity over time. The electrochemical results demonstrate a clear correlation between the release of GLUT and its radical scavenging efficiency, highlighting the potential of this delivery system for improving the effectiveness of GLUT in oxidative stress-related conditions.

This study provides new insights into the use of electrochemical methods for evaluating antioxidant activity and emphasizes the potential of microencapsulation in enhancing the therapeutic efficacy of antioxidants.

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OP. 7.6.

Harnessing the Pharmacological Potential of Piperine Through Semisynthesis – A Green Approach

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Abstract

Plants belonging to the Piperaceae family are cultivated and processed in the tropical regions of India and Sri Lanka, producing one of the most used spices worldwide: pepper. With a piperine concentration of up to 9%, *Piper nigrum* is a powerful source of natural medicine, contributing to increased apetite, improvement of blood circulation and possessing antibacterial activity [1]. Acknowledgement of its properties has led to further research, attempting to enhance the pharmacological profile of piperine through structural modifications. Therefore, this work focuses on the semisynthesis of bioactively potent compounds (piperine and derivatives) with pepper as a starting point. To achieve the desired products, piperine was first extracted from black pepper through diverse methods, such as ultrasound, Soxhlet and NADES extractions, also different compounds, and their efficiency was discussed. The crude extracts and pure piperine were processed simultaneously for an accurate comparison of the stages involved and the analogs of piperic acid were obtained through condensation with derivatives with amino groups. The results suggest a noteworthy level of reactivity and good yields.

Keywords: piperine, antibacterial activity, semisynthesis, piperic acid analogs

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OP 7.7.

Bioactive Compounds and Mineral Content in *Iris pseudacorus* from the Danube Delta: A Multi-Technique Approach

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Abstract

Iris pseudacorus is a perennial species widely distributed in wetlands, including ecosystems within the Danube Delta Biosphere Reserve. This study aims to characterize its chemical composition by analyzing bioactive compounds (flavonoids, polyphenols) and selected mineral elements, using analytical techniques such as HPLC-MS and ICP-MS [1]. Mercury was determined separately using a direct mercury analyzer [2]. Plant material was collected from the Danube Delta region and processed individually according to morphological parts. The findings are expected to contribute to a broader understanding of the phytochemical, nutritional, and environmental relevance of this species, in the context of local

biodiversity and its potential applications in alternative medicine, the food industry, and cosmetics.

Keywords: *Iris pseudacorus*, Danube Delta, bioactive compounds, mineral elements.

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OP. 7.8.

Study of Chemical Composition and Antineurodegenerative Effect of *Rumex acetosa*

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Abstract

Rumex acetosa, commonly called sorrel, is a perennial plant widely distributed and classified within the Polygonaceae family. Renowned for its distinctive tart flavor, it has served multiple purposes throughout history, including as a food source, medicinal herb, and dye agent. The plant's diverse biological activities stem from its rich phytochemical profile, which includes flavonoids, anthraquinones, tannins, and oxalic acid. Sorrel exhibits noteworthy properties, including potent antioxidant, anti-inflammatory, antimicrobial, antitumor, and antihypertensive effects. The presence of anthraquinones, naphthalenes, and polyphenolic compounds, such as flavan-3-ols, phenolic acids, and proanthocyanidins, has been linked to significant pharmacological actions. These effects encompass strong antiviral activity against herpes simplex virus type-1, inhibition of bacterial proliferation, antiproliferative effects on cancerous cells, and gastroprotective properties against gastric ulcers. This work aims to highlight the chemical composition of the *Rumex acetosa* by determining polyphenols and flavonoid content. Based on the main chemical compounds, the antioxidant and antineurodegenerative activity were determined. The obtained results are promising from both chemical and bioactive points of view, so that *Rumex acetosa* can be considered for future *in vivo* and *in vitro* testing.

Keywords: *Rumex acetosa*, antioxidant activity, antineurodegenerative effect.

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OP. 7.9.

Comparative Phytochemical and Pharmacological Evaluation of *Perilla frutescens* and *Plantago major* Extracts Obtained via Green Extraction Using Deep Eutectic Solvents

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Abstract

Perilla frutescens and *Plantago major* are two medicinal plants widely recognized for their therapeutic potential in both traditional and modern phytotherapy. This comparative study aims to analyze the phytochemical composition and pharmacological activities of their extracts, with a particular focus on shared bioactive compounds and overlapping therapeutic effects. Both plants contain significant levels of flavonoids, phenolic acids, and polysaccharides, which contribute to their antioxidant, anti-inflammatory, and immunomodulatory properties. While *Perilla frutescens* has a long history of use in East Asian medicine, especially for respiratory and allergic conditions, *Plantago* species are traditionally used in European herbal medicine for treating inflammatory disorders and respiratory infections.

Extracts were obtained using green extraction techniques based on deep eutectic solvents (DES), which offer a non-toxic and environmentally friendly alternative to conventional solvents. The chemical profiles of the extracts were characterized by High-Performance Liquid Chromatography (HPLC), revealing the presence of key phenolic compounds and flavonoids. In addition, the antimicrobial activity of both extracts was assessed against selected bacterial strains, demonstrating promising inhibitory effects.

Keywords: green extraction, HPLC, DES.

Acknowledgements: This work was partially supported by ADER grant 5.2.1. – "Conservation and valorization of the genetic heritage of aromatic and medicinal species that can be cultivated on the territory of Romania" and the bilateral project Ro-Fr, LAURENCE, PC Brancusi program, No 8BMFR/10/09/2024.

OP. 7.10.

Profiling and Quantification of Key Phytochemical Classes in *Cucumis metuliferus* Fruits

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Abstract

The chemical composition of plant extracts can be determined by various techniques and methods of analysis. Spectrophotometric methods are some of the analytical methods that are based on measuring the absorption or emission of electromagnetic radiation by chemical molecules, they can be successfully used in the dosage and quantification of various classes of organic compounds of interest. *Cucumis metuliferus* represents a species of the Cucurbitaceae family, with juicy fruits wrapped in a rigid shell with thorns, which can be consumed fresh or processed. Beyond its exotic appearance and delightful taste, this fruit has demonstrated a variety of therapeutic properties, including antioxidant, antimicrobial, anti-inflammatory, and antidiabetic effects[1], owing to its rich chemical composition.

The purpose of this study was the dosage and quantification of compounds with spectrophotometric methods such as saponins, polyphenols, flavonoids as well as the total content of

sugars and β-carotene.

In conclusion, the fruits of *C. metuliferus* are rich in a diverse range of bioactive compound classes, including phenolics, flavonoids, vitamins, and carotenoids, which contribute to their nutritional and therapeutic potential.

Keywords: *C. metuliferus* fruits, spectrophotometric methods, polyphenols, flavonoids, sugars, β-carotene

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OP. 7.11.

Tailoring Multifunctional Nanoplatforms Based on SPIONs and Graphene Oxide for Advanced Healthcare Applications

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Abstract

The development of multifunctional nanoplatforms is a key to advancing healthcare technologies, particularly in diagnostics and therapy. Recently, superparamagnetic iron oxide nanoparticles (SPIONs) coated with gold nanoparticles and functionalized with chelated gadolinium have been previously developed and thoroughly characterized, demonstrating high potential as dual T1/T2 MRI contrast agents and in magnetic hyperthermia. These nanoplatforms (A) showed favorable magnetic properties, efficient relaxivity profiles (B), and colloidal stability, positioning them as strong candidates for theranostic applications [1]. Pursuing these former studies, we are currently developing nanoplatforms based on SPIONs and gold nanoparticles (AuNPs) anchored on graphene oxide (GO) sheets. GO offers a versatile 2D layer that enhances dispersibility, surface functionality, and biocompatibility. SPION@GO nanoplatforms exhibit superparamagnetic behavior and are being tailored for applications in MRI and magnetic hyperthermia, while AuNP@GO systems provide enhanced plasmonic properties with potential use in radiosensitization. Full crystal, morphological and physical characterization is currently under progress as well as functionalization of these GO-based platforms with gadolinium chelates, aiming to soon enable tests to dual T1/T2 imaging capabilities in SPION@GO systems, thus expanding their diagnostic utility. Together, these nanoplatforms — from optimized gold-coated SPIONs to innovative GO-based composites — illustrate a materials-driven strategy to engineer hybrid systems for integrated diagnostic and therapeutic applications in oncology.

Keywords: Iron Oxide Nanoparticles, Theranostics, Magnetic resonance Imaging, Hyperthermia, Superparamagnetism.

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OP. 7.12.

Biochemical Characterization and Pharmacological Properties of Four Local Foods (*Phoenix dactylifera; Sesamum indicum; Cyperus esculentus; Anacardium occidentale*) Rich in Active Biomolecules and Fatty Acids

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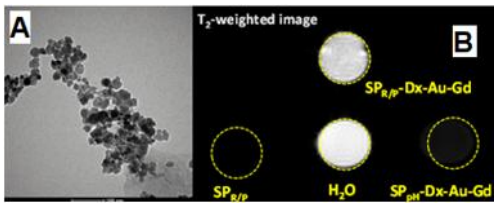
Abstract



The development of plant resources is essential to meet growing food and nutrition needs. However, some of these resources remain largely under-exploited, particularly in Benin. This study aims to determine the nutritional and phytochemical composition of four specific plant resources: *Anacardium occidentale* nuts, *Sesamum indicum* grains, *Cyperus esculentus* tubers and *Phoenix dactylifera* fruits.

By understanding the composition of these products, we are contributing to better use of these resources to improve food safety and promote public health. To achieve this, the methodology adopted includes a series of chemical and biological analyses, including bromatological evaluation, phytochemical screening and antioxidant activity tests to assess the free radical scavenging power of the fatty extracts. The results reveal disparities in the nutritional composition of these samples. TSRT and ST vary from 60.93 ± 0.69 mg/g to 1640.93 ± 2.57 mg/g. Dry matter, water and ash levels showed significant differences, with apparent correlations. Protein levels ranged from 3.19% to 20.31%, while fat yields were as high as 30%. Phytochemical analysis revealed specific profiles for phenolic compounds and alkaloids, with significantly different amounts of these compounds in each plant. In terms of antioxidant activity, the extracts demonstrated a dose-dependent ability to trap the DPPH radical, with a 50% inhibition concentration of around 0.5 mg/ml. The FRAP test showed significant reduction activity, with variations between samples. This study thus provides detailed information on the nutritional value of these plant products, highlighting their diversity and potential for food and medicinal applications. The results support the idea that the foods studied may have nutritional profiles with practical implications for their use in food and pharmacology. These data enhance our understanding of the intrinsic properties of these products, opening up promising prospects for their use in various fields and their industrial processing.

Keywords: Bromatological evaluation, phytochemical compounds, antioxidant activity, food safety.

OP. 7.13.

Formulation of an Antibacterial Ointment from Extracts of Four Plants Used in Benin to Treat Skin Diseases

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Abstract

The incidence of bacterial and fungal infections in humans has significantly increased in recent years. This study aims to formulate an antimicrobial ointment based on medicinal plants (*Citrus sinensis, Phyllanthus amarus, Syzygium aromaticum*, and *Zingiber officinale*) traditionally used in Benin to treat skin diseases. The secondary metabolites of these plants were identified through coloration and precipitation reactions, and the contents of phenolic compounds were evaluated by estimating total flavonoids, tannins, and total phenols using the aluminum chloride, butanol-HCl, and Folin-Ciocalteu methods, respectively. The antioxidant activity of the plant extracts (hydroethanolic and essential oils) was assessed using the DPPH method. The ointment was formulated from the extracts with carefully selected excipients, followed by physicochemical and organoleptic characterization. The results revealed that the plants contain metabolites such as tannins, flavonoids, anthocyanins, anthraquinones, sterols, and terpenes, with high levels of phenolic compounds. The plant extracts exhibited antioxidant activity ranging from 0.1µg/µL to 45µg/µL. The ointment formulated from *Citrus sinensis, Syzygium aromaticum, Zingiber officinale*, and *Phyllanthus amarus* was semi-solid, yellow in color, with a pleasant smell, good homogeneity, a pH of 6.10, and a moisture content of around 5%.

Keywords: skin diseases, extracts of medicinal plants, secondary metabolites, characterization, antiseptic ointment.

OP. 7.14.

Antioxidant, Anti-Inflammatory and Antiulcer Potential of the Aqueous Extract of *Detarium microcarpum* Leaves Guill & Perr.

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Abstract

Gastric ulcers constitute a major public health problem worldwide. These ulcers can lead to hemorrhages, perforations and stenoses.The present study was initiated to evaluate the gastro-protective effect of the aqueous extract of *D. microcarpum* leaves. A decoction was made and the aqueous decoction obtained was used for the various tests. The characterization tests were carried out using tube tests for

the detection of secondary metabolites. The quantification of phenolics, flavonoids and total tannins was done respectively with Folin Ciocalteu reagent, aluminum trichloride and polyvinyl polypyrrolidone. Antioxidant activities were evaluated by three methods (ABTS$^{\bullet+}$, DPPH$^{\bullet}$ and FRAP). The *in vitro* anti-inflammatory activity was performed using the lipoxygenase inhibition test and the gastroprotective potential was performed on MNRI mice using ethanol as ulcerogenic agent. Concerning the antioxidant activities, the aqueous decoctions of *D. microcarpum* presented good activity by the three methods (ABTS$^{\bullet+}$, DPPH$^{\bullet}$ and FRAP). Regarding the inhibition of lipoxygenase, a good percentage was obtained (41.61% at the concentration of 100µg/mL. The evaluation of the acute toxicity of the extracts showed no sign of toxicity in the mouse With regard to antiulcer activity, the greatest protection (69.99%) was provided at the dose of 400 mg/kg with a very reduced ulceration index 0.47±0.20 compared to the control group (3.95 ± 0.44). The antiulcer potential of the aqueous decoction of the species could be due in part to its antioxidant and anti-inflammatory properties.

Keywords: Antioxidant, anti-inflammatory potential and antiulcer activity.

OP. 7.15.

Traditional Uses and Secondary Metabolite Composition of *Boscia senegalensis* (Pers) Lam. Ex Poir. Capparaceae Harvested in Mali

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Abstract

Medicinal plants have been used since ancient times to relieve and cure human diseases in developing countries where access to modern care is limited. *Boscia senegalensis* is a versatile plant that adapts to Sahelian, desert and potentially unexplored areas. The objective of this work was to study the traditional use and phytochemistry of the plant. The material used consisted of a survey sheet, leaves and stems of *Boscia senegalensis*. These organs were harvested in their natural habitat on April 17, 2023 in Niono, circle of the Segou region in Mali. An ethnobotanical survey was carried out among traditional health practitioners and herbalists. Coloring reactions using specific reagents were used to determine the chemical constituents of the plant. Eighteen (18) diseases were listed during the ethnobotanical survey, the main ones being urinary infections, headaches, aches and pains, etc. Alkaloids, saponins, tannins and triterpenes were identified in the plant by phytochemical screening. The data generated by this study reinforce the scientific recognition of Boscia senegalensis as a medicinal plant of interest. Further studies are needed to understand the mechanism of action of the bioactive compounds.

Keywords: *Boscia senegalensis*; traditional uses; secondary metabolites.

OP. 7.16.

Valorization of Two Ivorian Agricultural Waste Products (*Corchorus olitorius* and *Euphorbia heterophylla* Seeds) to Improve the Productivity and Nutritional Quality of Eggs from Eggs of Laying Quails (*Coturnix coturnix japonica*)

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Abstract

In Côte d'Ivoire, poultry farming is a fast-growing sector, especially the breeding of laying quails prized by the population for their eggs. However, eggs are notorious high levels of cholesterol and are susceptible to oxidation. With this in mind with a view to improving the nutritional quality of eggs while also improve the zootechnical parameters of laying quails that this work was carried out by incorporating *Corchorus olitorius* and *Euphorbia heterophylla* in laying quail feed. The trial was carried out at the animal house of the large production farm of the Institut National Polytechnique Félix-Houphouët Boigny (INP-HB) in Yamoussoukro (Côte d'Ivoire). Sixty (60) laying quails (*Coturnix coturnix japonica*), eight (8) months old with an average live weight of 203.56±7.55 g, were used in this study, randomly divided into three (3) groups of 20 laying quails. The first group received commercial layer feed (IVOGRAIN-ponte 20 SIPRA) (100%, control diet [R0]).

The second group received a 6% incorporation of *Corchorus olitorius* seeds with the commercial feed (RC) and the third group received 6% Euphorbia heterophylla seeds (RE). After two weeks of experimentation, the egg-laying rate was improved in the respectively by 70.83% for RC and 70.37% for RE, compared with R0 (63.33%). In addition, average egg weight was also improved for RC (10.09 g) compared to R0 (9.45 g). Biochemical analysis showed that RC improved the vitamin A content of the egg yolk (109.50 µg/100g) compared with R0 (88.50 µg/100g). Both RC and RE significantly reduced total cholesterol (TC) levels in egg yolk (RC = 10.65% and RE = 14.69%) and oxidative capacity (CO) (RC = 50.08% and RE = 44.27%) compared to R0 (CT = 23.02 and CO = 35.17%). These results show that the valorization of these two agricultural products (seeds of *Corchorus olitorius* and *Euphorbia heterophylla*) could be beneficial to the poultry industry in Côte d'Ivoire for the production of eggs with excellent nutritional qualities.

Keywords: *Coturnix coturnix japonica*, egg quality, *Corchorus olitorius*, *Euphorbia heterophylla* and Ivory Coast.

OP. 7.17.

Valorization of the Essential Oil of *Tetraclinis articulata* (Vahl) Masters as Antioxidant and Antibacterial Agents, and their Incorporation into Gummy Candies

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Abstract

Numerous novel medications derived from secondary metabolites of plants have been employed in the treatment and prevention of various diseases. Essential oils and plant extracts are widely used as antibiotics to address infectious diseases caused by bacterial contamination, and they are also utilized as antioxidants to tackle neurodegenerative disorders. The development of new food products incorporating natural ingredients rich in antioxidants has emerged as an intriguing marketing strategy for the industry, particularly for products seeking to emphasize health benefits, such as confectionery items like gummy candies. Thus, the aims of this study were to analyze the chemical compositions and assess the antioxidant and antimicrobial activities of *Tetraclinis articulata* essential oil and Jelly candies manufactured using this plant's essential oil. Essential oils were extracted via hydrodistillation using a Clevenger-type apparatus, and their chemical composition was determined through GC-FID and GC-MS. The gummy candies formula comprised sugar, glucose syrup, water, citric acid, agar, and essential oil. The essential oil's ability to inhibit microorganisms was tested using three different methods: disc diffusion, liquid macrodilution, and solid-state dilution. The antimicrobial activity results varied depending on the strain. Colorimetric evaluation of the antioxidant activity of essential oils and gummy candies was conducted using the DPPH and ABTS methods. The antioxidant test results indicate that both the essential oil and Jemmy Candies exhibit significant antioxidant power. These findings suggest that *T. articulata* essential oil can be regarded as a therapeutic tool in the healthcare and agri-food industries.

Keywords: *Tetraclinis articulata* (Vahl) Masters, gummy candies, antioxidant, antimicrobial.

OP. 7.18.

Detection of Glutathione with a Novel Chemically Modified Electrode

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Abstract

Glutathione is composed of three amino acids: cysteine, glutamic acid, and glycine and it is involved in eliminating toxins from cells, transporting vitamins and minerals, regulating the immune system, and, above all, providing antioxidant protection [1]. The oxidation of glutathione was studied at the surface of ferrocene-modified carbon screen-printed electrode. Cyclic voltammetry and square wave voltammetry

techniques were used to determinate the efficiency of deposition of ferrocene into carbon screen-printed electrode as a mediator for the electrochemical oxidation of glutathione in buffer solutions. Results showed that pH 7 is the most appropriate for the electrochemical detection of glutathione. In the optimal condition one oxidation peak at 0.510 V can be observed. From the kinetics studies the diffusion coefficient of glutathione was found to be 3.82×10^{-5} cm^2 s^{-1}. The anodic peak current of glutathione at the surface of the modified electrode was linearly dependent on the GSH concentration in wide ranges when cyclic voltammetry and square wave voltammetry techniques, respectively. The detection limits were in the micromolar range. Therefore, the electrochemical oxidation of glutathione at the sensor surface can be employed for the voltammetric determination of glutathione in real samples.

Keywords: ferrocene, glutathione, voltammetry

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OP. 7.19.

Detection of Acetaminophen with Ferrocene Modified Carbon Paste Electrode

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Abstract

Paracetamol, also known as acetaminophen, is a widely used medication for pain relief and fever reduction. It is one of the most common over-the-counter medications worldwide and is often recommended for a variety of conditions, including headaches, muscle aches, arthritis, backaches, toothaches, colds, and fever [1]. Carbon paste electrodes are a useful option to develop chemically modified electrodes to be used in the detection of pharmaceuticals [2]. In this work a novel sensor based on ferrocene modified carbon paste electrode was developed for the selective detection. One anodic peak was observed related to the oxidation of the paracetamol. The kinetics studies were demonstrated that the electrochemical process is controlled by the adsorption process. For the quantification of paracetamol in different pharmaceutical products a calibration linear model was developed. The detection limit was 1.1 mM. The paracetamol was successful quantified in different pharmaceutical products and the results obtained were in good agreement with the concentrations indicated by the producers.

Keywords: acetaminophen, ferrocene, voltammetry

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OP. 7.20.

Electrochemical Determination of Melatonin in Pharmaceutical Products Using a Gold Nanoparticle-Modified Graphene Sensor

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Abstract

Melatonin is a crucial regulator of the circadian rhythm, influencing sleep patterns, mood, and a variety of physiological processes, while also serving as a potent antioxidant that helps protect cells from oxidative damage [1]. This study presents the development and application of a graphene-based sensor modified with gold nanoparticles for the electrochemical detection of melatonin. The sensor's quantification limits for pure melatonin were determined using cyclic voltammetry. Subsequently, the sensor was employed to measure the practical concentration of melatonin in two pharmaceutical products: a 5 mg melatonin supplement from Rotta Natura and a 5 mg pure melatonin product from ESI. The same cyclic voltammetry method was applied to both products, allowing for accurate determination of melatonin concentrations. The results highlight the significance of practical melatonin determination in ensuring the quality and efficacy of pharmaceutical products, emphasizing the potential of this sensor for real-world applications in pharmaceutical analysis.

Keywords: melatonin, gold nanoparticle-modified graphene sensor, cyclic voltammetry.

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OP. 7.21.

Detection of Phenylbutazone in Pharmaceuticals with Carbon Screen-Printed Electrodes

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Abstract

Phenylbutazone is an anti-inflammatory used to reduce pain and inflammation in arthritis and acute attacks of gout [1]. Phenylbutazone, due to its high toxicity, is not recommended as initial therapy for any rheumatic, inflammatory or painful process, only when the patient does not respond to other less toxic treatments and after a benefit-risk assessment [2]. Therefore, the detection of phenylbutazone in pharmaceuticals and medical samples is of great interest. The methods based on chromatography have the disadvantages of complexity, long time for analysis, and high costs. As complementary method of analysis in this study was developed an electroanalytical method based on carbon screen-printed electrodes and cyclic voltammetry. In optimal condition a well defined peak related to the oxidation of phenylbutazone was observed. The current of the anodic peak was proportional with the concentration of phenylbutazone in analysed samples. Based on the calibration model the electrode was used for the succesfull detection and quantification of phenylbutazone in pharmaceutical products with errors lower than 1%.

Keywords: phenylbutazone, electrode, pharmaceutical

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OP. 7.22.

Capture of Pharmaceutical Substances in Metal Azolate Frameworks

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Abstract

The drug delivery system (DDS) in biomedical materials science is an extremely fascinating and dynamic sector in the healthcare industry. When it comes to delivering medications to the human body, one of the biggest challenges is finding safe materials that can efficiently transport drugs [1,2]. The large surface area, remarkable porosity, distinct chemical composition, adaptable size and form, and simple surface modification capabilities of metal-organic frameworks (MOFs) have made them interesting candidates for drug delivery[3,4]. While the MOFs built up with polycarboxylate-type ligands are the most studied materials for the capture, storage and release of pharmaceutical substances, the MOFs built up with azolyl-type ligands, also called metal azolate frameworks (MAFs), are very few in such studies. Therefore, the aim of the present work is to contribute to the development of the research direction towards the application of MAFs in drug delivery systems. As such, the synthesis, characterization and preliminary studies regarding the capture of some pharmaceutical substances in three microporous MAFs built up with Zn(II), Co(II) and Cu(II) ions, and a pyrazolyl-type ligand, are presented.

Keywords: metal azolate frameworks, pyrazolyl-type ligands, microporosity, drug capture

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OP. 7.23.

Zinc Oxide Nanoparticles Modified with Halogenosilanes

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Abstract

Surface modification of inorganic nanomaterials through functionalization with organic capping agents may be regarded as a very useful and hand-on strategy to avoid particle agglomeration, thus improving the current properties and even to design new ones [1]. In this context, we here report a simple and low-cost method for the preparation of semiconductor zinc oxide nanoparticles (ZnO NPs) by chemical precipitation, using the organosilane surface modifiers which bear chlorine, bromine and iodine atoms. Powder X-ray diffraction (PXRD), scanning electron microscopy with energy dispersive X-ray spectroscopy (SEM-EDX), transmission electron microscopy (TEM) and Fourier transform infrared spectroscopy (FTIR) were employed to morpho-structurally characterize the obtained halogenosilane-modified ZnO NPs. In fact, the size and shape varied, depending on the type of halogenosilane used for

surface modification. Thus, the unmodified ZnO NPs are larger and have a regular, predominantly spherical shape, while the ZnO NPs modified with halogenosilane species are smaller and have a diversified morphology, which suggests both an efficient surface modification and different nucleation and growth mechanisms. These morpho-structural features are considered crucial in view of applying them into potential biomedical applications, such as antitumor properties [2].

Keywords: zinc oxide nanoparticles, halogenosilanes, surface modification, size control

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OP. 7.24.

Electrochemical Sensors for Histamine Detection in Foods

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Abstract

The aim of this paper is to review recent advances in the detection of histamine, a nitrogenous organic compound of the biogenic amines class, which can be found in fermented foods such as cheese, wine, fish and meat products [1]. High levels of histamine can cause health problems such as hypotension, headaches, flushing, and, in severe cases, even death [2]. Therefore, its detection is extremely useful in the field of food safety. In practice, conventional methods for histamine detection (chromatography, fluorimetry, colorimetry) require expensive equipment, laborious sample preparation, and a highly specialized analyst [3]. To overcome the limitations of traditional methods, new methods for histamine analysis have been developed over time such as electrochemical sensors. Advances in science have shown that electrochemical methods using nanomaterial-based electrochemical sensors offer the desired sensibility, adaptability, efficiency and ease of operation in histamine detection. In this review, we discussed the detection of histamine using various electrochemical sensors, where the detection is mainly based on voltammetric methods. These methods show very high sensitivity in the detection of the target analyte, with detection limits in the micromolar and nanomolar range.

Keywords: histamine, electrochemical sensor, nanomaterial, food.

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OP. 7.25.

Assessment of the Compounds with Antioxidant Properties in Nutraceuticals Using Cyclic Voltammetry

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Abstract

Nutraceuticals are food supplements that contain biologically active molecules (antioxidants, phytochemicals and vitamins) with a nutritional and therapeutic role [1]. Over time, nutraceuticals have

been shown to prevent and treat several diseases such as cancer, cardiovascular diseases, neurological disorders, obesity management, diabetes, as well as for the proper functioning of the human body [2]. Therefore, the analysis of these substances is of great interest. The aim of this study was to analyze compounds with antioxidant properties from three dietary supplements used for stress management using graphene-based electrochemical sensors (GPH) by cyclic voltammetry. The results obtained are satisfactory, this demonstrates that GPH sensors are excellent devices for sensitive and selective determination of antioxidants in nutraceuticals. They are characterized by high sensitivity (LOD value in the micromolar to nanomolar range), selectivity, a wide linearity range and short analysis time.

Keywords: nutraceuticals, antioxidants, graphene-based electrochemical sensors, cyclic voltammetry.

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OP. 7.26.

Detection of Paracetamol Using Voltametric Techniques

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Abstract

Paracetamol (acetaminophen) is among the most widely used analgesic and antipyretic drug, requiring a growing need for reliable, rapid, and cost-effective detection methods across pharmaceutical, clinical, and environmental applications. Electrochemical methods, using commercial screen-printed electrodes (SPEs), glassy carbon and various modified electrodes emerged as a promising approach due to its portability and affordability [1], [2], [3]. This review explores recent developments in the electrochemical detection of paracetamol using commercial SPEs using voltametric techniques such as cyclic voltammetry, differential pulse voltammetry, and square wave voltammetry. The electrochemical behavior of paracetamol is discussed in relation to electrode type, surface modifications, and experimental parameters including pH and scan rate. The review discusses how different modifications can improve sensor performance and addresses key challenges like selectivity and analysis in complex samples. The poster offers a clear overview of current approaches and future directions in paracetamol detection using commercial SPEs.

Keywords: paracetamol, electrochemical methods, screen-printed electrodes, cyclic voltammetry

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OP.7.27.
Development of Electrochemical Methods for Determination of Phenolic Compounds

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Abstract

In a world with fast daily technological advances, the need to develop new methods for the determination of compounds of interest becomes a priority. The development of these methods is focused on low cost, high portability as well as ease of use [1]. Phenolic compounds occur naturally in plants as their secondary metabolites, consisting of flavonoid and non-flavonoid classes. Phenolic compounds are studied for their properties associated with flavor, color, fragrance, preservation as well as antioxidant properties and human health benefits. [2] Electrochemical methods offer attractive advantages, ranging from selectivity to high sensitivity, for the detection of phenolic compounds. [3] Some of these methods are cyclic voltammetry (CV), square wave voltammetry (SWV), differential pulse voltammetry (DPV), all being appropriate for the study of phenolic compounds because, as a chemical species, they are able to donate electrons acting as reducers [4]. The same techniques are capable of evaluating the antioxidant capacity, total natural antioxidant content, identification and quantification of important chemical compounds etc. [5].

Keywords: Phenolic compound, electrochemical method, cyclic voltammetry, antioxidant capacity

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OP.7.28.
Comparative Analysis of Chemical Profile and Biological Activity of Extracts from Leaves and Flowers of *Artemisia* spp.

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Abstract

Plants are widely recognized as sources of biologically active metabolites, such as antioxidant compounds. In this context, plants of the *Artemisia* species (family: Asteraceae) are attractive as potential sources of natural compounds that exhibit diverse bioactivities, such as antimalarial, anti-inflammatory, antiviral, antioxidant, antidiabetic, antimicrobial and cytotoxic [1-3]. To have an overview of the distribution, identification and quantification of phenolic compounds present in different aerial organs of three *Artemisia* species and to further elucidate the similarities and differences between their chemical constituents, chromatographic analysis and determination of their biological activity were pursued. Therefore, this study aimed to investigate, according to the methods in the specialized literature, three species of *Artemisia* in terms of their chemical composition (determination of total polyphenols and total flavonoids), antioxidant activity (DPPH, ABTS, TAC), enzymatic inhibition (α-amylase, β-glucosidase) and

anti-inflammatory activity (inhibition of thermal denaturation of HSA). The total polyphenol content of *Artemisia* extracts was correlated with the antioxidant potential and varied depending on the plant species, extraction solvent and analytical method used. The bioactive molecules identified in *Artemisia* extracts make them an attractive natural source for the development of pharmacological applications against prevalent diseases.

Keywords: *Artemisia*; plant extract; anti-inflammatory activity; antioxidant activity.

Acknowledgments: This work was partially supported by ADER grant 5.2.1. – *"Conservation and valorization of the genetic heritage of aromatic and medicinal species that can be cultivated on the territory of Romania"* and UDJG internal Grant *"Targeted therapeutic molecules, anti-inflammatory and antitumor, isolated from exotic plants acclimatized in Romania*", funding contract no. 7956/31.03.2025.

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OP.7.29.
Applications of Conventional and Green Methods in Synthesis of Aromatic *N*-heterocycles

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Abstract

The continued interest in heterocyclic chemistry is due to their remarkable applications. *N*-heterocyclic scaffolds are important in the process of drug design and development. These compounds are widely present in synthetic and natural products [1]. Many new *N*-heterocyclic derivatives with remarkable biological activity and extensive pharmaceutical applications are progressively developed. They are predominantly used as pharmaceuticals, agrochemicals or intermediates, finding applications as disinfectants, developers, dyes, antioxidant, neuroprotective and anticancer drugs. Since organic processes consume large amounts of solvents and metal catalysts, the use of less harmful solvents and catalytic conditions enhances the sustainability of these reactions [2]. Therefore, efficient classical synthetic protocols must adapt to modern requirements to address green and sustainable production. In this context, the present work reveals more environmentally friendly alternatives for direct access to *N*-heterocyclic derivatives. Environmentally friendly synthetic reactions for the synthesis of *N*-heterocyclic compounds proved to be of great utility in terms of yield, reaction time, costs and ecological conditions, compared to conventional reactions.

Keywords: N-heterocyclic compounds, conventional synthesis; green methods.

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OP.7.30.

Phytochemical study and pharmacological activities of methanolic extracts of Eclipta alba (L) Hassk. (Asteraceae) on the behavior of NMRI mice

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Abstract

Many plants of the Asteraceae family are used in the symptomatic treatment of several neuropsychiatric disorders. Among them is Eclipta alba (Linn.) Hassk, which is a plant of the Asteraceae family, also known as *Eclipta prostrata* well known in traditional medicine. In the present study, we evaluated the psychotropic and biological potency of *Eclipta alba* (L) Hassk extracts. An ethnobotanical survey was conducted using a structured questionnaire. Methanolic extraction using Soxhlet was performed after harvesting the whole plant. The extract was then used for spectrophotometric determination of total polyphenols and flavonoids. ABTS, DPPH, and FRAP methods evaluated antioxidant activities. Also, the determination of acute toxicity and psychotropic effect of the whole plant extract of *Eclipta alba* was done using standard methods. The results showed 22 diseases treated by *Eclipta alba*. Regarding the dosage of polyphenolic compounds, the methanolic extract of *Eclipta alba* (L) Hassk. allowed obtaining 18.85 ± 0.61 mg EAG/ 100 mg of extract and 6.38 ± 1.05 mg EQ / 100 mg of extract. The toxicity test of the methanolic extract of the whole plant of *Eclipta alba* in mice established an LD50 greater than 5000 mg/kg bw. Regarding the behavioral study, the methanolic extract of *Eclipta alba* shows antidepressant activity. This study showed that the extract of *E. alba* has a pharmacological effect and provides justification for its use in traditional medicine in Burkina Faso.

Keywords: *Eclipta alba* (L.) Hassk., traditional use, pharmacological capacity.

OP.7.31.

Radiobiology perspectives – past, present and future

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Abstract

Radiation therapy (RT) continues to be an important part of cancer management with approximately 50% of cancer patients needing radiotherapy at some point during the course of their disease. Physics and

biology are inextricably linked in daily practice of RT, and developments in both contribute to kill the tumors and to reduce the toxicity secondary normal tissue's irradiation. Radiobiology offers the knowledge on the biological effects of radiation and serves as a basis for radiotherapy and radiological protection. External radiotherapy (but not only) has provided most of the knowledge in radiobiology because it is the most used radiation therapy modality.
This presentation will provide the information regarding radiation chemistry, biochemistry, mutation and cancer induction, embryonic damage as well as the dependence of radiation response on radiation quality and temporal dose distribution (repair). Also, will be discussed physicochemical events, cellular and tissue effects, and the molecular mechanisms involved in radiation response.
Radiobiology offers the conceptual basis for radiotherapy, identifying mechanisms and processes that underlie the response of tumors and normal tissues to irradiation, helps in development of specific new approaches in radiotherapy and contributes on the choice of schedules for clinical radiotherapy.
Keywords: radiobiology, biological effects, molecular mechanism.

OP.7.32.

Green-synthesized gold-coated nanodiamonds as potential radiosensitizers for proton therapy

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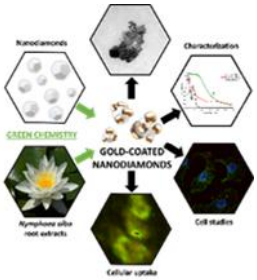
Abstract

Nanodiamonds (ND) possess unique properties, including high biocompatibility, tunable surface chemistry, and stable photoluminescence, that make them highly attractive for biomedical applications. In this study, we synthesized gold-coated nanodiamonds (NDAu) using a green chemistry route based on Nymphaea alba root extract as a natural reducing agent. The hybrids were produced from two types of ND with median diameters of 50 nm and 230 nm, which were subjected to different thermal treatments prior the gold coating to modulate their surface properties. The functionalized particles were comprehensively characterized using a combination of spectroscopic techniques (UV-Vis spectroscopy, ATR-FTIR spectroscopy, Raman spectroscopy, PIXE), Powder X-ray Diffraction (PXRD), electron microscopy (SEM and TEM), and zeta potential. These techniques evidenced the impact of the thermal treatments on the NDs, reported the influence of the plant extracts on the



final nanoparticles as well as confirmed and quantified the metallic gold presence in this material. Moreover, we carried out biological evaluation on A549 lung and PANC-1 pancreatic cancer cell lines to assess their cytotoxicity, cellular uptake, and impact on cell survival. Our results confirmed the efficacy of the gold-coating method, elucidating the modifications in particles structural, physical and chemical properties due to functionalization, and the interaction with cells. These nanoparticles could then be used for various biomedical applications, such as drug delivery or as potential radiosensitizers.

OP.7.33.
Phytochemistry and pharmacological properties of *Sida linifolia* fractions used in the treatment of diabetes in Togo

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Abstract

Diabetes is a disease characterized by chronic hyperglycaemia with acute and chronic complications. *Sida linifolia* is a plant traditionally used in Togo in the treatment of diabetes. Knowledge of the active compound composition of the plant would allow the development of new treatments for diabetes. The objective of this study was to conduct a phytochemical screening and evaluate the antihyperglycemic and antioxidant activity of Sida linifolia extract fractions. Fractionation was performed on the 80% hydroethanolic extract of the whole plant of Sida linifolia using solvents of increasing polarity. A phytochemical analysis was then performed on the fractions, as well as an evaluation of the in vitro oxidative activity and the effect on glucose absorption by rat muscle and jejunum. Phytochemistry revealed the presence of phenols, flavonoids, condensed tannins, sterols, triterpenes, and reducing sugars in the fractions. Phenol, flavonoid, and tannin contents were highest in the butanolic and aqueous fractions, which demonstrated the best in vitro antioxidant activity. The aqueous fraction had the best antihyperglycemic activity. The aqueous fraction reportedly contains the pharmacologically active compounds of the 80% hydroethanolic extract of the whole plant of Sida linifolia, used in the treatment of diabetes and its complications.

Keywords: fractionation, antihyperglycemic, traditional therapy, ex vivo

III. POSTERS

SECTION 3
PROGRESS IN FOOD SCIENCE AND BIO-RESOURCES ENGINEERING

PP.3.1.

Physicochemical characterization and optimization of the extraction of bioactive compounds of Teff using ultrasound-assisted method

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Abstract

In this study, the physicochemical properties of teff (*Eragrostis tef*) grains were analysed, whereas an optimization of the bioactive extraction via solid-liquid ultrasonic-assisted extraction method was applied in order to estimate the optimum parameters for polyphenolic compounds extraction. Different parameters were tested for optimisation, such as ethanol concentration 50%, 70%, and 90% (v/v), extraction time (30, 45, and 60 minutes), and temperature (30, 45, and 60 °C), by applying a Box-Behnken design for optimization. The optimization parameters were established as follow: 70% ethanol concentration, 45 minutes extraction time, and 45 °C temperature, leading to a total phenolic content (TPC) of 0.45 g gallic acid equivalents (GAE)/100 g. The moisture content was recorded at 12.67%, protein content at 7.24 g/100 g, lipid content at 2.56 g/100 g, and ash content at 2.24 g/100 g. The method yielded a substantial increase in antioxidant activities, with significant DPPH radical scavenging capacities observed under the optimized conditions. These results not only contribute to a comprehensive understanding of teff's nutritional profile but also highlight its potential applications as a functional ingredient in health-promoting food products.

Keywords: Teff (*Eragrostis tef*), antioxidant activities, physiochemical properties, optimize, phenolic

PP.3.2.

HPLC Profiling and Prebiotic Activity of Teff

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Abstract

This research focused on the high-performance liquid chromatography (HPLC) profiling of teff (*Eragrostis tef*) extracts obtained by solid-liquid ultrasound assisted extraction and the potential of to

enhance the metabolic activity of *Lactobacillus plantarum* by testing the its prebiotic activity.

The HPLC analysis exhibited a rich composition of phenolic compounds, with epigallocatechin identified as the most abundant at 2960.30 mg/g, followed by epicatechin at 113.55 mg/g and hesperidin at 163.64 mg/g. Additionally, the teff extract contained a high concentration of ferulic acid (41.79 mg/g).

The prebiotic activity of teff flour was evaluated by monitoring the growth of *Lactobacillus plantarum* in teff-based substrates over a 21-day period, where teff supported the proliferation of *L. plantarum*, demonstrating strong prebiotic potential. The bacterial counts (CFU/mL) indicated a significant increase from day 7th to day 14th in specific teff samples, confirming teff's ability to enhance gut microbiota. These results suggest that teff extract not only contributes essential bioactive compounds but also plays a pivotal role in promoting digestive health and overall well-being, positioning it as a valuable addition to functional foods aimed at enhancing gut health.

Keywords: teff, phenolic compounds, *L. plantarum*, prebiotic activity

PP.3.3.

Preliminary Studies on the Lactic Fermentation of Hemp Seeds

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Abstract

Novel lactic acid bacteria strains were isolated in pure cultures from various types of hemp seeds. These strains were morphologically characterized by evaluating colony characteristics (appearance, color) and microscopic features (staining affinity, shape, and size of the cells). As a result of the evaluations, four isolates belonging to the *Lactobacillus* genus were obtained. These were coded and criopreserved at temperature of -80°C, in 10% glycerol, in Collection microorganism the acronyum MIUG, to be tested in future research. Six fermentative media were formulated containing hemp seeds (*Cannabis sativa* L.) in different forms, whole, hulled, coarsely ground, flour, sprouted and at a ratio of 1:8 (g/g). The initial pH of the media was determined to be 6.50. The media were then sterilized at 121°C for 15 minutes. The sterilized media were inoculated with 2 % inoculum (DO_{600} of suspension of cells - 2.0) of *Lactobacillus plantarum* MIUG BL 21 strain. Fermentation was carried out under stationary conditions at temperature of 30°C for 48 hours.

The fermented products were analyzed for analysing the pH, acidity, antioxidant activity (using the DPPH method) and antimicrobial activity (both antibacterial and antifungal). The results indicated fermentative activity in all tested samples, associated with a decrease of pH and an increase of the acidity. The antioxidant and antimicrobial activities were influenced by the processing method of the hemp used as substrate. The best results were obtained in the sample containing ground hemp seeds (*Cannabis sativa* L.). This preliminary study suggests the potential use of *Cannabis sativa* L. hemp seeds as fermentation susbtrate for the development of products or ingredients with functional properties.

Keywords: hemp seeds; *Cannabis sativa* L.; lactic acid fermentation; *Lactobacillus plantarum* MIUG BL 21; bioactive properties.

PP.3.4.

Fermentation of hulled hemp seeds (*Cannabis sativa* L.) with kefir grains

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Abstract

The potential use of water and milk kefir grains for the fermentation of hulled hemp seeds (*Cannabis sativa* L.) was studied with the aim of obtaining ingredients with enhanced bioactive characteristics. The fermentation medium was prepared by mixing 10 g of hulled hemp seeds with 90 mL of tap water. The initial pH of the two fermentation media was determined to be 6.50 and 6.51, respectively. These values were considered suitable for the fermentation process, so no further adjustment was made. The samples were then sterilized by autoclaving at 121 °C for 15 minutes. The media were inoculated with 0.3% water kefir grains and milk kefir grains, respectively, and fermentation was carried out under stationary conditions at room temperature for 48 and 72 hours, respectively. During fermentation, pH and total titratable acidity were monitored. The results revealed significant differences between the samples depending on the starter culture used. Fermentation was faster when milk kefir grains were used, taking 48 hours, compared to 72 hours for the sample inoculated with water kefir grains. In both cases, the fermented products demonstrated functional potential (antioxidant activity, antimicrobial activity, prebiotic effect, and inhibition of certain metabolic enzymes). The study demonstrates the adaptability of kefir grains in the fermentation of hulled hemp seeds and the potential for diversifying products and ingredients with bioactive properties derived from hemp seeds.

Keywords: Hemp seeds (*Cannabis sativa* L.); fermentation; water kefir grains; milk kefir grains; functional products.

PP.3.5.

Physical, pomological, nutritional and phytochemical properties of some plum (*Prunus domestica* L.) cultivars grown in a collection orchard from South-West Romania

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Abstract

Geometrical and physical properties, moisture content, soluble solids content, titratable acidity, total phenolic content and DPPH radical scavenging activity were investigated in the fruits of six plum (*Prunus domestica* L.) cultivars ('Centenar', 'Minerva', 'Carpatin', 'Dobrowica', 'Čačanska Lepotica', and 'Mirabelle de Nancy') and two local plum selections ('Păscoaia' and 'Gogoșele Otăsău') grown in an experimental plum orchard collection established in 2016 in Orodel, Cornu village, Dolj county (South-Western Romania). In addition, phenolic compounds, organic acids and vitamin C contents were determined in fruit flesh and peel by high-performance liquid chromatography and the correlation between the measured values was investigated. Analysis of phenolic compounds indicated that chlorogenic acid and catechin hydrate were the predominant phenolic acid and flavonoid, respectively, in the flesh of most of the

investigated cultivars. Higher contents of phenolic compounds were found in the peel, where the phenolic profile was dominated by vanillic and chlorogenic acids among phenolic acids and by rutin among flavonoids. In the peel, the highest total phenolic content was measured in the peel of 'Centenar' cultivar (575.64 mg GAE/100 g fw) followed by 'Čačanska Lepotica' (536.55 mg GAE/100 g fw), while the flesh of 'Mirabelle de Nancy' (218.36 mg GAE/100 g) and 'Gogoşele Otăsău' (152.02 mg GAE/100 g) cultivars were the richest in phenolic compounds and antioxidant activity. A significant ($p < 0.05$) and positive correlation was found between DPPH radical scavenging activity and total phenolic content both in flesh and peel of the plum cultivars.

Keywords: plum cultivars, local selections, flesh, peel, phenolic acids, flavonoids, organic acids, antioxidant activity

PP.3.6.

Antioxidant activity and bioactive compounds in carrot pomace extracts obtained through various extraction methods

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Abstract

Carrot pomace, a by-product of carrot (*Daucus carota* L.) juice production, serves as a rich source of valuable phytochemicals, such as carotenoids, polyphenols, and dietary fibers. This study presents a comparative analysis of various extraction methods aimed at optimizing the recovery of bioactive compounds. Conventional techniques, including solvent extraction, were compared to advanced methods like ultrasound-assisted extraction (UAE). The solvents used in this study were a hexane: acetone mixture (3:1, *v/v*) and 70% ethanol, with extraction times set at 30 and 60 minutes. Key analyses, including the determination of bioactive compound content (total carotenoids, flavonoids, and total phenolics) and antioxidant activity, were performed spectrophotometrically.

Results show that UAE significantly outperforms traditional methods in terms of phytochemical extraction efficiency. The highest yield of total carotenoids was achieved using UAE with a hexane:acetone 3:1 mixture at 30 minutes at a temperature of 40 °C and 40 kHz, yielding approximately 35.72±1.21 mg/100g dw. The study concludes that the ultrasound-assisted extraction of phenolic compounds from carrot pomace is an efficient method with potential for industrial use, providing a sustainable approach for extracting natural antioxidants.

The findings highlight the value of selecting optimal extraction methods for enhancing the phytochemical yield from carrot pomace, fostering waste valorization in food processing, and expanding the use of carrot pomace in functional food and nutraceutical industries.

Keywords: carrot pomace; carotenoids; phenolic compounds; solvent extraction, phytochemicals.

PP.3.7.

Exploring the Nutritional Enhancement Potential of Carrot By-Products in Food Formulations

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Abstract

Carrots (*Daucus carota* L.), a commonly consumed root vegetable, are noted for their substantial levels of antioxidants, vitamins, and dietary fiber. The food industry is increasingly exploring the incorporation of carrot by-products into various food items to enhance their nutritional value and appeal. This study examines the possibilities of employing carrot by-products, particularly carrot pomace, to improve the nutritional composition of food compositions. Carrot pomace, a prevalent by-product of juice manufacturing, comprises substantial quantities of bioactive components, including carotenoids, polyphenols, and dietary fibers, recognized for their health advantages. The research examines the integration of carrot pomace powder into diverse food matrices (muffins, fondant, macarons, and cheeses) to assess its effects on nutritional composition, color attributes, and sensory qualities. The highest concentrations of carrot extract of total carotenoids (34.81±1.19 g/100g), β-carotene (30.76±0.57 g/100g), and lycopene (5.95±0.21 g/100g) were obtained when extracted with hexane:acetone/ (3:1). The findings demonstrated that including carrot pomace powder raised both the antioxidant capacity and the fiber content, as well as the profiles of bioactive compounds in the food compositions. Sensory assessments indicated favourable consumer approval of the supplemented food products. The results highlight the potential of carrot by-products as a sustainable supply of bioactive chemicals, presenting a viable strategy for minimizing food waste and enhancing the nutritional content of processed foods.

Keywords: carrot pomace; carotenoids; phytochemicals, food formulations; nutritional enhancement.

PP.3.8.

Valorization of red grape pomace inoculated with lactic acid bacteria by drying: evidences on phytochemicals profile

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Abstract

Due to the need of becoming more sustainable, a new trend among almost all production industries is increasingly growing, mainly to reuse the resulting by-products as raw materials for other processes and products. In winery, the main by-products is grape pomace (GP), obtained in huge solid waste produced in extensive amounts during the juice and wine making process. The main objective of this study was to obtain a GP dried powder, inoculated with 9.1 log CFU/mL of *L. casei* 431® with enhanced phytochemical profile and cells viability. The results showed that the fresh red GP showed a TPC of 2.81±0.14 GAE mg/g DW, wheareas when drying, different TPC were found in CA (12.88±0.31 mg GAE/g DW and IR (16.46±1.28 mg GAE/g DW) samples, respectively. The content of flavonoids increased from fresh GP (2.93±0.47 mg CE/g

DW) to 6.08±1.36 mg CE/g DW and 9.03±0.48 mg CE/g DW for CD and IR drying, respectively. TAC increased also, from 73.78±4.76 mg C3G/g DW to 154.17±29.15 mg C3G/g DW and 388.71±5.40 mg C3G/g DW for CD and IR drying, respectively. Further studies are currently developed to establish physico-chemical properties, the bioaccesibility of lactic acid bacteria, polyphenols, flavonoids, anthocyanins and antioxidant activity *in vitro*.

Keywords: red grape pomace; drying; phytochemical profile; polyphenols.

PP.3.9.

Alternative extraction solvents for a more pronounced protective effect of polyphenols in red grape pomace extracts: a comparative study

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Abstract

Currently, awareness within both the industrial sector and among consumers regarding the negative environmental and economic impacts of food loss and waste has significantly increased, as a result of the consequences triggered by climate change and the growing scarcity of natural resources. Thus, the efficient implementation of a sustainable model for by-products valorization, such as red grape pomace (RGP), can contribute to achieving key objectives including sustainability, efficient resource management, extraction of bioactive compounds, development of high value-added products, economic growth, and environmental protection. The present study aims to optimize the ultrasound-assisted green extraction and compare the efficiency of polyphenolic compounds from red grape pomace from *Feteasca Neagră* and *Merlot* varieties using a natural deep eutectic solvent (NaDES), obtained from choline chloride, lactic acid and water (1:2:1), compared to a conventional solvent (ethanol). By applying the Response Surface Methodology (RSM) with a Central Composite Design (CCD), the effects of three independent variables: temperature (°C), time (min) and solvent (ethane/water, % or NaDES volume, mL) on the following response variables were analyzed: total anthocyanin content (TAC), total polyphenol content (TPC), total flavonoid content (TFC) and antioxidant activity (DPPH).

Analysis of the perturbation plots for TAC indicated that this variable was most sensitive to the solvent factor in both extraction methods. According to the 2D contour plots for the second-order model applied to conventional extraction, the maximum TPC yield was obtained at 70% ethanol and an extraction time of 22.5 min, with a predicted value of 461.82 mg EAG/100 g DW. Beyond this point, a decrease in compound concentration was observed due to degradation caused by the high alcohol concentration and prolonged extraction time. For extraction with NaDES, the maximum predicted TPC value according to the 2D contour plots was 451.01 mg EAG/100 g DW, achieved using 10 mL of solvent and an extraction time of 60 min. The high viscosity of the NaDES composition appears to have provided enhanced thermal protection for these compounds compared to conventional extraction. In this study, the two solvents exhibited distinct behaviors in the extraction of bioactive compounds, attributed to the specific characteristics of their composition. Identifying optimal extraction conditions enables the recovery of extracts rich in stable polyphenolic compounds, which may subsequently be employed in future assessments of bioaccessibility as well as anti-diabetic and anti-obesity properties.

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Keywords: extraction, polyphenols, valorization, sustainability, NaDES

PP.3.10.

Comparison of Conventional and Emerging Techniques for the Extraction of Bioactive Compounds from Rosemary

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Abstract

Rosemary (*Rosmarinus officinalis L*) is a perennial plant which belongs to the Laminaceae family. Rosemary is widely used in medicine to treat different dysfunctions and disorders, such as: memory related disorders, hypertension, insomnia, headache and respiratory problems. Rosemary therapeutic effects have been associated with its phytochemical constituents, such as phenolic acids, flavonoids and terpenoids. The present study aimed to compare the enzyme assisted extraction with the conventional method based on the use of alcoholic solutions for the extraction of the biologically active compounds from rosemary. Moreover, the phytochemical profile and antioxidant properties of the extracts from rosemary leaves and stems were considered in the study. In case of the conventional method, the results of the extraction dynamics revealed that the highest recovery of the total phenolic content is achieved after 3 h of incubation at 50°C. Extending the extraction time up to 24 h, resulted in no significant increase of the DPPH and ABTS radicals scavenging activity. Slightly lower extraction yields of the bioactive compounds were registered in case of using a mixture of cellulases and hemicellulases for breaking the vegetal cell walls of both rosemary leaves and stems. The highest antioxidant activity was observed in case of the extracts collected after 3 h of enzyme assisted hydrolysis. The studies regarding rosemary phytochemical profile are quite limited, and they are mostly focused on the alcoholic extracts. The emerging extraction method proposed in the present study allowed avoiding the used of organic solvents for the extraction of the bioactive compounds while being rather efficient and time effective.

Keywords: phenolic compounds, antioxidant activity, aromatics herbs.

PP.3.11.

Study upon the influence low sodium environment on quality characteristics of pickled unripe tomatoes during storage

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Abstract

Pickled unripe tomatoes represent a part of the Romanian culinary heritage. Traditionally, they are manufactured during autumn, with the purpose to be stored throughout the winter. This is the main reason for the use of natrium chloride as a preservative. On the other hand, in the latest decades, sodium consumption has been related to a high risk of cardiovascular diseases. Thus, as a strategy of lowering sodium intake, the possibility to replace it with other salts was investigated. The aim of the present work was to assess the influence of sodium chloride replacing with magnesium or potassium chlorides on the quality characteristics of pickled unripe tomatoes, during storage.

Preliminary studies reveled that in fermented pickles manufacturing, the fermentation process ends in about 28 days, the next interval being considered storage of the vegetables in fermented state. Therefore physico-chemical characteristics (dry matter, lactic acid content), lactic bacteria number, texture and color parameters were determined at 28, 56, 94 and 120 days after the initiation of the fermentation process. For

the dry matter an increase with 19.95…44.48% was noticed, as a result of the mass transfer between the solution and the vegetal material. The lactic acid concentration decreased for all the samples, with a maximum of 51.17% for the tomatoes fermented with $MgCl_2$, due to its consumption by the lactic bacteria. Similar reduction was noticed for the lactic bacteria count. From textural point of view, despite the previous decrease in firmness during fermentation process, no significant variations were noticed during storage. The lowest values of firmness were determined for the KCl samples (3.20±0.39...3.97±0.55N), while the highest values were noticed for the $MgCl_2$ samples (4.55±0.61... 4.66±0.38N). Studies presented in literature explain the highest values of firmness in magnesium samples as a result of the interactions between the carboxyl groups in pectin which are facilitated by this ion. As in the case of texture parameters, the color parameters did not significantly vary during storage. The main conclusion of the study is that the magnesium and potassium chlorides could successfully replace the sodium chloride in pickles storage.

Keywords: fermentation, unripe tomatoes, low sodium environment, storage

PP.3.12.

Coaxial Electrospinning Applications for Obtaining PLA Fibers with Microencapsulated Thyme Essential Oil: - a Method to Develop Active Composite Materials

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Abstract

This study explores the development of a bioactive composite material with potential antimicrobial activity for food in an effort to support the transition toward sustainable and functional food packaging. Coaxial electrospinning was used to encapsulate thyme essential oil, known in nature for its antimicrobial activity, within polylactic acid (PLA)-based nanofibers. The electrospun fibers were deposited onto the film of whey protein isolate (WPI) and chitosan obtained by casting, while crosslinking between the composite layers was promoted through 1% citric acid solution spraying onto the film surface prior to fiber deposition. The multilayer composite, thus formed, offer mechanical protection to food while allowing for controlled release of active compounds through diffusion. These preliminary studies involved the evaluation of the mechanical properties including tensile strength, elongation at break, and elastic modulus to assess the influence of the active fiber layer on the structural integrity of the WPI-chitosan film.

The approach considers the potential of using biopolymers and essential oils combined through advanced structuring techniques for producing new bio-based antimicrobial packaging materials applicable as food contact materials. This study furthers aims to develop sustainable eco-friendly packaging systems able to extend shelf life of the food while reducing environmental impact.

Keywords: biopolymers, coaxial electrospinning, antimicrobial packaging, thyme essential oil, PLA, WPI, chitosan, multilayer materials

PP.3.13.

Assessment of OCP and PCB contamination transfer from Black Sea aquatic environments to fish

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Abstract

Organochlorine pesticides and polychlorinated biphenyls have been banned by the Stockholm Convention. Due to their toxic, persistent, bioaccumulative and toxic properties, their presence is felt in the marine environment. During 2021-2023, water, sediments and a commercially important fish species, the turbot, were sampled from the Romanian Black Sea coast. The OCPs and PCBs concentrations obtained in water, sediment and turbot were compared with the maximum permissible limits and threshold values existing in the legislation. The aim of this work is to assess the transfer of OCP and PCB contaminants from the marine environment to fish, highlighting exceedances of the threshold values existing in the legislation from the point of view of the ecological status of the environment and for human consumption.

Keywords: organochlorine pesticides, polychlorinated biphenyls, turbot, Black Sea, sediments, seawater

PP.3.14.

Influence of heat treatment on the stability of biological active compounds recovered from purple carrot peels

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Abstract

In the food industry vegetables and fruits can be consumed either fresh or thermally prepared, in this way increasing the stability of the foods that contain them. Some studies attest that the advantages of applying thermal treatment are related to the improvement of the color, texture and the increase of the microbiological stability.

The objective of the current experimental study was to evaluate the influence of temperature on the biological compounds (total monomeric anthocyanins, total flavonoids, total polyphenols and antioxidant activity) from purple carrot peels extracted by the ultrasonically assisted solvent method. The total anthocyanins content revealed a decrease of 20% after 20 minutes of treatment at temperature of 80°C, while after the same time of treatment at temperature of 160°C the decrease was higher (75%). Our study shows that the content of total flavonoids decreased by 50% after 20 minutes of heat treatment at 40°C, and at 140°C the decrease was at 45%. Otherwise, polyphenols suffered a smaller decrease, by 12% at the heat treatment of 120°C, after which, at 160°C, their content increased by 75% compared to the control. The antioxidant activity decreased in the range of 40-120°C by approximately 50%, and in the range of 140-160°C, it increased to 102% compared to the control. The biological active chemicals are significantly impacted by the thermal treatment methods utilized in the food business, which also have a significant impact on their bioavailability and bioactivities.

Keywords: purple carrot peels, biological active compounds, heat treatment

PP.3.15.

Biodegradable mulch films: economic and environmental advantages

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Abstract

Mulching films are increasingly used around the world due to their numerous benefits for vegetable crops. These include reducing evaporation and conserving soil moisture, suppressing weeds and their seeds, accelerating seed germination, regulating soil temperature, and retaining heat to support young plant growth. Additionally, they help minimize fertilizer usage by accelerating humus formation, limit soil erosion and degradation, create a balanced soil environment through a protective barrier, reduce gas exchange with the atmosphere, and ultimately enhance crop quality. However, most mulch film manufacturers have primarily focused on producing non-biodegradable, petroleum-based options such as polyethylene (PE), polypropylene (PP), polyvinyl chloride (PVC), ethylene vinyl acetate (EVA), polymethyl methacrylate (PMMA), and polycarbonate (PC). These materials have caused widespread ecological issues. A major concern arises at the end of their lifecycle, as these films are often improperly disposed of, creating environmental pollution and occupying valuable storage space. To address these environmental concerns, attention is shifting toward the development and adoption of biodegradable mulch films based on biopolymers. These eco-friendly alternatives offer a promising solution to the negative impact of synthetic polymers. Given the many agronomic benefits of mulching films, this paper aims to emphasize both the economic and environmental advantages of replacing traditional mulch films with biodegradable ones in vegetable production systems.

Keywords: biodegradable mulch film, environmental protection, economic advantages

PP.3.16 .

Food-educated preschoolers of today, healthy eaters of tomorrow

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Abstract

Analyses of data from around the world show that the prevalence of obesity and overweight in children and adolescents has risen. The predictions for the future are not encouraging, with some global estimates suggesting that 660 million children aged 5–19 years will be overweight or obese by 2030. Overweight and obesity are risk factors for diabetes, cardiovascular diseases, certain forms of cancer, joint problems, sleep apnea, and social and psychological problems. Preschool age is essential for the development of eating and life skills. From the perspective of physical development, this is the period in which the child accumulates bone and muscle capital, grows, on average, 5–6 cm per year, develops teeth, and gains strength and mobility. Nutritional needs due to growth are high, while the child's stomach is still small. At this age, the child needs concentrated but nutritionally balanced foods rich in minerals and vitamins. In Romania, there are sporadic official data on the dietary intake of preschoolers. Although nutritional guides have been developed, they are not sufficiently popularized and are not accessible to parents in terms of information and language. Parents, family, teachers, doctors, and the community have to guide children towards a healthy lifestyle. Since general eating habits are formed in the first years of life, adults must encourage children to eat nutritious foods and be an example.

Keywords: preschoolers, obesity, food education.

PP.3.17.

The Benefits of Finning Agents in Producing Quality White Wines

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Abstract

Sarba is a Romanian variety of white grapes obtained at the Research-Development Station for Viticulture and Winery Odobești by crossing two very valuable varieties: Tâmăioasă Românească and Italian Riesling. The purpose of this study was to highlight the effectiveness of the treatment with the fish-based fining agent for clarifying the young white wines (Șarba variety). Experiments were carried out on Șarba wines produced in Odobești vineyard, Vrancea county, in the climatic conditions of 2023, using the classical technology. The wine samples were aged on the yeast sediment for a period of 4 months and then clarified by treatment with fish-based fining agent (1 g/hl), treatment with milk casein at a dose of 25 g/hl and treatment with egg albumin using a dose of 3 g/hl. Each variant (including the control) was treated with 20 g/hl bentonite product. To highlight the effectiveness of the treatment, the turbidity of the wine was measured using the turbidimeter and the value of the colour intensity of the wine measured by the value of the optical density at wavelength λ = 420 nm. The efficiency of the white wine treatment with Ichtyocolle is observed for the sample treated with Ichtyocolle compared to the variants treated with milk casein and egg albumin. The tendency of white wine to browning is very low in the sample treated with fish-based fining agent at a dose of 1 g/hl and by 20 g/hl bentonite, compared to the control sample and the variant treated with egg white, but being very close to the casein-treated variant which is recognized for its superior ability to protect white wines against oxidation.

Keywords: white wines; finning agents, turbidity, browning.

PP.3.18.

Ulva lactuca Supplementation in Common Carp Diets: A Study of Growth Response in RAS with Varying Hydraulic Conditions

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Abstract

In recent years, recirculating aquaculture systems (RAS) have gained significant atraction due to their reduced environmental impact and enhanced control over water quality and production parameters. However, maintaining high stocking densities in RAS poses significant challenges to fish health, primarily due to stress associated with crowding and the concomitant decline in water quality. In the past decade algae have garnered attention as potential dietary additives in aquaculture, owing to their bioactive composition, with the aim of mitigating the adverse effects of stress on fish. This study aimed to evaluate the effects of a green algae *Ulva lactuca* extract—obtained through supercritical CO_2 extraction—on the growth performance of common carp (*Cyprinus carpio*) reared in RAS under three different water regimes:

high water quality maintained by practicing an exchange rate of 7.5 l/kg/day (ER1), medium water quality where the exchange rate was 3.75 l/kg/day (ER2), and poor water quality where the exchange rate was as low as 2.5 l/kg/day (ER3). Over a 50-day trial, fish were fed three types of diets: a control diet (C), and two experimental diets supplemented with 50 mg/kg^{-1} (EU50) and 100 mg/kg^{-1} (EU100) of algae extract. Key water quality parameters (nitrate, nitrite, ammonia, pH, oxygen and temperature) were continuously monitored throughout the study.

The results demonstrated a general improvement in growth performance in all groups receiving the extract, with significant differences depending on the water exchange rate and the concentration of the supplement. These findings highlight the potential of *Ulva lactuca* extract as a functional feed additive in promoting sustainable aquaculture practices.

Keywords: feed additive, growth performance, waste accumulation

PP.3.19.

Assessing Wine Quality and Authenticity: Enzymatic Measurement of Citric Acid Levels

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Abstract

Citric acid is a monohydroxy tricarboxylic acid, and is naturally present in wine, must, and grapes. Only a tiny portion of it is also created in the leaves; the majority is formed in the vine's roots, from where it moves into the grapes. Compared to tartaric and malic acids, citric acid accumulates in grapes in smaller amounts (0.1–0.8 g/L). The highest concentration of citric acid, which can occasionally surpass 1.5 g/L, is seen in botrytized grapes. The grapes' citric acid concentration either stays constant or slightly rises during the ripening process. For this reason, is regarded as the wine's most stable acid. These days, adding citric acid to the wines with lower acidity is considered as a remedy by OIV, but the final concentration should not exceed 1 g/L. This study's primary goal was to develop an enzymatic technique for measuring citric acid in wines that might detect potential frauds in the wine samples that were gathered. A particular enzyme called citrate lyase (CL) catalyzed a reaction that converted citric acid (citrate) into oxaloacetate and acetate (the basis of the enzymatic technique). Comparing the results to the traditional method of determining citric acid, which is based on the reaction of acetic anhydride in a basic solution to generate a product whose maximum absorbance was measured at 363 nm. Following analysis of 27 wine samples (white, red, and rose), the findings showed that there was less than 1% variation between the citric acid values determined by the two methods. The citric acid concentration of only two wine samples exceeded the suggested limit of 1 g/L.

Keywords: citric acids, wine authentication, enzymatic method.

PP.3.20.

Integrating the spirulina biomass and wild consortia of microorganisms from artisanal cultures to obtain metabiotic ingredients for aquaculture

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Abstract

Nutrients play a crucial role in fish growth, reproduction, and health by supplying energy and essential substances for growth and the immune system. Macronutrients (proteins, fats, and carbohydrates) support metabolism, tissue repair, and energy production, while micronutrients (minerals and vitamins) regulate metabolic processes and enhance immunity. Proteins are key for growth, and fats provide essential fatty acids (omega-3, omega-6), vitamins, and minerals, such as calcium, iron, zinc, and bioactive compounds (peptides, short-chain fatty acids, polyphenols, etc.) that promote overall health and quality in aquatic environments [1]. A balanced diet tailored to the species and environment is essential for the fish's optimal development and safety. Combining biotic-rich sources like spirulina biomass and wild microorganisms from starter cultures, such as kombucha membranes (SCOBY) and kefir grains, could lead to the production of new metabolites known as postbiotics. SCOBY membranes and kefir grains are natural sources of probiotics (bacteria and yeasts) that metabolize spirulin biomass to obtain a complex of metabiotics (pre-, pro-, and postbiotics). This complex can help enhance the health of fish and crustaceans by providing protection against pathogens and stimulating their immune systems. These probiotics and their postbiotics can improve food digestibility and promote faster growth in aquatic organisms [2-3]. Specific substrates for artisanal culture fermentation are tea, herbal infusions, animal and plant milk, whey, water, fruit, and vegetable juices. Testing other unconventional substrates can enhance the functional properties of fermented products. These substrates can offer significant benefits. *In vivo*, they can boost fish immunity, increase survival rates, and optimize digestion. *In vitro*, they can reduce pathogens and improve water quality through antimicrobial properties, contributing to a balanced microbiome in aquatic ecosystems [4]. The biomass of spirulina microalgae is a valuable source of essential nutrients, including proteins, lipids, vitamins, and minerals. It can be used as a dietary supplement for aquatic organisms, improving the food-to-body conversion rate and reducing the risks associated with infectious diseases.

Microalgae can also enhance water quality by lowering excessive nutrient concentrations (nitrogen and phosphorus) through photosynthesis. Therefore, there are valuable opportunities to supplement conventional fermentation media with dried spirulina biomass and fermentation by artisanal starter cultures to obtain innovative functional ingredients with metabiotic characteristics. These ingredients could then be incorporated into fish feed formulations, enhancing the life quality and safety assurance in the aquatic environments.

Keywords: wild microbial consortia, spirulina biomass, fermentation, metabiotic ingredients

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PP.3.21.

The Impact of Neurotoxic Compounds on the Nervous System of Zebrafish

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Abstract

Aquatic pollution with neurotoxic compounds poses a major threat to aquatic ecosystems, significantly impacting the health of aquatic organisms, particularly fish. This article examines the effects of such pollutants on the nervous system of zebrafish (*Danio rerio*), a species widely used in toxicology studies due to its small size, short life cycle, ease of genetic manipulation, rapid reproduction, and notable genomic similarities with humans. In recent years, this animal model has attracted increasing attention from researchers. Consequently, the neurotoxic effects of various pollutants—such as heavy metals, pesticides, pharmaceuticals, microplastics, and other emerging contaminants—have been extensively investigated. These compounds can impair neuronal development, neurotransmission, the function of the hypothalamic–pituitary–adrenal axis, as well as motor activity, feeding, and reproductive behaviors in fish. The aim is to enhance water monitoring and strengthen regulations concerning the release of toxic substances into the environment, ultimately reducing their impact on aquatic ecosystems.

Keywords: neurotoxicity, zebrafish, aquatic pollution, pharmaceutical contaminants, heavy metals, pesticides, microplastics, neurodevelopment, behavioral toxicity, ecotoxicology.

PP.3.22.

Effects of Extraction Parameters on Ultrasound-Assisted Recovery of Carotenoids from Pumpkin Peels

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Abstract

Pumpkins (*Cucurbita máxima* L.) are widely cultivated across Europe, grown extensively and consumed all over the globe, and hold significant value as a vegetable crop. Pumpkin peels, a by-product of pumpkin processing, are rich in bioactive compounds, including carotenes, phenols, vitamins, terpenes, flavonoids, and plant steroids, offering various health benefits. These pigments not only enhance the visual appeal of food but also provide nutritional advantages. This study focuses on optimizing carotenoid extraction from pumpkin peels using ultrasound-assisted extraction. A central composite design with three independent variables—solvent ratio (0.23–50.23 v/v), incubation temperature (6–99 °C), and incubation time (14–129 min)—resulted in carotenoid yields ranging from 53.01 to 106.01 mg/100g dry weight. The model's regression analysis, with an F-value of 705.14 and p-value < 0.0001, accurately described carotenoid extraction. Optimal conditions for maximum extraction were identified as a solvent ratio of 10 mL, an incubation temperature of 80 °C, and an incubation time of 100 minutes, yielding 97.01 mg/100g DW of carotenoids.

Keywords: carotenoids, ultrasound-assisted extraction, pumpkin peel, central composite design, food pigments, extraction optimization

PP.3.23.

Kinetics of convective air and infrared drying of apple snacks infused in *Hibiscus sabdariffa* extract

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Abstract

In this study, apple (*Malus domestica* variety) were sliced and infused in aqueous *Hibiscus sabdariffa* extract, then dried by hot air convection (CD) and infrared (IR) to obtain highly functional snacks. The infusion time was 30 min, followed by drying at temperatures varying between 50°C to 70°C. In order to study the kinetics of drying data were analyzed based on higher value of R^2 and lower *SSR* values and fitted to the Page model. The effective moisture diffusivity were higher for infused samples. For drying methods, the increase of temperatures resulted in reduction of the drying times, leading to a continuously decreases of moisture ratio values, as a function of drying time. It was observed that the drying time varied between 180 and 390 min for CD and between 150 and 330 min for IR. Compared to CD, the dehydration time of the IR drying was with about 25% lower when compared with control and with approximately 17% for the hibiscus extract infused samples. Two distinct drying periods were observed, the first one known as warming-up stage, when the drying rates reached the maximum values after 30 min (0.007 – 0.0115 g water/g DW for CD and 0.0048 – 0.0092 g water/g DW for IR drying). The second one period was characterised by significantly low drying rate. The Page model has the best match for all drying temperatures and methods, with the highest R2 values varying from 0.990 to 0.996 and the lowest SSR values varying from 0.0037 to 0.149.

Keywords: apple; drying; hibiscus; mathematical models.

PP.3.24.

Evolution of physico-chemical parameters during the ripening of Fetească regală grapes in the Dealu Bujorului vineyard

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Abstract

Determining the optimal harvest time is essential for obtaining quality wines. In the case of the Fetească Regală variety, the balance between sugar content, total acidity and berry weight defines the technological maturity of the grapes and directly influences the final quality of the wine. The present study aim was to monitorize the evolution of these parameters for the fetească regală grapes variety during the period 2021–2023, in the Dealu Bujorului vineyard. Samples were taken from 200 marked vine plants, and one berry was selected from each to form a representative sample. Analyzes were performed every 5 days, using laboratory press, refractometer and chemical titration. he results shown that full maturity was reached around the date of 10th September, with average values of 196 g/L sugar, 7.5 g/L acidity and 159 g/100 berries in 2021. At harvest of Fetească Regală grapes in 2021 the values were 215 g/L sugar, 6.0 g/L

acidity and 157 g/100 berries. During the three years, the sugar content at harvest varied between 204–218 g/L and the acidity between 4.4–6.2 g/L H_2SO_4. The mass of 100 grains fluctuated between 132–161 g, with the highest values in 2022 vintage. These observations confirm the influence of climatic conditions on the dynamic of ripening and underline the importance of physico-chemical parameters monitoring for establishing the ideal harvest time.

Keywords: white grapes; sugar content; acidity; ripening.

PP.3.25.

Use of a natural deep eutectic solvent (NaDES) for the development and optimization of ultrasound-assisted green extraction of polyphenolic compounds from red and white grape pomace

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Abstract

The oenological sector aims to align its activities with the principles of the circular economy. One of the primary objectives is the valorization of by-products generated during the technological process of grape processing. Grape pomace is one of the plant matrices often used in research due to its phytochemical composition. Various specialized studies focus on identifying the most efficient solvent and optimal extraction conditions in achieve maximum yield of polyphenolic compounds (PC). However, many conventional methods are used on toxic organic solvents and are time- and cost- consuming. Thus, ultrasound-assisted solid-liquid extraction, in combination with the use of a natural eutectic deep solvent (NaDES), can lead to the achievement of important goals: the use of a fast and economical extraction technique, and the use of an eco-friendly solvent. In this work, the efficiency of a solvent obtained from choline chloride, lactic acid and water, in molar ratio 1:2:1, was tested for the extraction of polyphenolic compounds (PC) from red grape pomace (RGP) from *Merlot* and *Feteasca Neagră* varieties, respectively white grape pomace (WGP) from *Fetească Albă* variety. A Two-Levels Full Factorial Design with three replicates was applied to study the impact of three factors: temperature (40 and 60°C, respectively), extraction time (30 and 60 minutes, respectively) and solvent volume (10 and 20 mL, respectively). The Pearson correlation coefficient (r) indicates the existence of a positive or negative linear correlation between two variables. At a 95% confidence level, a high and very high negative linear correlation was observed between the solvent volume and the response variables, confirmed by the r values obtained: for total anthocyanin content (TAC), r=-0.818, for total polyphenol content (TPC), r=-0.656, for total flavonoid content (TFC), r=-0.819, and for antioxidant activity (DPPH), r=-0.819. These results were further confirmed by Pareto chart and regression equations obtained for both types of grape pomace. This effect may be explained to the fact that in a smaller volume of solvent allow obtaining an extract rich in polyphenolic compounds. The optimal conditions for extracting PC from RGP, identified by maximizing the TAC, TPC TFC and DPPH responses was 60°C, 60 min and a solvent volume of 10 mL, with a desirability value of 0.997. For WGP, the best solution was 60°C, 30 minutes and a NaDES volume of 10 mL, with a desirability value of 0.991. In conclusion, NaDES can be considered a viable, efficient and sustainable alternative for the green extraction of polyphenolic compounds from grape pomace, due to its high efficiency and low volume requirement.

This work was supported by a grant of the **Ministry of Research, Innovation and Digitization, CNCS-UEFISCDI, project number PN-IV-P1-PCE-2023-0129, within PNCDI IV.**

Keywords: green, NaDES, grape pomace, Full Factorial Design, polyphenols

SECTION 4
ADVANCES IN ENGINEERING AND MANAGEMENT IN AGRICULTURE AND RURAL DEVELOPMENT

PP. 4.1
Rural Development in Romania's South-East Region through Skilled Workforce Financing Scenarios

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Abstract

The paper explores rural development opportunities in Romania's South-East Region by examining financing scenarios for training a skilled workforce. The authors propose a methodological framework that enables both regional generalization and local contextualization, thereby increasing the transferability of the findings. Emphasis is placed on the coordinated sequence of interventions—from funding and vocational training to economic stability—required to stimulate long-term development in rural areas. Through data analysis and projections of training program impacts for the period 2024–2030, the study highlights the importance of aligning public funding with the real needs of rural communities. The conclusions underline that sustainable rural development depends on institutional cooperation, the active involvement of local actors, and efficient use of resources provided by the National Recovery and Resilience Plan (NRRP) and other public funding mechanisms.

Keywords: rural development, skilled workforce, South-East Romania, financing scenarios, National Recovery and Resilience Plan (NRRP)

PP. 4.2
Fish Farming in the Moldova Region of Romania: Challenges and Opportunities in the Current Context

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Abstract

Fish farming in the Moldova region of Romania has experienced significant transformations in recent decades, influenced by environmental changes, economic fluctuations, and evolving regulatory frameworks. This study analyzes the current state of aquaculture activities in the region, focusing on production systems, species cultivated, water resource management, and the socio-economic role of fish farms in rural communities. Particular attention is given to the challenges faced by producers, including climate variability, limited access to modern technology, and market instability. At the same time, the paper

identifies emerging opportunities, such as the implementation of recirculating aquaculture systems (RAS), access to European funding, and increased consumer interest in locally sourced, sustainable fish products. The findings highlight the need for integrated policies and adaptive strategies to support the development of a resilient and competitive aquaculture sector in Moldova, Romania.

Keywords: Fish farming, recirculating aquaculture systems (RAS), economic fluctuations.

PP. 4.3

The Role of the Food Bank in the Republic of Moldova in 2024

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Abstract

In 2024, the Food Bank of the Republic of Moldova reported a lot of progress in the fight against food waste and in the assistance of the underprivileged sector. The cooperation with 64 economic agents made it possible for the Food Bank to salvage 211 tons of food products, which were then passed to 81 social services located in each corner of the country. The Food Bank's deal with Kaufland Moldova in the year 2024 appeared sufficient and they were able to step further. In the previous year, the collaboration led to the recovery of 64 tons of goods from Kaufland stores, which were then converted into 128,000 portions of cooked food for over 8,500 beneficiaries.

The Food Bank of the Republic of Moldova showed a constant commitment to the issue of food waste reduction and the help of the local community in their fight against social inequality by these activities, and as a result, they have been portrayed as a main figure in the social solidarity and food sustainability fields.

Keywords: Food Bank, food products, social services, Kaufland Moldova, benecifiaries.

PP. 4.4

Food Marketing and Its Impact on Obesity Rates in Moldova: A 2024 Perspective

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Abstract

The study analyzes the influence of food marketing strategies on obesity rates in the Republic of Moldova, offering a 2024 perspective grounded in recent data and policy developments. With rising concerns about public health and nutrition, the research examines how aggressive advertising of ultra-processed and high-calorie foods—particularly toward children and adolescents—contributes to unhealthy dietary behaviors. The paper highlights the role of media channels, promotional pricing, and packaging tactics in shaping consumer choices. It also evaluates current regulatory frameworks and public awareness campaigns, identifying gaps and proposing targeted interventions. Special attention is given to urban–rural disparities and socioeconomic factors influencing exposure to marketing messages. The findings suggest that while Moldova has made progress in aligning with international health standards, stronger enforcement mechanisms and cross-sector collaboration are needed to mitigate the impact of unhealthy food marketing. Ultimately, the study advocates for comprehensive strategies to promote healthier eating habits and curb the growing obesity trend.

Keywords: food marketing, obesity, Republic of Moldova

PP. 4.5

Market Concentration and Regional Disparities in the Agri-Food Supply Chain of the Republic of Moldova

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Abstract

The agri-food supply chain in the Republic of Moldova faces significant challenges due to both market concentration and regional disparities. A small number of large processors dominate key sectors such as cereals, sunflower seeds, and sugar, creating an imbalanced power dynamic that limits opportunities for small and medium-sized producers. At the same time, substantial regional differences in natural resources, infrastructure, and market access further exacerbate inequality. Northern Moldova benefits from fertile soils and higher productivity, while southern regions face climatic limitations and infrastructure deficits. These structural imbalances reduce the efficiency, inclusiveness, and resilience of the agri-food chain. The study highlights the need for targeted policy measures to support cooperative development, enhance infrastructure in underserved regions, and encourage fair competition. Greater integration among producers, better logistics, and regional investment could help balance the system and promote sustainable rural development across all areas of the country.

Keywords: agri-food supply chain, market concentration, regional disparities, Republic of Moldova

SECTION 5
ADVANCED RESEARCH IN ELECTRICAL / ELECTRONIC ENGINEERING, SYSTEM ENGINEERING AND INFORMATION TECHNOLOGIES

PP.5.1.
Optimizing energy consumption in the sintering process through advanced water flow control

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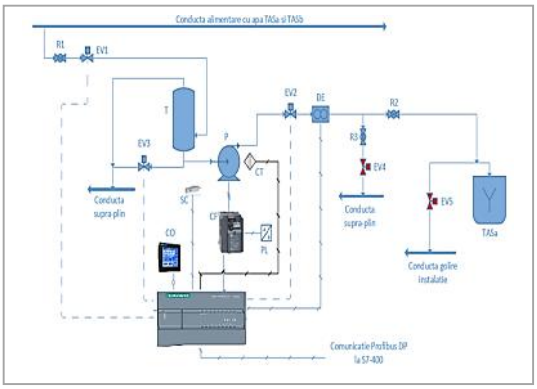
Abstract

This paper investigates the impact of advanced water flow control on energy efficiency in the ore sintering process. Utilizing an integrated automation system with PID regulation and a frequency converter to efficiently manage water flow, the study demonstrates how optimizing process parameters can lead to a significant reduction in electrical energy consumption. Detailed analysis of system behavior under various operational conditions reveals that precise water flow adjustments not only enhance the quality of the final product but also contribute to decreased CO2 emissions and increased industrial process sustainability. The results suggest that integrating advanced control technologies into traditional industrial processes is essential for achieving energy efficiency and environmental protection objectives. By implementing these techniques, the sintering process becomes not only more energy-efficient but also better adapted to current ecological requirements.



Keywords: energy efficiency, automated control, industrial sustainability.

PP.5.2.
Optimizing the operation of a Profibus network by using a Profibus MOLEX card

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Abstract

The project focuses on optimizing the performance and reliability of the new subnetwork by ensuring timely and error-free data transmission, enabling rapid detection and resolution of communication issues and transitioning from a linear to a star topology to enhance overall system uptime and stability.

The main objective is to ensure the optimal operation of consumers on the new subnetwork by delivering data packets promptly and error-free. The second objective is to quickly identify communication errors and resolve them efficiently. The third objective is to transform the linear communication network into a star topology to enhance overall system uptime and minimize failures.

Keywords: Profibus network, electric drive system, Profibus Analyzer, variable frequency converter

PP.5.3

Electrical System Analysis for Battery-Operated Electric Ships

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Abstract

This paper presents an in-depth analysis of the electrical systems used on battery-operated electric ships. With the growing demand for sustainable and environmentally friendly maritime transport, electric ships powered by advanced battery technologies are becoming increasingly relevant. The study focuses on the key components of the onboard electrical installation, including energy storage systems, power distribution networks, propulsion systems, and control architectures. Special attention is given to the challenges associated with battery management, energy efficiency optimization, load balancing, and ensuring system reliability under various operating conditions. The analysis also considers safety aspects, such as protection against overcurrent, thermal runaway, and emergency response strategies specific to battery-powered vessels. Furthermore, the paper explores the integration of renewable energy sources, such as solar panels and wind turbines, into the ship's electrical system to extend operational autonomy and reduce dependence on shore charging infrastructure. Case studies and simulations are used to illustrate practical design solutions and performance improvements. In conclusion, the development of robust and efficient electrical installations is essential for the advancement of battery-operated electric ships, contributing to a cleaner and more sustainable maritime industry.

Keywords: battery management, electric propulsion, power distribution, energy efficiency.

PP. 5.4.

DC Motor Parameters Estimation based on Neuronal Network

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Abstract

Taking into account the current evolution of artificial intelligence in every main domain, such as electrical engineering, autonomous driving, medical field and algorithms and the most popular among users, large language models, the need for laws and legal framework to protect users from biases, discriminations and false or incorrect answers, is an essential step for the evolution and mass adoption in AI fields. Every big economic power such as European Union, United States of America and China take different paths regarding the AI implementation and developments. Thus the European Union is taking a more reserved approach, prioritizing the user safety, putting first non biased decisions and good ethics, implementing a risk based classification system. On the other hand, the United States of America

is implementing a more descentralized approach, such as general federal laws, and every state is free to implement complementary legal framework, for example Colorado is taking the EU approach to categorise the AI based on risks. China is opting for targeted regulations, still sharing many similarities with the EU such as ethics and consumer security. As well as EU, the Chinese government is implementing a risk based framework, but little different, that Chinese policy is imposing rules for best practices and guidelines. The main objective of this paper is to review the everchanging legislative framework, and to make an objective comparasion between the different approaches in different continents. Due to the nonlinear behavior of the main components of machine tools, it is difficult to accurately determine the physical parameters. The property of artificial neural networks (ANN) to model nonlinear processes is exploited in this work, by implementing a neural parameter estimator. The principle was applied to a DC motor to estimate the mechanical and electrical parameters. The results of this test are presented.

Keywords: Artificial Intelligence, reglementations, United States of America, European Union, China, DC motor, estimator, mechanical and electrical parameters

PP. 5.5.

Numerical Results of an Operational Teleoperation System

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Abstract

The teleoperation system allows to the users to control the things remotely. In this paper, the authors proposed the study of a teleoperation system in the Matlab-Simulink development environment. The teleoperation system aims for the operator to feel the environment around the slave manipulator. It is shown how the slave device follows the behavior of the master device. Since the distance between these two devices is large, delays occur in the communication channels. These delays can cause instabilities in the teleoperation system. To avoid this, the variable wave method was used. The simulation results show a stabilization of the teleoperation system with delay.

Keywords: teleoperation, stability, delay, Matlab-Simulink, communication channels, master, slave.

PP. 5.6.

Omnidirectional Robot based on the Swedish Wheels

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Abstract

In this paper, the authors present kinematic and dynamic models, as well as direct and inverse kinematics of robots with two wheels, three omnidirectional wheels and four omnidirectional wheels. The dynamic model considers the mechanism of robot movement, taking into account the forces and torques that appear in the system. It allows describing the dependencies of the robot's position and orientation in relation to the applied forces and torques. It is used for the synthesis of automatic control systems, analysis of mechanical systems, simulation of robot movements. The most popular methods for describing the dynamic model of robots are the Newton-Euler method, the Euler-Lagrange equations. Simple dynamics solves the following problem: if we know the applied forces and moments, we also determine the positions, angular velocities. Inverse dynamics solves the following problem: if we know the positions, velocities and acceleration of the joints, we can calculate the corresponding forces and moments

of rotation. The kinematic model considers the mechanism of robot movement, neglecting the forces and torques that appear in the system. It allows the calculation of the robot's position and orientation and is used to formulate the relationship between the reference system of the workspace and the system of wheel motion variables. The kinematic model is the basic method for describing the position and orientation of the mobile robot, as well as the motion variables of all wheels. The method for describing the kinematic model of robots is the Denavit-Hartenberg Notation. Simple kinematics solves the following problem: if we know the positions, velocities, and angular acceleration of the wheels, we can calculate the current position, velocity, and acceleration of the robot relative to the initial position (i.e., linear and angular velocity). Inverse kinematics solves the following problem: if we know the positions, velocities, and acceleration of the robot in the workspace, we can calculate the angular velocity and acceleration of the wheels. The study in this paper is related to a four-wheeled robot with Mecanum wheels. The solutions of simple and inverse kinematics with respect to the coordinate system associated with the robot are presented. Kinematic model of a Swedish four-wheeled robot. The results of inverse kinematics and odometry are represented graphically.

Keywords: mobile platform, omnidirectional, 4 wheels

PP. 5.7.

Optimal nonlinear control of a mobile robot with differential wheels

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Abstract

In this paper, optimal control for an electric vehicle with differential wheels is proposed, compared to the classical cases of kinematic control. The dynamic system to be controlled is nonlinear, with time-varying parameters. Based on the formulation of the optimal control problem, the solution of the problem is determined based on the solution of the Riccati differential equation (SDRE) with infinite final time, imposed final state. In the formulation of the problem, the complete model with holonomic and non-holonomic constraints is used, respectively with the inclusion of the wheel rotation and the Center of Mass of the robot in the state vector. Under these conditions, the system is uncontrollable. However, the SDRE solution assumes that the dynamic system is controllable and observable. By using a change of variables, the system satisfies these conditions. Kinematics and dynamics of differential wheels mobile robots contain two constraint non-holonomic equations and one holonomic. In order to highlight the high performance offered by this type of control, the solution is implemented and obtained numerically in Matlab.

Keywords: mobile platform, optimal control, differential wheels.