

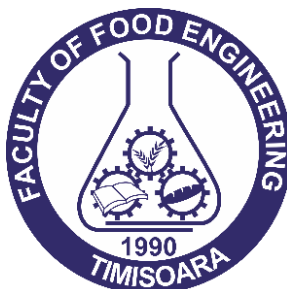


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BOOK OF ABSTRACT

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Oral Presentation 1

Antioxidant and anti-diabetic activity of Cr(III)-flavonoids hybrid metallodrugs

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Abstract

Diabetes Mellitus (DM) is a group of metabolic disorders, mainly characterized by hyperglycemia due to the absence of insulin or impairment of insulin secretion or insulin resistance [1]. A key factor in DM pathogenesis and progression is oxidative stress, which can simultaneously damage the insulin-secreting pancreatic β cells and, at the same time, contribute to insulin resistance, impairing the ability of insulin to facilitate glucose uptake [2]. Based on these premises, flavonoids, a family of naturally-occurring polyphenolic compounds widely used for drug discovery, mainly due to their bioactivity profile, including antimicrobial, antioxidant, antitumor, neuroprotective, and cardioprotective properties, attracted the keen interest of our Laboratory. The ability of flavonoids to coordinate with metal ions enhances their pharmacological profile compared to the parent flavonoids, thus providing a significant opportunity for novel drug discovery [3]. In that framework, Cr(III) has been implicated in the metabolism of carbohydrates, lipids, and proteins, hinting potency against insulin resistance [4]. The specific choice of metal is also linked to pharmaceutical preparations available as over-the-counter (OTC) medications in drugstores of various countries.

Bearing that in mind, research was launched in our laboratory to pursue the design, synthesis, isolation, and complete physicochemical and single-crystal crystallographic characterization of novel Cr(III)-flavonoid materials. After the optimization of various parameters, such as temperature, solvent, concentrations, and the addition of ancillary chelating agents, ternary crystalline materials of Cr(III) with chrysin or quercetin were isolated and meticulously characterized. The well-characterized flavonoid derivatives were further evaluated using in vitro muscle models (C2C12) due to enhanced carbohydrate consumption. Following the investigation of the complete (a)toxicity profile of the hybrid materials, before or after cell differentiation to myotubes, the antioxidant capacity and antidiabetic properties were evaluated, providing the complete bioactivity profile of the materials. At the same time, to further validate the metabolic shift towards normoglycemia, metabolomic analysis was performed, showing enhanced glucose uptake and increased proliferative signaling, further justifying their use as antidiabetic agents.

Keywords: Chromium, natural products, hybrid metal-organic materials, in vitro cell culture, insulin resistance

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Oral Presentation 2

Pomegranate peel – from traditional remedy to functional ingredient of the future

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Abstract

Pomegranate peel (*Punica granatum* L.), traditionally considered an agro-food waste, has experienced a significant reevaluation in recent decades, being recognized as a valuable source of bioactive compounds with functional potential. From a historical perspective, its use dates back to antiquity, when it was integrated into traditional medicine to treat infections, gastrointestinal disorders and inflammation. This continuity between past and present reflects the modern concept of “functional food”, in which foods offer benefits beyond their basic nutritional value.

In the last 10 years, scientific research has highlighted that pomegranate peel contains high concentrations of polyphenols, flavonoids and tannins (such as punicalagin and ellagic acid), compounds responsible for antioxidant, anti-inflammatory, antimicrobial and anticancer activities. Recent studies show that these properties contribute to the reduction of oxidative stress and the prevention of chronic diseases, supporting the role of pomegranate peel as a promising functional ingredient. Research has also shown that the antioxidant activity of the peel can be even superior to other parts of the fruit, which increases its nutraceutical value.

Another important aspect of recent research is the sustainable use of this by-product. Pomegranate peel, which can represent up to 50% of the fruit mass, is increasingly used in the formulation of functional foods (e.g., bakery products, nutritional bars or meat products), improving nutritional properties and oxidative stability. In parallel, the development of modern ecological extraction technologies (such as ultrasound-assisted extraction or supercritical fluids) has allowed the efficient extraction of bioactive compounds, strengthening the integration of pomegranate peel in the food and pharmaceutical industries.

Looking to the future, pomegranate peel is emerging as a key resource in the circular economy and in the development of new generation functional foods. However, further clinical studies are needed to validate the health effects in humans and to standardize dosages and administration forms. In conclusion, the transition of pomegranate peel from waste to functional ingredient illustrates a convergence between tradition and innovation, highlighting its significant potential in the nutrition of the future.

Keywords: pomegranate peel, functional food, polyphenols, antioxidants, sustainability, nutraceuticals.

Oral Presentation 3

Integrating Molecular and Mycotoxin Analyses of Black Aspergilli in Dried and Stored Produce

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Abstract

Dried fruits and stored vegetables are prone to contamination by black aspergilli and other toxigenic fungi during cultivation, processing, and storage. This study assessed the mycobiota and mycotoxin contamination of raisins and onions in Saudi Arabia and dried figs in Egypt, with emphasis on molecular identification and toxigenic potential of black *Aspergillus* species. Black raisins showed higher fungal loads than white, dominated by *Aspergillus*, *Alternaria*, *Cladosporium*, *Epicoccum*, *Fusarium*, and *Rhizopus*. *A. carbonarius* and *A. niger* were frequent, with ochratoxin A detected in 70% of samples. In onions, black aspergilli (*A. welwitschiae*) were detected in 37 of 40 samples; fumonisin B2 occurred in 37.5%, while ochratoxins were absent. Sun-dried figs in Upper Egypt had higher fungal counts and diversity than industrially dried samples, with *A. welwitschiae*, *A. flavus*, and *A. niger* dominating. Aflatoxins, OTA, and fumonisins were more prevalent in sun-dried figs, whereas industrial drying reduced contamination. These results highlight the widespread occurrence and molecular diversity of toxigenic black aspergilli in dried fruits and vegetables, emphasizing the role of improved drying, storage practices, and molecular monitoring in mitigating mycotoxin risks and enhancing food safety.

Keywords: *Aspergillus welwitschiae*, *Aspergillus niger*, Mycotoxins, Molecular identification, Multiplex PCR

Oral Presentation 4

Green Extraction of Polyphenols from Winery By-Products for Antidiabetic Applications

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Abstract

The synergy between the bioavailability of phenolic compounds in wine industry by-products and their antidiabetic potential may lead to the development of alternative solutions for the prevention and management of type 2 diabetes. In the context of the rising incidence of impaired glucose tolerance, the efficient utilization of white grape pomace (WGP) through green extraction methods represents a promising avenue for identifying sustainable inhibitors of enzymes involved in this condition.

The aim of the study was to evaluate the bioavailability of phenolic compounds from an extract obtained by combining ultrasound-assisted extraction with natural deep eutectic solvents (NaDES). High-performance liquid chromatography (HPLC) analysis revealed the presence of 17 phenolic compounds prior to in vitro digestion of the WGP-NaDES extract, with this number decreasing to 6 after digestion, suggesting selective stability under gastrointestinal conditions.

In silico prediction of ADMET properties indicated that 55.56% of the identified compounds exhibit low toxicity, and 16.67% are non-toxic. The WGP-NaDES extract demonstrated superior α -glucosidase inhibitory activity compared to the reference drug, with an IC_{50} of 0.066 ± 0.001 mg/mL, while for α -amylase, the IC_{50} value was 0.92 ± 0.02 mg/mL.

Molecular modeling studies suggested a possible competitive inhibition mechanism for catechin, epicatechin gallate, and chlorogenic acid in the case of α -amylase, and for epicatechin gallate in the case of α -glucosidase. Furthermore, the localization of gallic and protocatechuic acids in the vicinity of the entrance to the active sites of both enzymes indicates a possible “gatekeeping” role, contributing to the inhibition of enzymatic activity.

The results highlight the potential of these extracts obtained through green methods to transform winery by-products into sustainable solutions for reducing the incidence of type 2 diabetes.

Keywords: NaDES, valorization, bioaccessibility, α -amylase, α -glucosidase

Oral Presentation 5

Functional packaging in ice cream production

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Abstract

Ice cream, as a frozen dairy product, requires packaging that ensures product quality, safety, and stability throughout the cold chain. In the context of growing global concerns regarding conventional plastic materials, sustainable packaging has become a strategic priority for the ice cream industry. This review synthesizes recent research on bio-based, biodegradable, and active packaging materials applicable to ice cream, emphasizing essential functional properties such as oxygen and moisture barrier, mechanical resistance at low temperatures, and compliance with food safety standards. Nanocellulose and biopolymers are highlighted as innovative materials to enhance packaging performance and reduce environmental impact. Additionally, life cycle assessment and cold chain optimization underscore the role of packaging in the overall sustainability of the product. This review explores the potential of sustainable packaging technologies to reduce the ecological footprint of ice cream while maintaining product quality and safety, and highlights opportunities for innovation and sustainable development in the industry.

Keywords: sustainable packaging, ice cream industry, biopolymers, nanocellulose, biodegradable materials

Oral Presentation 6

Hemp and sunflower oilcakes characterization: a comparative review

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Abstract

Oilseeds processing industry generates important amounts of by-products with high nutritional value. This review aimed to summarize the data available in the literature regarding the chemical characterization of hemp (*Cannabis sativa* L.) and sunflower (*Helianthus annuus* L.) oilcakes. According to the results presented in the papers studied, the utilization of these oilseed by-products as nutrient-dense ingredients is highly promising due to their rich protein and bioactive compounds content. Oilcakes have been evaluated in various forms, including crude meals, protein-enriched fractions, and aqueous extracts, to determine their nutritional and functional properties. The hemp oilcakes, characterized by specific phytochemicals and essential fatty acids, and sunflower oilcakes, noted for their high tocopherol and protein content, demonstrated significant potential for food and feed applications. Currently, researchers are looking for sustainable, plant-based alternatives to enhance staple food nutritional value, and this review concludes that both hemp and sunflower oilcakes are among the best options available. This is not only because of their high protein density but also due to the economic feasibility of valorizing extraction by-products for the agricultural and food industries. However, the precise interaction between processing temperatures and the long-term oxidative stability of these cakes requires further exploration to fully optimize their industrial shelf-life.

Keywords: by-product valorization, hemp oilcake, sunflower oilcake, chemical composition

Oral Presentation 7

Influence of cooking processes on the fate of elements and chemical species in food: Selected Case Studies

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Abstract

Trace elements can occur in food because of their presence in the environment, due to human activities or contamination during storage and food processing, including cooking.

There are various ways of cooking (boiling, grilling, frying, etc.) and each of them can affect differently the elements' content. This may lead to a decrease or an increase in element concentration, or even to a transformation of the species. Therefore, to better assess people's exposure to these contaminants and avoid or reduce harmful human effects, it is important to know the fate of the elements

and their species in food during cooking.

For this work, we conducted various studies and implemented different approaches to evaluate the impact of cooking on (i) arsenic (As), lead (Pb) and cadmium (Cd) in whelks and (ii) total arsenic and inorganic arsenic (iAs) in rice. For the total elements' determination, analyses were carried out by inductively coupled plasma-mass spectrometry (ICP-MS). For the speciation analyses, high performance liquid chromatography (HPLC) coupled to ICP-MS. This latter technique allows also to assess possible interconversions of Cr species due to foodstuffs cooking. Results obtained show that boiling was the cooking method with the highest impact on the elements' content, especially for As and iAs with a significant concentration decrease in cooked samples (rice and whelks).

Keywords: cooking; trace elements; chemical species; ICP-MS; HPLC; isotopic dilution; foodstuffs

Oral Presentation 8

Optimization of 5-CQA Extraction from Coffee Silverskin Using Ultrasound-Assisted Extraction and Response Surface Methodology

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Abstract

Coffee production generates substantial amounts of by-products, particularly coffee silverskin (CSS), which has attracted attention due to its abundance, unique composition, and health-promoting properties. CSS valorization through green extraction technologies supports a circular and contribute to a more sustainable coffee industry. This study aimed to maximize the recovery of 5-caffeoylquinic acid (5-CQA) from this by-product through ultrasound-assisted extraction (UAE). Optimization was performed using Response Surface Methodology (RSM) based on a Central Composite Design (CCD). UAE was conducted with an ultrasonic probe under varying solid-to-liquid ratios (0.31–3.68 g/100 mL), extraction times (1–30 min), and ethanol concentrations (0–100%). Extracts were analyzed by HPLC-DAD. Statistical significance ($p < 0.05$) and model fit were evaluated through ANOVA, regression analysis, and lack-of-fit tests. CSS extracts presented high levels of 5-CQA, with the solid-to-liquid ratio exerting the greatest influence on extraction yield, followed by extraction time. These findings confirm UAE as an efficient and sustainable extraction method for CSS valorization.

Keywords: Coffee by-products; Ultrasounds; Green extraction; Chlorogenic acids; Sustainability.

Acknowledgments:

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Oral Presentation 9

**Sustainable Valorization of Olive Pomace: Antidiabetic Potential of Extracts
Obtained by Green Methodologies**

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Abstract

Diabetes mellitus is a major global metabolic disorder, with type 2 diabetes (T2D) being the most prevalent form, strongly associated with lifestyle-related risk factors. Bioactive food compounds have attracted increasing interest as complementary approaches for T2D prevention and management [1]. The disposal of olive pomace (OP), the main by-product of olive oil production, poses environmental challenges but is also a rich source of phenolic compounds with recognized bioactivity in this context [2].

This study evaluated the anti-diabetic potential of extracts from fresh olive pomace (FOP) and extracted olive pomace (EOP), the latter obtained after industrial olive pomace oil extraction. Extracts were produced using microwave- and ultrasound-assisted green extraction methods and compared with conventional solid-liquid extraction. Total phenolics, flavonoids, antioxidant activity, and phenolic profile by RP-HPLC-DAD-FLD were determined [2]. Caco-2 cell viability was assessed by quantifying extracellular LDH activity, followed by the evaluation of [1,2-³H(N)]-deoxy-D-glucose (³H-DG) uptake. Quantitative reverse transcription real-time PCR was used to determine the expression of SGLT1, GLUT2, GLUT5, CHREBP, and SREBP1c genes [1].

EOP extracts showed significantly higher phenolic and flavonoid contents and antioxidant activity than FOP extracts, regardless of the extraction method. Hydroxytyrosol and tyrosol were most abundant in ultrasound- and microwave-assisted EOP extracts, while the microwave-assisted EOP extract also showed the highest oleuropein, pinoselinol, and verbascoside levels. Regarding the cell assays, none of the extracts reduced Caco-2 cell viability at 0.05-1.0 mg/mL. All extracts significantly inhibited ³H-DG uptake at 0.5 and 1.0 mg/mL. After 24 h exposure, SREBP1 expression decreased by more than 50%, and most extracts also significantly reduced the expression of SGLT1 and GLUT2 genes, which encoded transporters involved in intestinal glucose absorption, potentially explaining the observed decrease in ³H-DG uptake.

Overall, these results highlight the potential of OP extracts, particularly EOP obtained by microwave-assisted extraction, as promising *in vitro* modulators of intestinal glucose absorption. This supports the valorization of OP as a sustainable source of bioactive compounds, with potential applications in the development of functional ingredients for T2D management.

Keywords: by-product, hydroxytyrosol, tyrosol, glucose uptake, fructose uptake, gene expression.

Acknowledgments: This work received financial support from PT national funds (FCT/MECI, Fundação para a Ciência e Tecnologia/Ministério da Educação, Ciência e Inovação) through the project

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Oral Presentation 10

**Sustainable Source of Protein and Essential Amino Acids
in the Wine Sector: the case of Vine Thieves**

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Abstract

“Vine thieves” are small branches that grow along the vine and compete for nutrients that would otherwise be directed to the fruit. They are pruned and discarded, representing a substantial proportion of the residues generated [1,2]. While other parts of the vine have been extensively characterized regarding their bioactive profiles, the composition of “vine thieves” remains largely unexplored. Their valorization aligns with a circular-economy strategy, promoting sustainability within the sector. To explore this potential, the protein content and amino acid profile of leaves and stems from three red grapevine varieties (Vinhão, Touriga Nacional and Padeiro de Basto), all belonging to the species *Vitis vinifera*, were analyzed.

The protein content was determined using the Kjeldahl method (984.13, AOAC) [3] after precipitation of the protein fraction with trichloroacetic acid. The protein nitrogen content was determined by precipitation of the protein fraction. Total and free amino acid profiles were quantified by RP-HPLC-FLD, using automatic online derivatization with OPA/FMOC [4]. Crude protein content ranged from 19 to 22 g/100 g in the leaves and from 12 to 13 g/100 g in the stems, with Touriga Nacional and Vinhão varieties standing out, respectively. True protein accounted for 80-90 % of total protein in the leaves and 50-70 % in the stems. A total of 19 amino acids were identified in both plant organs, including all the essential ones. Glutamic and aspartic acids were the predominant non-essential amino acids, while leucine, lysine, and valine stood out among the essential ones. Total amino acid content ranged from 175 to 181 mg/g in the leaves and from 91 to 94 mg/g in the stems, with approximately 50% of the essential amino acids corresponding to branched-chain amino acids. All essential amino acids were also identified in their free form, with the exception of methionine and phenylalanine in the Touriga Nacional stem sample. Asparagine, glutamine and proline were the predominant free amino acids in both leaves and stems.

This pioneering study demonstrates the potential of “vine thieves” as a sustainable source of protein and essential amino acids, contributing to the valorization of grapevine residues and promoting circularity within the wine sector.

Keywords: *Vitis vinifera* L.; amino acid profile; protein content; sustainability

Acknowledgments: This work received financial support from the PT national funds (FCT/MECI) through the project UID/50006 - Laboratório Associado para a Química Verde - Tecnologias e Processos Limpos. The authors also acknowledge to the projects STrengthS4WineChaiN – Sinergias científicas e tecnológicas para o desenvolvimento da cadeia da vinha e do vinho na Região Norte (Ref. NORTE2030-FEDER-01786100); GrapeUP – Grape by-products high-value upcycling (Ref. COMPETE2030-FEDER-02182500); and AIProSos (Sustainable regional protein-rich foods), funded by CYTED (ref. 125RT0165). L.E.S. and S.M. are grateful to GrapeUP for their research grants (REF.BOLS-FFUP-25-4 and REF.REQUIMTE 2025-44, respectively). Also, to Quinta D’Amares, Rua da Cerca, n.º 15 Bico, 4720-173, Amares, Braga, for supplying the samples for this study.

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Oral Presentation 11

Novel ternary lanthanide-flavonoid materials as theranostic agents

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Abstract

The versatile coordination chemistry of 4f metallic elements, encompassing diverse oxidation states and geometries, along with size similarity to Ca(II) ions, renders them highly effective at interacting with biological targets [1]. These metals, upon coordination with naturally occurring metabolites, exhibit distinct antioxidant, anti-inflammatory, and antitumor properties, generating highly promising candidates for advanced theragnostic designs. As clinical reliance on diagnostic and therapeutic metallodrugs grows incessantly, a well-designed complexation of rare-earth elements with flavonoids, leading to hybrid metal-organic species, represents a critical frontier in drug discovery [2].

Addressing the need for bioavailable, atoxic, and specific metallodrugs to pursue theranostics in human (patho)physiologies (diabetes, cancer, neurodegeneration), our research group targets the design and synthesis of novel ternary lanthanide coordination systems encompassing La(III), Nd(III), Eu(III), Pr(III), and Gd(III) ions. These complexes were synthesized, utilizing the bioactive flavonoid chrysin and the 1,10-phenanthroline donor as ligands. The newly isolated mononuclear structures were evaluated through the formulation of a thorough physicochemical profiling, enhanced with computational and theoretical studies. Furthermore, the binding affinities of these materials were tested against carrier proteins, utilizing a suite of optical techniques, such as circular dichroism, fluorescence,

and UV-Visible spectroscopy. Resolving the precise magnetic and geometric properties of these materials has also been vital to linking structural speciation directly to optical and magnetic properties. Ultimately, the comprehensive physicochemical data generated here provide a foundational blueprint for the molecular engineering of next-generation hybrid materials with targeted dual applications in medical diagnostics and therapeutics.

Keywords: Hybrid lanthanide-organic materials, rare-earth metals, BSA, X-ray crystallography

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Oral Presentation 12

Hybrid vanadodrugs with anti-cancer activity against 2D and 3D HCC models

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Abstract

Vanadium is a first-row transition metal of high environmental, industrial, and medicinal importance. Due to the structural reactivity and biological flexibility of vanadium compounds, arising from a) the variety of oxidation states, b) ability to coordinate with various ligands of high biological significance, such as amino acids, achieving distinct geometries and bioactivity profiles, and c) structural similarity of ionic vanadate forms to phosphate ions, they emerge as multi-therapeutic agents, against various pathophysiological conditions [1]. Hepatocellular Carcinoma (HCC) is the most common form of liver cancer, and the third leading cause of cancer-related deaths, due to high malignancy and aggressiveness, leading to late diagnosis. At the same time, the complex tumor microenvironment reduces the potency of the therapeutic options, further enhancing cancer lethality [2].

Cognizant of the aforementioned grounds, research was launched in our laboratory to delineate the in vitro potency of well-characterized peroxido-vanadodrugs, coordinated with betaines, against HCC models. The analytically, spectroscopically, and crystallographically validated hybrid materials, V(V)-Bet-Na and V(V)-Bet-K, were screened against 2D and scaffold-free 3D models to enhance the biological importance of the bioactivity profile of the materials. To further enrich our understanding of the potency of the molecules, apart from the viability studies, morphological and chemotacticity studies were carried out under dose-, time-, and cell line-dependent conditions, in comparison with the uncoordinated ligands. Moreover, cell cycle and metabolome were analyzed under similar conditions to better understand the shift of the cellular metabolism during incubation with the hybrid materials, while the intracellular vanadium concentration was also evaluated. Based on the collective results, both materials reveal significant potency against in-vitro HCC models, through metabolic shift of the cells toward apoptosis, while at the same time, using the free ligand comparison as well as the metal uptake studies, synergism of the chemical moieties of the hybrid materials can be supported.

Keywords: Liver cancer, in vitro testing, V(V), betaine, metal-organic materials, naturally occurring compounds

Literature

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Oral Presentation 13

Structural speciation and biological investigation of novel zinc(II)-amino acid zwitterionic hybrid materials

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Abstract

Type 2 diabetes has become a rapidly increasing disease, leading to microvascular and macrovascular complications that cause profound psychological and physical distress to patients. Compared with people who do not have diabetes, patients with type 2 diabetes have a lack of insulin caused by pancreatic β -cell dysfunction and insulin resistance in target organs [1].

To meet the growing demand for innovative metallotherapeutics based on biogenic metal ions, this study focuses on exploring the rational development of Zn(II)-centered molecular systems with enhanced biological relevance. Emphasis was placed on glycine, as the simplest amino acid, accompanied by its N-functionalized derivatives, further encompassing the role of zwitterionic ligands with selective affinity for (sub)cellular domains in the presence of physiologically relevant metal ions [2,3]. The anticipated structural modifications enable the formation of flexible novel zinc-organic frameworks with optimized physicochemical properties for biological performance. New hybrid zinc-amino acid complexes were thus synthesized after multiparameter optimization of pH, concentration, thermal conditions, and solvents, to produce high-purity crystalline materials. Subsequently, the newly synthesized materials were extensively characterized physicochemically, using techniques including elemental analysis, FT-IR, Nuclear Magnetic Resonance (¹H, ¹³C NMR), Electron Spray Ionization Mass Spectrometry (ESI-MS), and single-crystal X-ray diffraction, providing detailed insight into structural features that are intimately linked to zinc's biological function.

Based on these structural insights, the newly synthesized complexes were further evaluated for their biological activity. Primarily, their antibacterial activity was studied against a panel of Gram-positive and Gram-negative bacterial strains, revealing significantly enhanced antibacterial efficacy compared to free zinc ions and the neat substrates. To better determine the interaction profiles of the binary materials, involving the developed compounds and key biomolecular targets, including HSA, BSA, insulin, PTP1B, and α -glycosidase, in silico molecular docking analyses were performed. These binding affinities and interaction patterns indicate a strong potential for biological relevance, highlighting their future application as anti-diabetic metallodrug candidates.

Keywords: Metal-organic materials, zinc, X-ray crystallography, zwitter ion, antibacterial, biological activity

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POSTERS



Design, synthesis, and physicochemical characterization of quercetin derivatives as new substrates in chemical reactivity with metal ions

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Abstract

The main causes of morbidity and mortality worldwide are chronic diseases, such as cancer, cardiovascular diseases, Diabetes mellitus, as well as neurodegenerative disorders. These diseases are inextricably linked to oxidative stress, namely the imbalance between reactive oxygen species and antioxidant defense, resulting in cellular damage [1]. Based on the above, the need for search of potent antioxidant compounds becomes imperative. Flavonoids, and especially quercetin, attract intense research interest as they possess both antioxidant and anti-inflammatory properties [2]. Nevertheless, flavonoids, such as quercetin, exhibit low water solubility, reduced stability, and limited bioavailability, thus making their utilization more difficult implement. In this context, our research aims to improve the physicochemical and biological characteristics of quercetin through structural modifications of the core structure and the formation of new systems [3,4].

In an effort to pursue the modification of flavonoids in order to achieve highly soluble and bioavailable species, our Lab has embarked on such research. The first step in that investigation was the synthesis of the 5'-sulfonic derivative of quercetin, with the ultimate goal of increasing its solubility in aqueous media. This product was initially characterized by infrared spectroscopy (FT-IR), while its molecular structure was determined by X-ray crystallography. Subsequently, quercetin 5'-sulfonic acid was used for the synthesis of ternary complexes with lanthanide ions. The assembly of these complexes aims to produce more stable and active systems, with improved antioxidant capacity as well as a modified pharmacokinetic profile compared to free quercetin [5]. The successful synthesis of the complexes was confirmed spectroscopically. At the same time, the formation of Schiff bases of quercetin with tromethamine was investigated, aiming to enhance its stability and biological activity [6]. Although the formation of these new compounds was confirmed spectroscopically, the isolation of a crystalline product has not thus far been achieved under the specific experimental conditions. Overall, the experimental results support the contention that chemical modification and metal complexation of the modified flavonoid of quercetin, thereby enhancing the therapeutic potential of the specific flavonoid as well as that of other natural polyphenols.

Keywords: flavonoids, quercetin, metal-organic materials, physicochemical characterization, synthesis

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P2

Aspects regarding biodiversity protection and food security

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Abstract

This study is a scientific literature and public reports review of the aspects regarding biodiversity protection and food security. While food security refers to the physical and economic access of all people to sufficient, safe and nutritious food, biodiversity is the biological foundation that makes the production of this food possible. Biodiversity is not only the variety of wild species, but also the genetic diversity of cultivated plants and farmed animals. A high genetic diversity allows crops to adapt more easily to pests and climate change. The factors that destroy nature simultaneously affect food security: climate, overexploitation, pollution and pesticides. To guarantee the food of the future, international policies emphasize: regenerative agriculture, reducing food waste and preserving wild species (protecting natural habitats that provide ecosystem services to agriculture). In conclusion, protecting biodiversity is not only an ecological objective, but a strategic necessity for global economic and social stability.

Keywords: scientific literature, international organizations, public reports

P3

Valorization of banana peel waste into functional ingredients and sustainable packaging materials: a circular economy framework

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Abstract

Banana peel accounts for approximately 30–40% of total fruit weight and represents one of the most abundant yet underutilized agro-industrial by-products worldwide, with an estimated 36–54 million tonnes generated annually from global banana and plantain production. Despite a rich nutritional and functional profile - including dietary fiber, resistant starch, phenolic compounds, carotenoids, pectin, and phyosterols - banana peel is predominantly discarded, generating significant environmental and economic burdens. This review examines scientific advances in the valorization of banana peel waste within a circular economy framework, focusing on two principal pathways: the extraction of functional food ingredients and the development of sustainable packaging materials. A narrative review of literature published between 2010 and 2025 was conducted using the Scopus, Web of Science, and ScienceDirect databases, with inclusion criteria based on peer-reviewed original research and review articles. Regarding functional ingredients, we discuss conventional and emerging extraction methodologies, bioactive characterization, and evidence of antioxidant, antimicrobial, and prebiotic activity, as well as applications in food fortification and nutraceuticals. Concerning sustainable packaging, we address the use of banana peel-derived pectin, cellulose nanofibers, and bioactive extracts in biodegradable films and coatings, which generally exhibit tensile strengths of 5–25 MPa and inhibitory activity against foodborne pathogens such as *E. coli* and *S. aureus*. Techno-economic and life cycle considerations are also reviewed to assess industrial-scale feasibility. Collectively, the evidence supports banana peel as a promising raw material for value-added products aligned with circular economy principles, contributing to waste reduction, resource efficiency, and sustainability across the food supply chain.

Keywords: fruit waste valorization; bioactive compounds; pectin extraction; cellulose nanofibers; biodegradable films; food by-products

P4

Nature's Superfood: A Review of Apple Nutrients and Health Benefits

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Abstract

Apples (*Malus domestica* Borkh.), frequently consumed fruits, are known to be a great source of micronutrients – including vitamins (C, A, and E, thiamin, riboflavin, nicotinic acid, folic acid, and

pyridoxine) and minerals (potassium, phosphorus, calcium, magnesium, zinc, and iron) – as well as soluble and insoluble dietary fibers, and various bioactive compounds. Apple bioactive compounds with beneficial effects on human health include various polyphenols (specifically hydroxycinnamic acids, glycosylated flavonoids, flavan-3-ols, proanthocyanidins, and dihydrochalcones), along with polysaccharides (pectin), phytosterols, and pentacyclic triterpenic acids. Epidemiological studies demonstrate a correlation between apple consumption and a reduced incidence of several chronic pathologies: cardiovascular disease, asthma, type 2 diabetes, Alzheimer's, and Parkinson's disease. Numerous *in vitro* and *in vivo* studies demonstrate that apples and their bioactive compounds possess high antioxidant activity, facilitate cholesterol reduction, attenuate lipid oxidation, and inhibit the growth of various cancer cells. This review evaluates the nutraceutical potential of apples and their derivatives (juices, purees, pomace, chips, and isolated bioactive compounds) on human health.

Keywords: apple, apple product, phytochemicals, chronic disease, human health



The hypoglycemic potential of the bitter cucumber (*Momordica charantia*) exploited in the bakery industry

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Abstract

Bitter cucumber (*Momordica charantia*) is one of the most studied plants with antidiabetic potential, due to its high content of bioactive compounds such as charantine, polypeptide-p, vicina, triterpene saponins, flavonoids and vitamin C (70-90 mg/100 g). The literature highlights the ability of these compounds to reduce blood sugar by inhibiting α -glucosidase and α -amylase, stimulating glucose uptake at the cellular level and improving insulin sensitivity. In parallel, the pulp and peel of the fruit contain 2-3g/100g of dietary fiber, with beneficial effects on digestion and on reducing the glycemic load of food.

The present paper investigates the potential of the use of bitter cucumber as a functional ingredient in the bakery industry, given the need to develop hypoglycemic products and foods intended for people with diabetes, prediabetes or those following low-carb diets. In bakery applications, the addition of 2-5% powder or bitter cucumber extracts in the dough increases the hydration capacity of the dough by 8-12%, modifying the rheological properties and improving the antioxidant profile of the finished products, due to the presence of polyphenols and triterpenoids with radical-scavenging activity. However, high levels of additives can affect sensory properties, in particular by intensifying the bitter taste, which requires optimisation of proportions and processing technology.

The results synthesized from the recent literature indicate that *Momordica charantia* is a promising ingredient for the formulation of functional bakery products with hypoglycemic impact, but further research is needed on the stability of bioactive compounds during baking, the reduction of bitterness through advanced technological processes and consumer acceptability. The controlled integration of this plant raw material can contribute to the development of innovative products with

superior nutritional value and favorable metabolic potential.

Keywords: functional foods, hypoglycemic, charantine, p-polypeptide, antidiabetic.

P6

Valorization of dandelion (*Taraxacum officinale*) in low-glycemic index bakery products

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Abstract

Dandelion (*Taraxacum officinale*) is an outstanding plant source for the development of functional bakery products, due to its complex phytochemical profile and high content of bioactive compounds. The comparative analysis of the plant organs highlights significant differences: the leaves contain up to 508 µg/100 g vitamin A, 35 mg/100 g vitamin C and 778 µg/100 g vitamin K, the flowers are rich in carotenoids (up to 3.5 mg/100 g), and the root stands out for a high level of inulin (8-12%), an essential component in hypoglycemic formulations. The total content of polyphenols varies between 120-180 mg/100 g in the leaves and 150-220 mg/100 g in the flowers, giving the plant a high antioxidant activity.

The integration of dandelion into bakery products significantly influences the rheological properties of the dough. Soluble and insoluble fiber increase hydration capacity and can improve the texture of the core, while inulin acts as a gelling agent, contributing to the structure of low-gluten products. Moderate additions (3-5%) maintain the elasticity of the dough, while high levels can reduce the volume of the bread, requiring the optimization of technological processes. The polyphenols and flavonoids in the plant contribute to the inhibition of lipid oxidation, extending the shelf life of the products.

From a metabolic perspective, dandelion has significant hypoglycemic potential: inulin reduces glucose absorption, and phenolic acids such as chicoric acid and ferulic acid inhibit the enzymes α -amylase and α -glucosidase, mechanisms similar to antidiabetic therapies. Thus, dandelion becomes a valuable ingredient for the development of low-carb breads, functional biscuits, nutritional bars and products for people with diabetes or low-carbohydrate diets.

The results highlight the high potential of dandelion in bakery and the need for further research on the stability of bioactive compounds during baking and storage, as well as optimization of the level of incorporation to maintain sensory qualities.

Keywords: inulin, dietary fiber, bioactive compounds, functional bakery products, hypoglycemic.

P7

Conventional and Emerging Extraction Technologies for Vegetable Oils: A Comparative Review

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Abstract

Vegetable oils are among the most widely consumed lipid sources globally, playing a critical role in food technology, nutrition, and industrial applications. The quality, composition, and yield of extracted oils are strongly influenced by the extraction method employed during processing. This review provides a comprehensive comparative analysis of conventional and emerging extraction technologies applied to vegetable oils, with emphasis on their efficiency, oil quality, and sustainability. Conventional methods, including mechanical pressing and solvent extraction using hexane, are examined in terms of their widespread industrial application, high extraction yields, and associated limitations such as thermal degradation of bioactive compounds and environmental concerns related to solvent residues. Emerging technologies, including supercritical fluid extraction with CO₂ (SC-CO₂), ultrasound-assisted extraction (UAE), microwave-assisted extraction (MAE), and enzymatic extraction, are critically evaluated for their potential to overcome these limitations by preserving nutritional quality, reducing energy consumption, and minimizing environmental impact. Key parameters such as fatty acid profiles, tocopherol and polyphenol content, oxidative stability, scalability, and production costs are compared across methods. Furthermore, regulatory frameworks governing solvent residues and food safety standards are briefly addressed. The findings indicate that while conventional methods remain dominant at the industrial scale, emerging technologies offer significant advantages in terms of oil quality and sustainability, representing promising alternatives for the future of vegetable oil processing.

Keywords: oil quality, supercritical fluids, ultrasound-assisted extraction, microwave-assisted extraction, solvent extraction, emerging technologies.

P8

Locally Cultivated *Thymus vulgaris* L. as a Sustainable Source of Bioactive Compounds for Topical Applications

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Abstract

The growing demand for natural and sustainable ingredients in topical formulations highlights the importance of identifying locally available plant sources with relevant bioactive properties. In this context, *Thymus vulgaris* L., known as thyme, widely recognized for its traditional use and biological activity, represents a promising candidate (1,2).

This study investigates a 70% ethanolic extract obtained from locally cultivated *Thymus vulgaris* L. (Banat region, Romania), focusing on its antioxidant potential and preliminary biocompatibility. The total phenolic content was determined using the Folin-Ciocalteu method, while antioxidant activity was assessed using the DPPH radical scavenging assay. The safety profile was evaluated using the chorioallantoic membrane (CAM) model.

The extract showed a significant phenolic content, associated with notable antioxidant activity. In the CAM assay, no signs of irritation or vascular damage were observed, indicating a favorable biocompatibility profile under the tested conditions.

These findings suggest that locally cultivated thyme may serve as a sustainable and accessible source of bioactive compounds with potential benefits for external use. Further studies are required to explore its functional efficacy in specific topical applications.

Keywords: thyme; phenolic content; antioxidant; CAM model; biocompatibility

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P9

Quantitative analysis of selenium and its importance in food supplement quality and safety

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Abstract

Selenium (Se), a trace metalloid element found in the environment in organic and inorganic forms, exhibits significant antioxidant, anti-inflammatory, anticancer, potentially antiviral, and antibacterial activity. Selenoproteins are the main form of organic Se in foods and play an essential role in human health. Foods rich in Se, whether natural or artificially processed, have proven to be high-quality sources for supplementing Se in the human diet [1]. Moreover, selenium can be used in the form of selenium nanoparticles (SeNPs) to develop packaging with important antioxidant and antimicrobial properties [2]. In this context, verifying the composition of food supplements is essential to ensure consistency between the declared and actual content of this type of product, given the still insufficiently consolidated regulatory framework in Romania. The determination of total selenium in various matrices can be achieved using a series of spectral techniques, such as XRF, ICP-MS, or XAS, which have proven to be the most suitable for quantifying total selenium [3]. The choice of an appropriate selenium quantification technique is usually developed together with an appropriate sample preparation method, taking into account the matrices to be tested and the expected selenium concentration. In this work, a rapid quantification of total Se in various commercially available food supplements was performed using portable handheld X-ray fluorescence (pXRF) and FT-IR analysis. The total Se analysis using the two spectral analyses was in good agreement with the value labeled on the commercial supplements. Therefore, it can be stated that the combination of pXRF and FT-IR analysis provides rapid, high-yield quality control for selenium-based food supplements.

Keywords: food supplements, portable handheld X-ray fluorescence, FT-IR analysis, total selenium content

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P10

Food Fraud and Its Impact on Public Health – Case Study: Romania

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Abstract

Food fraud has become a major challenge for public health, market integrity, and agri-food supply chains. This paper examines the concept of food fraud and its impact on population health through toxicological, allergenic, microbiological, and nutritional pathways. It also highlights vulnerable food categories and reviews current detection methods. The study is based on an integrative analysis of scientific literature and recent reports from international and Romanian authorities. Romania is used as a

case study, focusing on products such as honey, dairy, meat, fish, spices, oils, and premium beverages, which are particularly exposed due to their high economic value and analytical complexity. The findings indicate that food fraud not only affects health but also undermines traceability, delays risk communication, and reduces consumer trust. The paper emphasizes the need for risk-based controls, advanced laboratory techniques, digital traceability, and stronger collaboration between stakeholders.

Keywords: food fraud; food authenticity; public health; traceability; food safety; Romania

P11

Use of nanotechnology in food processing, packaging and safety

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Abstract

This review focuses on the use of nanotechnologies in food processing and packaging with special attention to their reflection on food quality and safety. The topic of this review includes application of nanotechnology in food processing, application of nanotechnology in food packaging and food contact materials, nanotechnology and food safety as well as regulation of nanotechnologies to ensure food safety.

Nanotechnology has potential applications in all aspects of food sectors including food processing, food packaging, food monitoring, production of functional foods, development of foods capable of modifying their colour, flavour or nutritional properties according to a person's dietary needs as well as production of stronger flavourings, colourings and nutritional food additives. Moreover, lowering the costs of food additive ingredients and increasing the shelf life of food products could be achieved using this technology. The food market demands technologies, which are essential to keep market leadership in the food processing industry to produce fresh authentic, convenient and flavourful food products. Prolonging the product shelf life and freshness as well as improving the quality of food are the target. Nanotechnology is a technology that has the potential to revolutionize the food industry. Developing smart packaging to optimize product shelf life using nanotechnologies has been the goal of many companies. Such packaging systems would be able to repair small holes/tears, respond to environmental conditions such as temperature and moisture changes and alert the customer if the food is contaminated. Nanotechnology can provide solutions for these, for example modifying the permeation behaviour of foils, increasing barrier properties (mechanical, thermal, chemical and microbial), improving mechanical and heat-resistance properties, developing active antimicrobial and antifungal surfaces, and sensing as well as signaling microbiological and biochemical changes and creates the nano-biodegradable packaging. Development of food analytical methods for the detection of tiny amounts of a chemical contaminant, virus or bacteria in food system is another potential use of nanotechnology. This will result in more safety for the food processing system. There is an urgent need for regulatory systems capable of managing any risks associated with nanofoods and the use of nanotechnologies in the food industry.

Keywords: nanotechnology, nanofoods, packaging, safety, biodegradable

P12

Comparative evaluation of the mineral profile of wild blueberries from the mountain areas of Banat.

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Abstract

Blueberries, the fruits of the shrub *Vaccinium myrtillus*, found in the wild flora („forest”), but also cultivated, are among the most popular *berries* present in the common diet, consumed also for therapeutic purposes (food-medicine), due to their content of biologically active compounds (polyphenols, vitamins, essential mineral elements, and trace elements), useful in maintaining health status and preventing various conditions (e.g., Wilson's disease, late-onset cutaneous porphyria, hemochromatosis, some tumors). This has aroused interest in detecting the mineral profile, comparatively, of *wild blueberries* from a mountainous area, defined [*Muntele Mic (1), Poiana Mărului (2), Pecinișca (3)*], in Caraș-Severin County (Romania). It should be noted that in blueberries, heavy metals (Pb, Cd, As, Hg, etc.) can be identified (accidentally or not), which, even at low concentrations, are toxic to the human body. This statement confirms the evaluation of the mineral profile of „wild” blueberries. The specialized literature reports that the evolution of mineral elements is variable, constrained by variety, pedoclimatic conditions, and the degree of pollution. The study proposes the determination of concentrations (*mg/kg product*) (average values) in blueberries from the wild flora, from the previously mentioned area, of certain mineral elements, resulting in the following profile: **1. essential:** Na (**19.39**), K (**1126**), Ca (**112**), Mg (**78.9**), Mn (**3.97**), Fe (**5.35**), Zn (**2.88**), Cu (**1.95**), Cr (**0.025**); **2. potentially toxic:** Pb (<**0.10**), Cd (<**0.02**). The obtained results allowed the evaluation of the mineral intake in the recommended daily diet for a consumption of 400 g of fresh product. Subsequently, investigations were conducted on the dry matter (**15.86÷18.53** %) and mineral salts (ash) (**0.23÷0.26** %).

Keywords: wild blueberries, mineral profile, trace elements, nutritional assessment, pedoclimatic conditions, food safety.

P13

Study on the production, technological characterization, sensory evaluation and nutritional value of the duo bar with cranberries

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Abstract

This paper presents a study on the production, technological characterization, sensory evaluation and nutritional value of a duo-type bar with cranberries, designed as a food product with functional potential.

The technological process was optimized by selecting raw materials and establishing processing parameters, in order to obtain a product with appropriate physicochemical and sensory properties. The technological characterization included the analysis of the proximate composition, the determination of moisture, protein, lipid and carbohydrate content, as well as the evaluation of the product's stability. The sensory evaluation was carried out by the scoring method, using a panel of evaluators, following parameters such as appearance, color, aroma, taste and texture. The results revealed a high acceptability of the bar, due to the balance between the crunchy and soft component, as well as the specific taste contribution of cranberries. The nutritional analysis indicated a significant content of fiber and bioactive compounds, giving the product functional valences. In conclusion, the cranberry duo bar represents an innovative alternative in the snack category, combining sensory qualities with nutritional benefits.

Keywords: cranberry; nutritional value, fiber, functional food, bioactive compounds

P14

Technological, sensory and nutritional characterization of noodles obtained from intermediate flour

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Abstract

The paper presents the technological, sensory and nutritional characterization of noodles obtained from intermediate flour, highlighting the influence of the raw material composition on the properties of the finished product. Intermediate flour, with a higher extraction degree and a balanced content of proteins, fibers and minerals, determines rheological peculiarities of the dough, which require the adjustment of the technological processing parameters. The obtaining process included the stages of kneading, resting, laminating, cutting and controlled drying, optimized to ensure the stability and quality of the product.

The sensory evaluation was carried out by the scoring method, analyzing parameters such as appearance, color, odor, taste and consistency. The results revealed a firm texture, a slightly browned color and a specific taste profile, associated with the use of intermediate flour. The nutritional analysis

indicated an increased content of fibers and minerals compared to products obtained from white flour, maintaining an adequate level of proteins.

In conclusion, noodles made from intermediate flour represent a superior nutritional alternative, with good sensory acceptability, conditioned by rigorous control of technological parameters.

Keywords: flour: nutritional value, fiber, functional food, bioactive compounds

P15

Linking Food System Resilience to Population Caloric Requirements in Crisis Situations: A Conceptual Framework

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Abstract

Natural hazards and climate extremes increasingly threaten the stability of food systems, generating significant risks for agricultural production, food sustainability, and population nutrition. While food system resilience has become a central research topic, limited attention has been given to the integration of population caloric requirements within resilience frameworks. This study aims to bridge this gap by examining the relationship between hazard exposure, agricultural adaptive capacity, and caloric adequacy in crisis situations. Drawing on recent literature on spatiotemporal resilience dynamics and farm-level adaptation, the paper proposes an integrated conceptual framework linking food system resilience to population energy needs. Particular emphasis is placed on estimating caloric requirements under disrupted conditions in order to identify potential caloric gaps and nutrition risks. The findings suggest that caloric adequacy should be understood as a systemic outcome of resilient agricultural systems rather than solely as an operational objective of humanitarian response. By connecting agricultural resilience with nutrition planning including food wasting, the study supports more anticipatory and risk-informed strategies for crisis preparedness. The proposed perspective contributes to strengthening interdisciplinary approaches aimed at safeguarding both food system functionality and public health in an increasingly uncertain environmental context.

Keywords: nutritional risk, adaptive capacity, energy intake, emergency situations, natural hazards

P16

TMPRSS5-Targeted PLGA Nanocarriers for Gene Delivery in Charcot-Marie-Tooth Disease

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Abstract

Over the recent years, nanotechnology has emerged as a powerful and transformative tool in the field of biotechnology and medicine, particularly in drug and gene delivery. Nanoparticles overcome major challenges of conventional therapies by encapsulating, protecting, and enabling controlled release of various drugs and biological macromolecules, while minimizing toxicity, thereby improving targeting efficiency and overall therapeutic outcomes [1]. Charcot-Marie-Tooth disease represents the most common inherited peripheral neuropathy and is defined by genetic heterogeneity and progressive damage to the peripheral nervous system. A key pathological phenotype in the most prevalent CMT subtypes includes impaired Schwann cell function and inadequate axonal myelination [2].

Poised to pursue research in the field, we launched research in our Labs, focusing on the design and development of modified (poly (lactic-co-glycolic acid)) nanoparticles for the delivery of a therapeutic plasmid DNA (pDNA). PLGA polymer was selected as the core material due to its biocompatibility, biodegradability, and drug compatibility [3]. Furthermore, to enhance specificity toward the target cells (Schwann cells), the surface of the nanoparticles was engineered with a “guiding” peptide ligand, to exploit TMPRSS5 (Transmembrane protease serine 5), a transmembrane protein reported to be expressed preferentially in Schwann cells compared to different tissue cells [4]. Regardless of the selected strategy, the targeting moieties were conjugated to carboxylic acid terminus PLGA nanoparticles, using EDC (ethyl(dimethylaminopropyl)carbodiimide) – NHS (N-hydroxysuccinimide) coupling, aiming to optimize both the encapsulation efficiency of the plasmid DNA and the successful conjugation of the targeting peptide [5,6]. The synthesized nanocarriers were comprehensively characterized using physicochemical techniques, such as Fourier Transform Infrared Spectroscopy (FT-IR), Dynamic Light Scattering (DLS), particle size and shape analysis, using Laser obscuration (Ambi value), Confocal Microscopy, and Transmission Electron Microscopy (TEM). Following in vitro validation, the thoroughly characterized nanoparticles were prepared for in vivo assessment to examine their targeting capability and pDNA delivery efficiency.

Keywords: Nanobiotechnology, nanocarriers, targeted drug delivery, surface functionalization, gene therapy

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P17

Development and Characterization of a Functional Chicken Liver Pâté Enriched with Broad Bean and Beetroot Powder

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The present paper aims to develop a chicken liver pâté enhanced with nutritionally valuable plant-based ingredients: broad bean and beetroot powder. The objective of this study is to highlight the benefits of these additions in improving the nutritional profile of the final product and in reducing lipid oxidation.

The first part presents the current context regarding the reduction of meat consumption and the shift towards functional foods. The nutritional and functional properties of broad bean and beetroot are emphasized, focusing on their content of vegetable proteins, fibers, vitamins, minerals, and bioactive compounds (especially phenolic compounds and betalains).

The second part includes the author's own contributions, consisting of formulation, technological processing, and characterization of four pâté variants: a control sample (without plant additions) and three variants with 5%, 10%, and 15% broad bean and beetroot powder.

The products were analyzed organoleptically, physicochemically, and sensorially. Results showed that the plant-based additions reduced moisture, lipid content, and energy value, without significantly compromising sensory qualities. Protein and mineral contents remained within acceptable limits, and the plant ingredients brought an additional biological value.

This study supports the potential of lentils and beetroot powder as functional ingredients in the meat industry, particularly in reformulated products, offering healthier and more sustainable alternatives for consumers.

Keywords: functional pâté, broad bean, beetroot powder, bioactive compounds, sensory analysis

P18

Effect of Rosemary Extract on the Oxidative Stability and Quality of Sausages

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Abstract

The present paper aims to develop a type of sausages enriched with a natural antioxidant, namely rosemary extract, in order to improve oxidative stability and extend shelf life. The objective of this study is to highlight the effect of incorporating rosemary extract on the physicochemical, sensory, and nutritional characteristics of the final product.

The first part presents the current context regarding the growing interest in clean-label meat products and the replacement of synthetic additives with natural alternatives. The antioxidant properties of rosemary extract are emphasized, focusing on its content of phenolic compounds (such as carnosic acid and rosmarinic acid), which contribute to delaying lipid oxidation in meat systems.

The second part includes the author's own contributions, consisting of formulation, technological processing, and characterization of four sausage variants: a control sample (without antioxidant) and three variants with increasing concentrations of rosemary extract.

The products were analyzed from organoleptic, physicochemical, and sensory points of view. The results showed that the addition of rosemary extract significantly reduced lipid oxidation and improved product stability during storage, without negatively affecting sensory attributes. Slight improvements in flavor and overall acceptability were also observed at optimal concentrations.

This study supports the potential use of rosemary extract as a natural antioxidant in the meat industry, contributing to the development of safer, more stable, and consumer-friendly products.

Keywords: sausages, rosemary extract, natural antioxidant, lipid oxidation, sensory analysis

P19

Enzymatic biocatalysts utilized in muffin fabrication technology

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Abstract

The present research investigates the application of alpha-amylase and xylanase as biocatalysts to refine the rheological properties of dough used in muffin production. By using alveographic method, the study assesses how discrete and combined enzymatic dosages influence the viscoelasticity of the flour-water system and the resulting structural characteristics of the baked muffins. Fungal alpha-amylase serves as a versatile biocatalyst within the food industry, with a primary application in cereal-based baking technologies. This enzyme facilitates the endo-hydrolysis of complex starch polysaccharides into fermentable mono- and disaccharides. These low-molecular-weight carbohydrates serve as the metabolic substrate for *Saccharomyces cerevisiae* (yeast) during fermentation, leading to the evolution of biogenic carbon dioxide which enhances the specific volume and resulting in a finished product with superior crumb porosity, soft textural attributes, and an improved organoleptic profile. Xylanase is a hydrolytic enzyme capable of catalyzing the degradation of xylan, a fundamental polysaccharide constituent of the plant cell wall. Xylanases primarily depolymerize the hemicellulosic xylan matrix by cleaving the glycosidic linkages and disrupting the network of covalent cross-links and hydrogen bonding within the xylan supramolecular structure. The application of consistographic analysis

establishes standardized parameters for the enzymatic treatment of refined wheat flour, ensuring process homogeneity and product consistency. An optimized enzymatic dosage enhances oven spring and extensibility by modulating the starch-protein matrix. This intervention increases the concentration of fermentable reducing sugars, which act as precursors for the Maillard reaction and caramelization, resulting in a more intense crust pigmentation. Furthermore, amylase supplementation mitigates starch retrogradation, thereby extending shelf-life and kinetic freshness. The resulting finished products exhibit a superior porosity profile, increased specific volume, and a refined crumb morphology.

Keywords: xylanase, alpha-amylase, alveographic method, muffin

P20

Impact of enzymatic treatment on the rheological and technological parameters of wafer batter

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Abstract

This study evaluates the biocatalytic modulation of the rheological profiles of refined wheat flour batters intended for wafer fabrication, specifically focusing on the synergistic or individual effects of xylanase and asparaginase. Utilizing alveographic analysis and the Falling Number method, the research quantifies the impact of varying enzyme concentrations on the viscoelastic behavior of the aqueous flour matrix and the structural integrity of the final aerated confection. The incorporation of xylanase facilitates the hemicellulose backbone to reduce the degree of polymerization and systematically cleave terminal units to yield low-molecular-weight saccharide. Concurrently, asparaginase catalyzes the deamination of L-asparagine into L-aspartic acid and ammonia, effectively mitigating the precursor for acrylamide synthesis via the Maillard reaction without compromising the organoleptic profile of the wafer. Experimental results indicate that these enzymatic interventions adjust batter viscosity and extensibility, yielding wafer sheets with enhanced porosity and textural fragility.

The alveographic parameters—specifically dough resistance to deformation, the extensibility and elasticity properties of the dough—were utilized to characterize the dough's resistance to biaxial deformation and its elastic recovery. Notably, high enzymatic dosages induced an adverse transition toward a soft and adhesive (sticky) dough consistency. While an increase in specific volume was observed, the macrostructure of the crumb exhibited degradation. This localized loss of structural integrity and increased adhesiveness is attributed to the release of low-molecular-weight oligosaccharides, which possess a reduced water-binding capacity compared to the high-molecular-weight arabinoxylan precursors, leading to an excess of free water in the gluten-starch matrix.

Keywords: xylanase, asparaginase, alveographic method, falling number

P21

Obtaining and qualitative and nutritional characterization of a chickpea and shrimp spread

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Abstract

The aim of this work is to obtain a chickpea and shrimp spread and characterize it from a sensory, physicochemical and nutritional point of view, by comparing it with a commercial hummus preparation. From a sensory point of view, the taste, smell, consistency, external appearance and general acceptability were assessed. From a physicochemical point of view, the moisture, fat, protein, carbohydrate and salt content were determined and the energy value of the product was calculated.

CONCLUSIONS AND RECOMMENDATIONS

1. The obtained product, namely the chickpea and shrimp spread, is an innovative product, by using seafood and sesame paste, for a high protein intake, with a homogeneous consistency, with significant nutritional properties.
2. Following the sensory evaluation, the shrimp and chickpea spread obtained a higher score on the General Acceptability criterion, compared to the commercial sample, the results obtained highlighting a clear preference of consumers for the shrimp sample.
3. The nutritional comparison showed that shrimp paste contains almost double the protein (19.2%) compared to commercial hummus (7.35%), while the ratio of fat, moisture and minerals clearly reflects the advantages brought by the addition of sesame and shrimp. As a recommendation, in the future, this recipe can become the basis of a premium product line, and optimization of the formula – either by adjusting the proportion of shrimp or by adding functional spices – can further extend the health benefits.

Also, further studies on long-term stability and evaluation of the antioxidant potential of the constituent compounds will contribute to the shaping of a category of functional spreads, with real added value for the consumer.

Keywords: quality, spread, chickpeas, shrimp.

P22

Beetroot appetizer– a variety of Romanian zacusca

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The product is a variety of traditional zacusca, made from onion, roasted peppers, tomato juice and spices and the main component, beetroot. Zacusca, a traditional dish, usually made with eggplant, was made this time with raw (V1) and oven-baked beetroot (V2), giving the dish a distinctive taste and consistency. Beetroot is a nutrient dense super food rich in fibers, antioxidants, folate, potassium, iron and vitamin C and low in calories and fat. The aim of the study was to obtain and characterise from sensory, physico-chemical and nutritional point of view the beetroot zacusca. The beetroot appetizer paste has a more textured consistency, with a well-appreciated taste, color and aroma, in a hedonic scale from 1 to 5. The measured physico-chemical parameters were: humidity 45.6%, dry mater 55.4%, salt 1.1% and acidity (cm³ NaOH 0,1n/100 g) 4.1- 4.3 and vitamin C in raw (9.5mg/100g) and oven-baked beetroot (5.1 mg/100g). Energy value was 164 cal/100g product, which recommends it as a dietary product.

Key words: beetroot zacusca, sensory, physico-chemical properties

P23

Quality and Antioxidant Characterization of a Chickpea-Based Vegan Meat Analogue

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Abstract

Driven by increasing concerns regarding personal health, environmental sustainability, and animal welfare, plant-based nutrition is rapidly gaining global traction. Consequently, vegan meat analogues—particularly those replacing processed meat products—have become the focus of rigorous scientific investigation. This study describes the formulation and characterization of two chickpea-based vegan pariser analogues: a plain version (CBVB1) and a variant incorporated with beetroot powder as a natural colorant (CBVB2). The products were evaluated for total polyphenol content (Folin-Ciocalteu method), antioxidant potential (DPPH assay), proximate composition, and sensory attributes (5-point hedonic scale). Results indicated that both formulations contained substantial total polyphenols, with CBV2 exhibiting the highest concentration. Both products demonstrated superior antioxidant capacity, maintaining significant DPPH radical scavenging activity even at high dilutions (1:100 and 1:1000), with the strongest antiradical performance observed in CBVB2. Proximate analysis revealed negligible nutritional and energetic differences between the two variants. Compared to conventional meat-based pariser, these chickpea analogues were cholesterol-free, lower in lipids and proteins, and reduced in caloric density, while being significantly enriched with dietary fiber. Sensory evaluation showed that the

beetroot-enhanced variant was the most preferred by panelists. While the plain version received a "satisfactory" rating for color, all other organoleptic characteristics for both formulations were highly rated, suggesting that chickpea-based pariser is a viable and health-promoting meat alternative.

Keywords: plant-based meat analogues, chickpea-based pariser, beetroot powder fortification, antioxidant activity, nutritional profile.

P24

Ganoderma lucidum enrichment of sugar-free raw-vegan brownie balls

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Abstract

Despite the global popularity of conventional confectionery, their elevated glycemic index and unfavorable lipid profiles are increasingly linked to adverse metabolic outcomes. Consequently, developing functional alternatives, such as raw-vegan and sugar-free formulations, is essential for promoting healthier dietary patterns. This study investigated the fortification of raw-vegan brownie balls with *Ganoderma lucidum* powder, a medicinal mushroom renowned for its bioactive properties and versatility in functional food design. The primary objective was to develop and characterize three experimental formulations containing 1% (RVB-G1), 2% (RVB-G2), and 3% (RVB-G3) *G. lucidum* powder, respectively. These were comparatively evaluated against a control sample (RVB-C) regarding their proximate composition, total polyphenol content (TPC), antioxidant activity, and sensory attributes. The base matrix consisted of walnuts, cashews, dates, coconut flakes, cocoa powder, and hemp seeds. Experimental data revealed that the incorporation of *G. lucidum* significantly enhanced the TPC and radical scavenging activity in a dose-dependent manner. Furthermore, sensory analysis indicated that all enriched variants outperformed the control in terms of overall acceptability, with the 3% inclusion level (RVB-G3) identified as the optimal formulation. These findings suggest that *G. lucidum* represents a viable ingredient for enhancing the nutritional and antioxidant profile of unbaked desserts without compromising organoleptic quality.

Keywords: functional desserts, *Ganoderma lucidum*, raw-vegan, antioxidant activity, food fortification.

P25

Functional valorization of sea buckthorn pomace through drying and granulometric fractionation

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Abstract

The valorization of food processing by-products into functional ingredients is a key approach supporting the transition toward a circular economy. Fruit- and vegetable-derived powders are increasingly used as natural ingredients to enhance nutritional value and functional properties of food products. Among these, sea buckthorn pomace (SBP), a by-product of juice production, represents a promising yet underutilized resource. SBP is rich in dietary fiber, polyphenols, and other bioactive compounds, making it a valuable raw material for functional ingredients. Powders from such plant-based sources offer advantages over bioactive compounds obtained by conventional solvent extraction, as they better preserve biological activity. Moreover, dry fractionation is a green processing method, avoiding chemical solvents and requiring less energy than traditional techniques, thus reducing environmental impact while maintaining functionality. In this study, SBP resulting from juice processing was dried to a moisture content below 5% as a stabilization step aimed at extending shelf life and preserving bioactive constituents. Drying also facilitated subsequent milling and size reduction, leading to powders with enhanced surface area and improved functional characteristics. The material was then subjected to granulometric fractionation using sieves, separating particles into distinct size classes and enabling controlled distribution of bioactive compounds among fractions with specific physicochemical properties and functional profiles. The relationship between particle size, bioactive compounds content, physicochemical characteristics, and antioxidant activity is important for optimizing grinding and sieving processes to produce fractions with desired functional properties. The results demonstrate that the combination of drying and particle size fractionation enhances the functional performance of SBP. Moreover, the fractions can be selectively incorporated into various food systems: fine fractions are suitable for beverages, dairy, or confectionery due to improved dispersibility and bioactive availability. In conclusion, this study highlights the potential of SBP as a sustainable and value-added ingredient, supporting its application in the formulation of functional foods.

Keywords: sea buckthorn processing by-product, bioactive compounds, drying-grinding-sieving, functional powders, particle size, sustainable processing

P26

Sea buckthorn pomace and seed extracts as natural antioxidants for sustainable food applications

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Abstract

The valorization of sea buckthorn by-products, particularly pomace and seeds, represents an important direction for sustainable food processing and the development of functional ingredients. Juice production generates considerable amounts of residual biomass, which remains a rich source of bioactive compounds with significant antioxidant potential. These by-products contain a wide range of valuable constituents, including phenolic compounds, flavonoids, carotenoids, phytosterols, tocopherols, and polyunsaturated fatty acids, supporting their use as natural antioxidants in food systems. The efficiency and composition of sea buckthorn pomace extracts are strongly influenced by the extraction method and solvent type. Hydroalcoholic systems have been shown to enhance the recovery of phenolic compounds, leading to extracts with higher antioxidant activity compared to pure solvents. A strong correlation between total phenolic content and antioxidant capacity has been consistently observed, highlighting the importance of polar compounds in oxidative stability. In contrast, non-polar and supercritical CO₂ extraction techniques enable the selective recovery of lipophilic bioactives such as carotenoids and sterols. Optimized supercritical conditions allow the production of fractions with distinct phytochemical profiles and enhanced biological properties, including antioxidant and antimicrobial activity. Emerging green technologies, such as ultrasound-assisted extraction, further improve the efficiency of bioactive recovery from sea buckthorn by-products. This approach enables rapid enrichment of edible oils with carotenoids, significantly reducing extraction time while increasing yield compared to conventional techniques. Such innovations support the development of clean-label and sustainable food applications. In addition to pomace, sea buckthorn seeds represent a promising yet insufficiently explored source of antioxidants. Seed extracts, particularly those obtained with polar solvents, exhibit strong antioxidant and antibacterial activities, as well as stability under thermal processing. These properties highlight their potential application as natural preservatives in food systems. In summary, sea buckthorn by-product extracts offer versatile applications in food, nutraceutical, and functional product development, combining technological functionality with health-promoting benefits.

Keywords: sea buckthorn by-product extracts, natural antioxidants, bioactive compounds, functional foods, food preservation

P27

Analysis of the technological process and physico-chemical quality indicators of poultry parizer

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Abstract

The present paper aims at the analysis of the technological manufacturing process and the evaluation of the physico-chemical quality indicators for an assortment of poultry parizer made in its own production. The technological flow followed the critical processing stages, starting with the preparation of the raw material and the formation of a stable emulsion, followed by the essential heat treatment carried out until the temperature of $72 \pm 2^\circ\text{C}$ was reached in the thermal center of the product, a vital parameter for microbiological safety and stability of the composition. The results of the laboratory analyses for the own production sample revealed a high quality product, with a moisture content of 65.32% and a protein fraction of 11.84%, values that comply with the reference norms (maximum 70% moisture and minimum 11% protein). The fat content of 12.08% indicates a balanced nutritional profile, being considerably below the maximum limit of 20% found in the literature. The slightly hydrolyzable nitrogen value (17.74 mg $\text{NH}_3/100\text{g}$) confirms a high degree of freshness, being well below the critical threshold of 35 mg/100g. Additional indicators, such as pH of 6.17, salt content of 1.9% and total ash of 2.7%, reflect a correct management of the recipe and the mixing process. With an energy intake of 188.32 kcal/100g, the analyzed parizer demonstrates that rigorous compliance with technological parameters allows obtaining a poultry meat product with optimal physicochemical properties and a high biological value.

Keywords: poultry, parizer, technological process, physico-chemical indicators, food quality.

P28

Comparative analysis of quality parameters for raw-stirred salami made of wild boar and deer meat

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Abstract

The present paper explores the technological process of obtaining a salami from game meat (own production) and evaluates the physico-chemical quality indicators that define the nutritional value and stability of this artisanal product. The manufacturing technology followed the specific stages of raw-dried and matured products, emphasizing the selection of the hunting raw material (characterized by a high myoglobin content and low lipid profile) and its mixing with pig fat fractions to ensure juiciness and optimal maturation and fermentation texture was monitored to ensure the controlled reduction of water activity and the achievement of a stable sensory and microbiological balance. The results of the physico-chemical analyses for game salami (own production) reveal a product with an exceptional nutritional density. The total protein content of 27.086% is characteristic of game meat, exceeding the values found in most poultry or pork products. The humidity level of 28.036% confirms an advanced and correctly executed drying process, which, together with the salt content of 4.7%, ensures the long-term preservation of the product by inhibiting the development of alternative microorganisms. From the point of view of freshness, the slightly hydrolyzable nitrogen value of 11.4 mg NH₃/100g indicates a raw material of remarkable quality and rigorous hygiene in the technological flow, being well below the alert thresholds for matured products. The pH of 5.8 and the total ash content of 9.24% reflect rich mineralization and optimal acidification during fermentation. With an energy intake of 401 kcal/100g and a fat content of 30.076%, the analyzed product is a food with a high biological value, representative of the category of superior processed hunting products.

Keywords: game meat, matured salami, technological process, physicochemical indicators, food safety, total protein.

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Analysis of the chemical composition and energy value of pistachio, cardamom and chocolate muffins

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Abstract

The present paper aims at the development and physicochemical characterization of an innovative pastry product - pistachio, cardamom and chocolate muffins (own production) - analyzing the impact of functional ingredients on the final quality. The technological process followed the classic manufacturing stages, including the separate preparation of the dry mixture (flour, sugar, loosening agent) and the liquid mixture (eggs, milk, butter), followed by rapid homogenization to prevent the excessive development of the gluten network. The aromatic notes were provided by the addition of cardamom, while pistachios and chocolate contributed to both the sensory profile and the nutritional density of the product. Baking was carried out under controlled conditions at temperatures of 180-200°C for about 25-30 minutes, optimal parameters for ensuring the coloring kinetics of the shell and the porous texture of the core. The analysis of the quality indicators for the own production sample revealed

a balanced profile, with a humidity of 32.926%, a value that ensures optimal freshness and is comparable to the reference standards for muffins baked at high temperatures. The use of pistachios resulted in a fat content of 11.338%, representing a significant reduction compared to standard variants (14%), confirming the potential for replacing saturated fats with oilseed pastes. The level of protein (6.366%) and total ash (1.2%) exceeded the values of the control muffins (5.30% protein and 0.89% ash), indicating an improvement in biological value and mineral content. The product had a pH of 6.11 and an energy intake of 302.71 kcal/100 g, falling into the category of gourmet pastries with an optimized nutritional profile. The results demonstrate that pistachio, cardamom and chocolate muffins are a viable alternative to conventional products, offering a balance between premium sensory qualities and superior physicochemical indicators.

Keywords: *muffins, pistachios, cardamom, physico-chemical indicators, technological process, energy value.*

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Study on the technological process and physicochemical parameters of ostrich meat salami

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Abstract

This paper analyzes the technological manufacturing process and the main quality indicators for an assortment of ostrich meat salami made in our own production. The production technology aimed to capitalize on the superior nutritional characteristics of ostrich meat, by combining it with pork fat and controlled fermentation to obtain a raw-flavored salami-type product. The maturation process allowed the reduction of water activity and the establishment of an optimal pH for microbiological safety. The results of the laboratory analyzes for the sample of our own production highlighted a product with outstanding physicochemical characteristics. The protein content of 26.268% is particularly high, exceeding the typical values for ostrich salami in the literature (which range from 19.99% to 22.14%), which gives the product a superior biological value. The fat content of 21.994% indicates a balanced formulation, significantly lower than in commercial pork salami (which can exceed 34%), but sufficient to ensure the characteristic texture and flavor. The pH value of 5.04 is excellent, falling below the critical threshold of 5.3 identified in studies on fermented ostrich salami, which guarantees microbiological stability and efficient lactic fermentation. The moisture content of 44.454% reflects a proper maturation process with controlled weight loss. The freshness indicator (slightly hydrolyzable nitrogen) of 13.12 mg NH₃/100g confirms the quality of the raw materials and the integrity of the product. With an energy intake of 317.39 kcal/100g and a salt content of 3.11%, the analyzed ostrich salami demonstrates that compliance with technological parameters allows obtaining a product with optimal physicochemical properties, superior nutritional profile and distinctive sensory characteristics.

Keywords: *ostrich meat, salami, technological process, maturation, physico-chemical indicators, nutritional value.*

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Study on the technological process and physicochemical quality indicators of blood sausages

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Abstract

This paper analyzes the technological manufacturing process and the main quality indicators for an assortment of blood sausages made in our own production. The production technology aimed at incorporating whole blood into the composition, followed by a controlled heat treatment by boiling at temperatures of approximately 82°C, an essential parameter for protein coagulation and microbiological stability of the finished product. The results of the laboratory analyses for the sample of own production showed a moisture content of 60.66% and a protein fraction of 13.94%, values that indicate a higher quality than traditional recipes, where the protein is usually around 13.1%. The fat content of 21.74% demonstrates a balanced formulation, being significantly lower than in commercial assortments (which can reach 28.7%), which optimizes the protein-to-fat ratio towards the values recommended in the healthy diet. The pH value of 6.41 fits perfectly into the optimal range of 6.35 - 6.52 identified in the literature for functional products with added blood, favoring an adequate texture. The freshness indicator (slightly hydrolyzable nitrogen) of 20.41 mg NH₃/100g confirms the quality of the raw materials, being well below the spoilage threshold. With an energy intake of 252.06 kcal/100g and a moderate salt content of 1.70%, the blood sausages analyzed represent a product with high biological value and physico-chemical characteristics in accordance with current quality standards.

Keywords: blood sausages, technological process, physico-chemical indicators, nutritional value, food safety.

P32

Effects Of Hydrocolloids On Yeast Activity, Dough Rheology, And Quality Of Frozen Mini-Baguettes During Storage

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Abstract

The study analyzes the effect of adding certain hydrocolloids: guar gum, xanthan gum, and hydroxypropyl methylcellulose (HPMC) on baker's yeast, the properties of frozen dough, and the

quality of mini-baguettes after storage at -18°C for 56 days. The control sample, without hydrocolloids, was compared with three variants formulated with each hydrocolloid. The results show that frozen storage progressively reduces the fermentative activity of the yeast; however, samples containing hydrocolloids maintain higher CO_2 production than the control. After 60 minutes, HPMC showed superior values at the end of the storage period, while after 120 minutes, xanthan gum and guar gum provided the best long-term fermentative stability. From a rheological perspective, hydrocolloids improved dough stability, kneading tolerance, and water retention capacity. Xanthan gum had the strongest effect, increasing stability, resistance to extension, and the balance between elasticity and extensibility. HPMC produced moderate effects, while guar gum resulted in a stiffer dough. In the final product, the addition of hydrocolloids contributed to maintaining specific volume, reducing the increase in hardness, and preserving sensory acceptability.

Xanthan gum stood out for volume stability and improved texture, while HPMC achieved the highest sensory scores after 56 days. In conclusion, hydrocolloids act as cryoprotective agents in frozen dough by limiting water mobility, protecting the gluten network, and maintaining yeast viability. The choice of hydrocolloid should be aligned with the technological objective: rheological stability and volume for xanthan gum, fermentative stability for guar/xanthan, and sensory acceptability for HPMC.

Keywords: cryoprotective agents, fermentative activity, rheological stability, sensory acceptability

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Improving Polyphenol Recovery from Rose Hips Using Ultrasound-Assisted Extraction

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Abstract

The use of *Rosa canina* L. rose hips as an alternative source of natural colorant, preservative, or bioactive ingredient represents a growing area of research, driven by increasing consumer interest in value-added products.

The present study aimed to apply response surface methodology (RSM) to optimize ultrasound-assisted extraction (UAE) condition for the recovery of phenolic compounds with high antioxidant activity. Temperature ($25\text{--}45^{\circ}\text{C}$), sonication time (20–40 min), and ethanol concentration (50–90%) were selected as the main factors in a Box–Behnken experimental design. The dependent variables analyzed were total anthocyanin content (TAC), total polyphenol content (TPC), and antioxidant activity.

The experimental results were well fitted to a quadratic model, explaining over 98% of the variability in the responses as a function of the applied UAE factors. Under optimal conditions (45°C , 40 min, 52.12% ethanol), the predicted values were 4.87 mg M3G/100 g DW for TAC, 5819.91 mg GAE/100 g DW for TPC, and 82.26% DPPH radical scavenging activity.

The validated extract exhibited high levels of gallic acid (1683.39 ± 11.36 mg/100 g DW), hesperidin (110.09 ± 7.16 mg/100 g DW), and naringin (83.82 ± 11.54 mg/100 g DW), according to high-performance liquid chromatography (HPLC) analysis.

The valorization of wild natural resources represents an important research direction. The rose hips valuable bioactive properties certify their technological virtues both as agents used to enhance shelf-life and as potential ingredients for functional foods.

Keywords: natural resources, antioxidant activity, functional foods

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Effect of Drying Conditions on the Bioactive Compound Profile of Wild *Crataegus monogyna* L. Fruits

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Abstract

The incorporation of powders obtained from the drying of wild *Crataegus monogyna* L. fruits into food matrices may contribute to the development of a category of products with high biological value, due to the anti-inflammatory, antioxidant, and antidiabetic effects.

The aim of the study was to perform a comparative analysis of infrared (IR) and hot-air convection (CD) drying at temperatures of 50, 60, and 70°C, applied to *Crataegus monogyna* L. purée. It was evaluated the changes induced by the two methods on the drying rate, polyphenolic and carotenoid profiles, as well as antioxidant activity.

The drying curves highlighted the specific characteristics of the two techniques regarding drying rate as a function of moisture content. The differences observed between the two techniques are attributed to distinct mechanisms of water removal from the plant matrix structure, as well as structural changes in the particles under the action of the heat source.

The highest values of total polyphenol content and antioxidant activity were observed at 70°C for both techniques. This phenomenon can be explained by the partial inactivation of enzymes involved in browning reactions. However, the values obtained through IR drying were higher than those corresponding to CD drying, suggesting a gentler nature of infrared drying process. Regarding total carotenoid content, the maximum values were recorded at 70°C for IR drying (628.06 ± 4.50 mg/100 g DW), while for CD drying, the obtained value was 587.09 ± 5.79 mg/100 g DW at 60°C.

IR drying represents a faster alternative that may reduce the degradation of bioactive compounds, thereby promoting the production of a functional powder rich in biologically active compounds, with potential application as a food ingredient.

Keywords: functional powder, polyphenol content, carotenoid profile

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Mineral and lipid profile of blackthorn pomace obtained under different processing conditions

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Abstract

Fruit pomace valorization is an actual trend among scientists, and the demand of consumers for healthy products, along with the European direction toward waste reduction, highlights the opportunity to re-use blackthorn pomace in functional products development. For this purpose, conditioning of blackthorn (*Prunus spinosa*) pomace is an essential step in order to achieve the best nutritional and functional value of the ingredient. This paper aimed to evaluate the impact of drying temperature (45-65 °C) and particle size (L < 200 µm, 200 µm < M < 300 µm, L > 300 µm) on the mineral and lipid profile of blackthorn pomace. Mineral content (Ca and Cu) was assessed by atomic absorption spectrometry, and lipid profile in terms of polyunsaturated (PUFA), saturated (SFA), omega-3 (n-3) and 6 (n-6) fatty acids was determined by gas-chromatography. Thrombogenic index (TI) was also calculated. I-optimal design and Response Surface Methodology with a quadratic model were used to study the impact of factors (temperature – numeric, and particle size – categoric) on the characteristics mentioned. Based on desirability function, the best processing condition for each particle size was obtained based on the maximum PUFA/SFA and n-3/n-6 ratio, and minimum TI. The content of minerals and PUFA/SFA ratio decreased with temperature increase, while n-3/n-6 ratio and TI increased with temperature up to certain levels. The best drying temperature for S particle size was 50.82 °C, for M particle size 50.18°C, and for L particle size it was 45.45°C. These results highlight the possibility to use blackthorn pomace for further applications in food industry due to its high nutritional value. The selection of the best processing conditions depends on the final destination of the ingredient proposed.

Keywords: nutritional value, by-product valorization, PUFA, health-related lipids, macro and trace elements.

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Aromatic hydrocarbon oxidation catalyzed by metal-organic materials of V(V)-peroxido-zwitterion species

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Abstract

Vanadium appears in numerous non-living and living systems, thereby attracting considerable attention to a wide range of applications, including nanotechnology [1], biochemical processes [2], medicinal chemistry [3], industrial catalysis [4], and biocatalysis [5]. It has been recognized as an essential biological element, playing roles in both catalytic and inhibitory functions in living organisms. Given its catalytic significance, our Laboratory has focused over years on the development of molecular materials based on vanadium-organic substrate complex systems designed to replicate the active site(s) of vanadium-dependent enzymes. In the framework of vanadium importance in catalysis, efforts have been made in our Lab to develop such molecular materials targeting vanadium complex systems that stand on their own as independent catalysts of organic substrate oxidation at ambient temperature.

In pursuit of relevant research, a series of dinuclear complexes were synthesized involving

vanadium with N-methylglycine and N, N'-dimethylglycine in aqueous media, and H₂O₂, capable of exerting catalytic activity. The new materials were characterized by elemental analysis, FT-IR, Raman, NMR, UV-Visible, cyclic voltammetry, TGA-DTG, and X-ray crystallography. In all of the compounds, pH appears to be an important factor in the synthesis and isolation of pure crystalline products. The products of the catalytic reaction systems investigated were identified and quantified by GC-MS-TIC and GC-FID.

The experimental results suggest that the vanadium species exert catalytic activity, with aromatic hydrocarbons, such as benzene, transforming it in products with high specificity and yield at ambient temperature. Specifically, the catalytic transformation of organic substrates (e.g. benzene) in the presence of the well-defined vanadium complexes, projects the catalytic potential of the peroxido-loaded vanadium centers toward substrate hydroxylation. The observed activity denotes the importance of such species in catalysis, with vanadium in the oxidation state V(V) bound to both peroxido and betaine ligands being responsible for the occurring oxidative transformations. The structural attributes of such ternary assemblies contribute to the unique activity under mild temperature conditions, thereby exemplifying the global directives for such catalysts, the use of which in industry projects merit further perusal into practical applications.

Keywords: Vanadium, catalysis, zwitterions, metal-organic compounds, synthesis, substrate hydroxylation

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P37

Multivariate assessment of the physico-chemical composition of commercial cheese varieties

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Abstract

The nutritional composition of cheese is highly variable, influenced by the source of milk, processing methods, and ripening periods. Understanding these differences is crucial for nutritional labeling, quality control, and consumer guidance. This study aimed to characterize and classify 20 diverse cheese varieties based on five key physico-chemical parameters: Moisture (U), Dry Matter (SU), Protein (P), Fat (F), and Energy Value (E). Principal Component Analysis (PCA) and Hierarchical

Cluster Analysis (HCA) were employed to identify the main drivers of variability and to group the samples based on their nutritional similarities. The data set included a wide range of products, from fresh (e.g., Cottage cheese, Ricotta) to hard-matured cheeses (e.g., Parmezan, Gruyere). PCA results indicate that moisture content and dry matter (which are inversely correlated) explain the highest proportion of variance among the samples. Cluster analysis effectively partitioned the varieties into distinct groups. Varieties like Parmezan and Cheddar showed distinct profiles compared to blue cheeses (Danish blue, Roquefort) due to their specific balance of protein and fat. The application of multivariate statistical tools provides a robust framework for differentiating cheese varieties. These results facilitate a deeper understanding of how specific macro-nutrient ratios contribute to the overall nutritional identity of different cheese categories, offering valuable insights for both the dairy industry and clinical nutrition.

Keywords: Cheese composition, Principal Component Analysis (PCA), Cluster Analysis, Nutritional Profiling, Physico-chemical properties.

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Aqueous *Cornus Mas L.* extracts against ROS-mediated neurodegeneration

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Abstract

Neurodegenerative diseases are a group of chronic heterogenous disorders, mainly characterized by neuronal dysfunction. The main phenotype of the disorders includes compromised motor function, accompanied by loss of memory and cognitive decline. The molecular pathogenesis of these diseases is heterogeneous and it is greatly affected by various genetic and environmental factors. Mounting evidence, however, suggests that oxidative stress plays a crucial role in its onset and progression, simultaneously affecting common cellular and molecular mechanisms of these disorders [1,2]. Oxidative damage is particularly evident in neuronal tissue, due to high concentration of ROS-sensitive poly-unsaturated fatty acids [3]. Based on these premises, natural herbs, such as *Cornus Mas L.*, attracted the keen interest of our Lab, which is a widely used plant in folk medicine, especially in Asia. In fact, the bioactivity profile of *Cornus* fruit has demonstrated beneficial properties against pathophysiological conditions, including inflammation and oxidative stress [4].

In an effort to delineate the efficacy of *Cornus Mas L.* extracts as nutraceutical agents against ROS-mediated neuronal damage, research was launched in our Laboratory, in pursuit of the complete bioactivity profile of the extracts. The models used included sensitive neuronal cell lines, both mouse (N2a) and human (SH-SY5Y) cell lines, with H₂O₂ as promoter of oxidative damage. Following the establishment of the complete (a)toxic profile of the extracts, antioxidant studies were performed, including viability and staining studies, while the mechanism of the observed antioxidant and anti-inflammatory action was validated using RT-PCR. At the same time, the supplementation of the extracts with bioavailable and bioactive form of metal ions (e.g. zinc), was also examined, to delineate the synergistic activity of the therapeutic potential. The collective results reveal atoxicity up to very high concentrations (mM range), exhibiting significant antioxidant capacity, which was further enhanced by metal supplementation. The complete in vitro profile of the extract suggests that the specific aqueous extracts provide significant candidate as nutraceutical supplement and merit further consideration in the development of food stuffs with neuroprotective potential.

Keywords: Neuroprotection, oxidative stress, in vitro, natural products, zinc(II), cell cultures

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P39

Bioactive compounds in edible parts of *Chenopodium album* L.: implications for human nutrition

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Abstract

The increasing interest in plant-based diets has brought new attention to underutilized wild edible species, including *Chenopodium album* L. Traditionally consumed in many regions as a leafy vegetable, this plant represents a potentially valuable source of health-promoting compounds. The aim of this study was to evaluate the variability of bioactive compounds, with a focus on total phenolic content (TPC) and antioxidant activity (TAC), in the edible parts of *Chenopodium album* (leaves, stems, and seeds), and to assess their potential contribution to human nutrition based on existing literature data.

The organizational approach consisted of a comprehensive analysis of data reported in peer-reviewed scientific studies. Relevant articles were selected from databases such as ScienceDirect, PubMed, and Google Scholar, using keywords related to phenolic compounds, antioxidant capacity, and nutritional composition of *Chenopodium album*.

The findings indicate a clear variation in the concentration of bioactive compounds depending on the analyzed part. Leaves consistently showed the highest levels of total phenolic content and antioxidant activity, stems generally exhibited lower values, while seeds presented moderate levels, with some variability depending on processing and maturity. Reported total phenolic content in leaves ranged widely but was consistently higher than in other tissues, and antioxidant activity followed a similar trend. These differences suggest that the nutritional potential of *Chenopodium album* is not uniform and depends significantly on the specific plant part consumed.

In conclusion, *Chenopodium album* represents a valuable source of natural antioxidants, particularly when its leafy parts are consumed. The variability observed among different plant organs emphasizes the need for a more targeted approach in evaluating wild edible plants from a nutritional standpoint. These findings support the integration of such species into modern diets, especially in the

context of functional foods and sustainable nutrition.

Keywords: antioxidants, polyphenols, dietary intake, edible plants

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Analysis of the Recent Evolution of the Global Coffee Market: Determinants of Price Increases and Perspectives on Sector Sustainability (2023–2025) – Review

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Abstract

The present review examines the recent evolution of the global coffee market during the 2023–2025 period, with a particular focus on the factors that have driven the significant increase in international prices and on the effects of this dynamic on the sustainability of the sector. Based on the relevant literature and the FAO documents consulted, the analysis highlights that the rise in international quotations was closely associated with supply disruptions, mainly caused by adverse climatic conditions in major producing countries such as Brazil, Vietnam, Indonesia, and other key coffee-producing states, compounded by logistical difficulties and additional trade pressures. In this context, price volatility cannot be explained solely by the relationship between supply and demand, but must also be examined in connection with the structural vulnerabilities of the global value chain, the high exposure of coffee crops to climate-related risks, and the essential role of smallholder producers, who make a significant contribution to global production. At the same time, the analysis shows that the current challenges facing the coffee sector go beyond the strictly economic dimension, encompassing relevant issues such as traceability, supply chain transparency, increasingly stringent sustainability requirements, and the social and environmental costs associated with production. Looking ahead, the reduction of areas suitable for coffee cultivation under the impact of climate change may intensify market instability and lead to a reconfiguration of the relationships among production, trade, and consumption. In conclusion, this review supports the need for integrated interventions aimed at strengthening climate resilience, fostering innovation, enhancing traceability, and ensuring fair support for smallholder farmers, with a view to developing a more stable and sustainable coffee sector.

Keywords: global coffee market, price dynamics, volatility, climate change, sustainability sector, traceability, global value chain

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Copper metal-organic compounds with O,N,O-ligands as potential micronutrients in plant growth

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Abstract

Copper (Cu(II)) is an essential micronutrient for plants and participates in various physiological and biochemical processes. As a cofactor in a variety of enzymes, Cu(II) plays an important role in photosynthesis, respiration, antioxidant systems, and signal transduction. However, the difference between beneficial and detrimental copper concentrations in living systems is narrow. In plants, Cu(II) deficiency can lead to growth retardation, increased senescence, and reduced productivity [1,2]. In this context, copper-containing coordination compounds have attracted considerable attention due to the redox activity and biogenic nature of copper ions, which provide multiple pathways for biological activity [3]. The pharmacological properties of these metal complexes can be fine-tuned by varying the nature of the ligand and donor atoms, while the variable oxidation states of transition metal complexes of copper (Cu(I,II)) enable diverse chemical reactivity [3,4]. Consequently, copper compounds exhibit significant biological potential, including antibacterial, antifungal, and anti-inflammatory activities [4].

Within this framework, three Cu(II) coordination compounds, containing diisopropanolamine (DIPA), triisopropanolamine (TIPA), and 2,2-bipyridine (bipy) ligands, were synthesized and physicochemically characterized by elemental analysis, FT-IR and UV-Visible spectroscopies, and single-crystal X-ray crystallography. The coordination environment of the copper centers was further investigated by solid-state electron paramagnetic resonance (EPR) spectroscopy. The experimental spectra were simulated using the EasySpin toolbox in MATLAB in order to determine the spin Hamiltonian parameters [5]. The simulations indicated distinct electronic environments for the Cu(II)-DIPA and Cu(II)-TIPA compounds, consistent with the coordination geometries obtained by X-ray crystallography. The derived g and A parameters were interpreted according to established correlations for Cu(II) complexes, providing insight into the electronic structure of the Cu(II) centers. In contrast, a newly derived dinuclear Cu(II)-bipy compound exhibited no detectable EPR signal, likely due to magnetic exchange interactions between the two copper ions, thus quenching the paramagnetism inherent to individual Cu(II) ions. The so synthesized compounds were studied for their antibacterial activity showing no effect on essential bacterial growth.

Keywords: Copper, coordination compounds, synthesis, EPR spectroscopy, electronic structure, antibacterial activity

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Sustainable Recovery of Bioactive Compounds from Grape Pomace Using Conventional and Microwave-Assisted Extraction

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Abstract

Wine production is one of the most important agricultural activities worldwide. In addition to large annual wine production volumes, it also generates waste, notably grape pomace (GP). Traditionally regarded as waste, this residue has been reanalyzed from the perspective of bioeconomy and circular economy principles, proving to be a rich source of bioactive compounds with great valorization potential [1]. Its heterogeneous composition includes a variety of polyphenols, dietary fibers, flavonoids, and other secondary metabolites that give to GP biological properties such as antioxidant, anti-inflammatory, and antimicrobial activities. To promote GP valorization, it is of utmost importance to optimize extraction methodologies to obtain the bioactive compounds responsible for these properties.

A conventional solid–liquid extraction was performed using different variables (time, temperature, solvent volume, pH, and water/alcohol ratio) to determine total phenolic, flavonoid, and anthocyanins contents, as well as antioxidant activity (using both DPPH[•] scavenging and Ferric Reducing Antioxidant Power assays), through spectrophotometric methods. Based on the results obtained, new extraction conditions were subsequently established for microwave-assisted extraction. The results demonstrated that, in most of the analyses performed, microwave-assisted extraction provided higher values when compared to conventional extraction, indicating greater efficiency. The best overall results were achieved under the following microwave-assisted extraction conditions: 40 min extraction time, 70 °C, 50% ethanol, and 210 mg of sample.

Overall, the analyses carried out demonstrate that GP, often regarded as waste with no economic value, represents a strategic resource aligned with current requirements of industrial sustainability. The optimization of extraction methodologies is therefore essential to enhance the recovery of bioactive compounds and promote the effective valorization of this residue, allowing its use not as a mere solution for waste management, but as an opportunity to create new products with high added value.

Keywords: Circular economy; environmental responsibility; sustainable valorization; wine production by-products

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Assessing *Cytisus* Flowers as a Natural Resource of Antioxidant Compounds Using Sustainable Extraction Methods

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Abstract

Cytisus striatus (Hill) Rothm. is a native shrubby species widely distributed across the Iberian Peninsula, especially in areas characterized by poor soils and ecosystems subject to recurrent disturbances, such as wildfires [1]. The biomass generated can be used in conformity with European and national regulations (Circular Economy and Waste Management in line with the United Nations Sustainable Development Goals for 2030), reducing residues accumulation and obtaining added value compounds. Despite its abundance and ecological relevance, this species remains undervalued from a nutritional and chemical perspective, representing a plant resource with high potential for integration into bioeconomy, circular economy, and sustainable development models [2].

In this study, the recovery of phenolic compounds from *C. striatus* flowers (CF) was optimized using microwave-assisted extraction (MAE), ultrasound-assisted extraction (UAE), and by the conventional solid-liquid extraction (CE), using a hydroalcoholic solution (50:50, v/v) as solvent. Total phenolics content (TPC), total flavonoids content (TFC), antioxidant capacity through DPPH and FRAP assays, and phenolic profile by HPLC-DAD were determined in lyophilized flowers powder. The TPC values ranged from 29.31 to 31.80 mg GAE/g dw and TFC varied between 9.39 and 10.41 mg CE/g dw, displaying antioxidant capacity with highest values of 20.03 mg ET/g dw and 287.09 $\mu\text{mol ESF/g dw}$ for DPPH and FRAP, respectively. HPLC-DAD analysis identified apigenin-7-glicoside, luteolin-7-glicoside and rutin in all extracts. Our findings indicated that UAE was the most effective method for extracting bioactive compounds, possibly because ultrasound increases the penetration and availability of solvents in the floral matrix, allowing for greater interaction between the solvent and the target compounds.

This study highlights the potential of CF using food-grade solvents (water and ethanol), as promising source of biactive compounds for several applications, in line with the principles of the circular economy and the sustainable valorization of resources. Thus, green extraction technologies offer a path toward sustainable resource recovery, aligning economic, environmental, and health-related goals in a bio-circular-green economy paradigm.

Keywords: green extraction, broom flowers, bioactive compounds, sustainable valorization.

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P44

Structural speciation of Ti(IV)-peroxido-citrato compounds in aqueous media

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Abstract

The synthesis of metal-organic compounds, based on titanium, has attracted intense research interest due to that metal ion's unique properties, low cytotoxicity, and significant bioavailability. Titanium has been used in ceramics, retainers and general materials, applicable to surgical restorations, dental fillings and other applications, mainly in the Ti(IV) oxidation state [1,2]. These compounds represent a promising class of hybrid materials, which is not only limited in their materials science but also has biomedical applications, as the emerging materials can be used as pharmaceutical compounds (e.g. anticancer drugs, antibiotics) or due to their sensitivity to pH changes they can transport and release drugs in acidic environments, such as those encountered in tumors or inflamed tissues [3]. However, as titanium comes in contact with biological tissues and fluids, both its interaction with cellular and subcellular components gets challenged. The importance of this interaction is demonstrated by possible toxicity manifestations, originating from titanium-containing implants, which ultimately lead, among other things, to rejection by recipient patients. Understanding this interaction at a basic chemical level is particularly important and such an effort requires in-depth examination of metal-organic titanium complexes and their chemical reactivity in aqueous environments, which have the ability to confer solubility and at the same time bioavailability.

In an effort to increase the bioactivity of these compounds, research was carried out in our laboratory, aimed at the synthesis of peroxido-analogs of metal-organic titanium compounds in aqueous environments, with the titanium center encompassing bound hydroxycarboxylic acids (e.g. citrate). The introduction of the peroxido group is intended to confer many functional possibilities both in catalytic applications and in biomedical environments, where ROS formation could be monitored-controlled and toxicity will be reduced or neutralized [4]. The isolated crystalline materials were further characterized through elemental analysis, FT-IR, UV-Visible, FT-Raman, NMR, and X-ray crystallography, with the results meriting due attention regarding the toxicity profile of titanium compounds in an aquatic environment, such as that encountered in human biological tissue fluids.

Keywords: Titanium, citric acid, structural speciation, metal-organic, anti-inflammatory activity. metal-organic complex

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Optimization of Drying Conditions for White Grape Pomace to Obtain a Phenolic-Rich Functional Powder

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Abstract

In recent years, climate change has left a significant mark on food production, with the agri-food sector being strongly affected. Moreover, global population growth and the depletion of non-renewable resources have led to the development of action plans aimed at preventing food waste and losses, as well as promoting the valorization of by-products with economic and functional potential.

White grape pomace is a by-product resulting from the winemaking process, which, due to its chemical composition, represents an important source of polyphenolic compounds with bioactive properties reported in scientific literature. Beyond its traditional use as a fertilizer, which, when applied in excess, may negatively impact on the soil microbiome, grape pomace can be transformed into a powder suitable for incorporation into various food matrices, such as bakery or pastry products, thereby enhancing their biological value.

The aim of the present study was to evaluate the effect of different drying temperatures (50–70 °C) applied through two distinct techniques: hot-air convection drying (CD) and infrared drying (IR). Principal Component Analysis (PCA) was employed to identify the components with eigenvalues >1, which accounted for the variations related to color parameters, physicochemical characteristics of the powders, polyphenolic compound stability, and antioxidant activity.

The first three principal components explained 89.14% of the total variance and were used for 2D and 3D representations of the loading and score plots. According to the 2D representation for PC₂, a positive correlation was observed between total polyphenol content and antioxidant activity, whereas the browning index showed a negative correlation. These results suggest that the application of higher drying temperatures reduces the activity of polyphenol oxidase, the enzyme responsible for polyphenol oxidation.

The powder obtained through convection drying at 70 °C was characterized by high polyphenol content and superior antioxidant activity.

Keywords: By-product, Antioxidant Activity, Principal Component Analysis.

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Quality evaluation of muffins enriched with cranberries and cinnamon biscuits

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Abstract

The use of plant-based functional ingredients to enhance the nutritional profile and consumer appeal of bakery products has gained significant traction in the food industry due to their high consumption rates and compatibility with fruit-based additives. This study aimed to evaluate the physicochemical and sensory properties of muffins enriched with cranberry and cinnamon biscuits, comparing them against a traditional control sample to determine their potential as value-added products.

Physicochemical analysis revealed that enrichment led to a significant impact on the product's chemical profile, characterized by decreased pH level, alongside an increase in total acidity and moisture level. Specifically, the enriched muffins demonstrated a superior functional profile with an antioxidant capacity of 83.20 $\mu\text{M Fe}^{2+}/\text{g}$ and a total polyphenol content of 949.0 mg GAE/100 g. These shifts in pH and acidity are consistent with the incorporation of bioactive-rich materials, which influence both the nutritional value and the stability of the product.

Sensory evaluation revealed a definitive consumer preference for the enriched formulations. The novel muffins achieved a higher overall acceptability score of 4.44 compared to 3.84 for the control, with marked improvements in taste, aroma, and texture. The results suggest that the incorporation of cranberry and cinnamon biscuits not only fulfills consumer demand for attractive physical attributes and taste but also significantly empowers the product's functionality in the market. This research provides important data on the advantages of such formulations, filling a gap in the development of health-oriented bakery goods.

Keywords: muffins; cranberries; cinnamon biscuits; sensory evaluation; antioxidant capacity; physicochemical parameters; texture; nutritional enhancement.

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Impact of tomato by-products addition on the oxidative stability of pumpkin oil

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Abstract

Lately, there has been a significant surge in the processing of botanical resources, specifically involving grains, fruits, and vegetable crops. During the manufacturing of tomato-derived goods, approximately 10% to 35% of the initial raw material is discarded as waste. Extracted by pressing high-grade, roasted seeds, pumpkin seed oil (*Cucurbita pepo* L) is a dark, unrefined culinary oil frequently utilized as a dressing for salads. High levels of linoleic acid, an omega-6 fatty acid found in pumpkin oil, are associated with better cardiovascular health and regulated blood sugar levels. To assess long-term stability, pumpkin oil enriched with tomato by-products was monitored for six months at a controlled ambient temperature of 20°C. Tomato skins and seeds, rich in bioactive compounds, were dried at 50°C using a hot-air oven. The resulting powder was added to pumpkin oil in various proportions (0.1, 1, 1.5, and 2% w/v) to maintain its quality. To evaluate the oxidative status of food lipids, chemical analysis was conducted by measuring peroxide (PV) and p-anisidine (p-AV) values, followed by the calculation of the total oxidation (TOTOX) index. The findings suggest that tomato by-products can serve as effective natural antioxidants to enhance the stability of pumpkin oil.

Keywords: pumpkin oil, tomato by-products, bioactive compounds, oxidative stability,

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Alcoholic beverages with natural flavors

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Abstract

Recently, the European alcoholic beverage sector has seen a rise in "clean label" trends, emphasizing transparency by eliminating artificial additives and preservatives in favor of organic, natural components. These drinks typically feature a vodka base with an alcohol content varying from 5.0% to 34.4%. Consumer preferences are gravitating toward citrus notes alongside berry varieties such as blackberries. This research aimed to develop and evaluate spirit drinks enriched with natural flavorings to enhance their antioxidant profile. Combining three distinct varieties of *Capsicum peppers* allows for the creation of vodka with a deep sensory complexity, blending sharp spiciness with fresh, vegetal notes. The most frequent choices for such infusions are *Capsicum annum*, *Capsicum frutescens*

and *Capsicum chinense*. The flavoring method begins with pepper preparation; removing seeds helps control the heat level. Place the peppers in a glass container and cover them with vodka. The mixture is then left to macerate for 1–7 days, shaking daily until it reaches the desired spiciness. Once the flavor is sufficiently developed, the peppers are removed and the vodka is filtered to ensure clarity. The study involved a comprehensive analysis of the products' sensory attributes, relative density, total acidity, and dry extract, reflecting the modern consumer's demand for innovative beverage options.

Keywords: alcoholic beverages, peppers, natural antioxidant compounds

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Smart and active packaging in the food industry: a review

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Abstract

The food industry is increasingly challenged by the need to ensure food safety, maintain product quality, and reduce losses along the supply chain. In this context, smart and active packaging technologies have gained significant attention as innovative solutions for monitoring and preserving food products. This paper provides a comprehensive review of recent advances in smart and active packaging systems used in the food industry. The study is based on the critical analysis of scientific literature, focusing on key technologies such as time-temperature indicators, freshness indicators, gas sensors, and active packaging systems with antimicrobial and oxygen-scavenging properties. Findings from the reviewed studies demonstrate that these technologies effectively extend shelf life, improve microbiological safety, and maintain the sensory attributes of food products. However, challenges related to high implementation costs, regulatory constraints, and consumer acceptance remain significant. From a practical perspective, these packaging systems offer valuable tools for the food industry, enabling improved quality control, reduced food waste, and enhanced supply chain efficiency, thereby supporting more sustainable food production and distribution systems.

Keywords: biodegradable materials; chromatic indicators; cold chain; intelligent sensors; volatile compounds

P50

Evaluation of Bioactive Compounds and Antioxidant Activity in a Functional Jam Based on Pumpkin and Ginger

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Abstract

This paper aims to provide a physicochemical and sensory characterization of an innovative jam product, developed by valorizing pumpkin in combination with functional ingredients such as ginger, lemon, and raisins. The study focused on determining the nutritional profile and antioxidant capacity of the final product, using sugar as a preservative and sweetening agent. The determination of titratable acidity revealed maximum values for the ginger raw material, while the raw pumpkin exhibited lower acidity. The resulting jam was processed to a concentration of 55°Brix. Compositional analysis showed a dry matter content of 54.8% and a moisture content of 43.3%. The analysis of bioactive compounds demonstrated a significant increase in antioxidant concentration in the finished product: the total polyphenol content reached 2.13 ± 0.0015 mg GAE/g, a value superior to the individual raw materials (ginger: 0.77 mg GAE/g; pumpkin: 0.64 mg GAE/g). This synergy was also reflected in the radical scavenging activity (RSA), with the finished product showing a free radical inhibition capacity of $67.98 \pm 0.045\%$, compared to 14.95% for ginger and 5.49% for pumpkin. Sensory evaluation, conducted using the spider diagram method, confirmed the high acceptability of the jam, which achieved superior scores across all analyzed parameters, particularly for consistency (8.4) and taste (8.2). The results highlight the successful combination of a traditional recipe with ingredients such as raisins and ginger, resulting in a balanced product with high commercial potential and outstanding sensory characteristics.

Keywords: pumpkin, ginger, jam, polyphenols, RSA, °Brix.

P51

Nutritional and Sensory Profile of an Innovative No-Sugar Antioxidant Plant-Based Bar

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Abstract

This paper focuses on the development and complex characterization of an innovative nutritional bar, formulated from a blend of plant-based raw materials: oat flakes, wheat bran, sunflower seeds, dried plums, raisins, and carob powder. The study aimed to obtain a nutritionally balanced product with no added sugar, targeting vegan consumers and individuals interested in healthy eating. Regarding the physicochemical indicators, the bar exhibited an acidity of 12 degrees, moisture $33.4 \pm 2.46\%$, and a soluble solids concentration of 47.2°Brix. The nutritional profile per 100 g of product highlights an energy value of 351.4 kcal, with a protein content of 8.33 g, 11.3 g of lipids, and a significant carbohydrate intake (63.4 g), of which 8.85 g are fibers - essential elements for supporting digestion. The functional properties of the product are supported by a notable level of total polyphenols

(26.6 mg GAE/100 g) and a very good radical scavenging activity (RSA) of 63.45%. These results suggest significant antioxidant benefits for the body, comparable to data reported in the literature for similar fruit- and seed-based products. Sensory evaluation confirmed a very high level of general acceptability, with the product achieving a score of 8.22 out of 9 points. Detailed analysis via the spider diagram reveals maximum ratings for aroma, taste, and appearance, while consistency represented the limiting parameter, with a score of 7.84. The results demonstrate the success of the proposed formulation, as the bar represents an attractive alternative from both a nutritional and sensory perspective, providing a solid foundation for future optimizations within advanced research programs.

Keywords: *nutritional bar, polyphenols, RSA, sensory analysis, no added sugar.*

PS2

Mango and papaya seed flour – from agri-food byproduct to functional food

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Abstract

Flours obtained from mango (*Mangifera indica* L.) and papaya (*Carica papaya* L.) seeds represent an emerging direction in the field of functional foods, utilizing agro-food by-products rich in bioactive compounds. Traditionally considered waste, these raw materials have recently been re-evaluated due to their complex nutritional composition and potential to contribute to human health and the sustainability of food systems.

Research in the last 10 years has highlighted that mango seed flour is an important source of dietary fiber, lipids, proteins and phenolic compounds, presenting significant antioxidant and antibacterial activities. For example, recent studies on mango seed flour show the presence of bioactive functional groups and an antimicrobial activity relevant for food applications. Similarly, papaya seeds contain bioactive compounds and enzymes (such as papain), with antioxidant and antimicrobial effects demonstrated in recent literature.

In addition, recent research has demonstrated that fiber extracts from mango and papaya seeds exhibit important functional properties, including high water and oil retention capacity, emulsifying stability, and high dietary fiber content, making them suitable for the development of functional foods. These characteristics support their use in bakery products and other enriched foods, contributing to the improvement of nutritional value and technological properties.

Another important aspect is the integration of these by-products into the circular economy. Recent studies highlight that the valorization of fruit waste, including seeds, contributes to the reduction of environmental impact and the development of sustainable ingredients for the food industry. At the same time, the use of seed flour in cereal products has been associated with improved mineral content and antioxidant activity, with beneficial potential in the management of metabolic diseases.

In the future, mango and papaya seed flour has the potential to become a key ingredient in the development of new generation functional foods. However, further clinical studies are needed to validate the effects on human health and to optimize technological processes. Thus, the valorization of these by-products reflects the transition towards sustainable and health-oriented food systems.

Keywords: seed flour, mango, papaya, functional food, bioactive compounds, sustainability, circular economy.

P53

Influence of Edible Flower Extracts on Oxidative Stability of Vegetable Oils

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Abstract

The present work focuses on evaluating the influence of natural extracts obtained from edible magnolia petals on the preservation stability of rapeseed and olive oils. These oils were selected due to their high susceptibility to oxidative degradation and their widespread use in the food industry. The experimental study involved enriching oil samples with different concentrations of magnolia extracts, followed by storage for 21 days. Analyses were carried out at 7-day intervals in order to monitor changes in key quality parameters, including peroxide value, free fatty acid content, refractive index, total polyphenol content, and antioxidant capacity. Sensory evaluation was also performed to assess the acceptability of the formulated samples.

The results indicated a clear improvement in oxidative stability for the enriched oils, reflected by a slower increase in peroxide values and better maintenance of quality indicators compared to the control samples. The most effective variant was observed at a 10% extract concentration. This effect can be linked to the presence of bioactive compounds, especially phenolics and flavonoids, known for their antioxidant properties.

Overall, the findings suggest that magnolia petal extracts can be considered a promising natural alternative for improving the shelf stability of edible oils.

Keywords: magnolia petal extract; polyphenols; lipid oxidation; antioxidant activity; shelf life

P54

Physicochemical and functional characteristics of elderberry (*Sambucus nigra* L.) jams

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Abstract

Elderflower (*Sambucus nigra* L.) has been traditionally used across Europe for its aromatic, medicinal, and nutritional properties. The elderberries contain a rich spectrum of bioactive compounds, including phenolic acids, flavonoids such as rutin and quercetin derivatives, volatile terpenes, and essential minerals (Ağalar, H.G.,2019). These compounds contribute to the plant's well-documented antioxidant, antimicrobial, anti-inflammatory, and immunomodulatory effects. In recent years, consumer interest in natural, plant-based functional foods has increased significantly, driving innovation in the development of value-added products derived from edible flowers (Vujanović, M.; et al., 2020). Sugar preservation is a standard method for stabilising plant materials, as high solute concentrations inhibit microbial growth. While sucrose is the traditional sweetening agent, sorbitol—a polyol with a low glycemic index and humectant properties—offers a functional alternative for reducing caloric content while maintaining product stability. However, the impact of sorbitol on the phytochemical integrity and sensory profile of elderberry (*Sambucus nigra* L.) jam remains insufficiently studied. This study evaluated the nutritional, physicochemical, and functional characteristics of fresh elderberries and two jam formulations: a traditional sucrose-based jam (60% w/w) and a naturally sweetened alternative using sorbitol (60% w/w). Samples were processed via atmospheric thermal evaporation to a soluble solid content of $60\pm 2^\circ$ Brix. Analytical methods included spectrophotometric determination of total polyphenols, antioxidant capacity (DPPH), and color parameters (L^* , a^* , b^*). Titrimetric analysis was used to measure acidity and Vitamin C retention. The sorbitol-sweetened jam achieved a 35% reduction in energy value compared to the sucrose control. Titrimetric results showed a decrease in Vitamin C across both formulations, yet the sorbitol matrix demonstrated superior functional preservation, maintaining 85% of the fresh fruit's radical scavenging activity. Spectrophotometric analysis confirmed robust polyphenol retention and stable color parameters in the sorbitol samples. Furthermore, the sorbitol jam exhibited enhanced humectancy, resulting in a smoother texture.

Keywords: jams, elderberry, vitamin C, functional product.

P55

Hybrid V(III) and V(IV) complexes with natural substrates as potential therapeutic agents

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Abstract

Transition metal chemistry, provides a powerful framework for developing therapeutics that target complex metabolic and malignant diseases. The concept of metallodrugs with atoxic, specific and biologically-relevant profiles emerges dominantly in the world scene, offering alternatives to conventional used drugs to cure diseases. Among the metal ions of biological importance in a multitude of organisms (from arthropods to humans) vanadium has been looked into over the past decades. In that respect, the pharmacological efficacy of vanadium coordination compounds is rooted in their broad spectrum of biochemical reactivity exemplified throughout the biological hierarchy of cellular diseases. In metabolic applications, specific oxidation states, such as V(IV), complexed with endogenous substrates, like α -hydroxy acids, actively ameliorate hyperglycemic conditions, characteristic of Type 2 Diabetes mellitus [1,2] Furthermore, vanadium compounds demonstrate potent antineoplastic capabilities. These materials initiate severe cytotoxicity in malignant cells by precipitating oxidative-

stress induced apoptosis.[3].

Cognizant of that metal ion's potential in pharmaceutical development, the clinical translation of metallopharmaceuticals remains limited. That is due to both lack of deep knowledge of appropriate bioactive species as well as defined bioactivity profiles, ambiguous pharmacokinetic profiles, and narrow safety margins, despite their well-documented therapeutic potential. To overcome these barriers, our research group has focused on the design, synthesis, and isolation of novel vanadium compounds with natural substrates, such as α -hydroxy acids, to optimize their biological efficacy and clinical viability. Through optimized redox- and oxidation state-driven strategies, novel V(III,IV) and V(IV,IV) dinuclear complexes were synthesized in the presence of citric and tartaric acids as metal ion-binding ligands.

The structural and physicochemical profiles of these materials were rigorously mapped, using comprehensive analytical techniques, including single crystal X-ray diffraction, EPR, UV-Visible, and FT-IR spectroscopies, alongside magnetic susceptibility measurements.

The collective results revealed highly distinct structural speciation behaviors across a multitude of metal oxidation states. In such a framework of studies, the incorporation of the lower valent V(III) centers in binary materials bearing coordinated hydroxycarboxylic acids highlighted a synergistic mechanism, vital for modern drug design.

Keywords: Vanadium dinuclear compounds, citric acid, tartaric acid, metallotherapeutics, X-ray crystallography

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P56

L-Carnitine metal-organic compounds in the development of therapeutic metallodrugs

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Abstract

Recent advances in the pharmaceutical sciences have highlighted the growing importance of metal-organic chemistry, pertaining to the synthesis of new hybrid compounds that encompass complex transition metals with biogenic ligands [1]. L-carnitine, a natural occurring amino acid derivative, existing as a zwitterion under physiological conditions, is encountered in the human body, primarily in its free form alongside a small fraction of acyl-carnitine derivatives [2]. It serves as a key regulator of cellular metabolism by transferring long chain fatty acids from the cytosol into the mitochondrial matrix, catalyzing the β -oxidation of fatty acids linked to fuel energy production [3]. In addition to this central metabolic role, L-carnitine promotes carbohydrate handling by enhancing non-oxidative, insulin-stimulated glucose uptake [4]. Beyond its metabolic role, L-carnitine exhibits antioxidant activity by reducing oxidative stress and facilitating detoxification, while also protecting mitochondrial components and enzymes from peroxidative damage by removing harmful esters from the mitochondria [2,5].

In the biological inorganic systems, the essential trace element zinc(II) plays a vital role in stabilizing protein and enzyme structures across human tissues [6]. Beyond structural support, zinc is recognized for its antidiabetic properties, as it contributes to the synthesis, formation, storage, and maintenance of insulin in its hexameric form – a necessary requirement for proper hormonal function and glucose homeostasis [7,8]. Its therapeutic profile also extends to antioxidant behavior, as it inhibits the formation of damaging reactive species, boosts the synthesis of endogenous antioxidants and protects free sulfhydryl groups from oxidation. Consequently, studies have shown that zinc effectively lowers overall cellular oxidative stress [9].

On the basis of the aforementioned grounds, our research focuses on merging these two components into a structurally characterizable family of novel metal-organic compounds. By combining the antioxidant profile of L-carnitine and the antidiabetic benefits of zinc, resulting in a new metal-organic hybrid compound designed to reduce oxidative stress, a better monitoring molecular tool is expected to emerge that enhances glucose regulation and support cellular energy production.

Keywords: Metal-organic compound, zinc, carnitine, synthesis, hybrid materials, biological activity

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P57

Food safety management on the technological flow of obtaining sweet potato and pumpkin cake

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Abstract

This paper investigates the food safety management strategies applied to the technological process of manufacturing sweet potato and pumpkin cake. The aim of the research is to develop an efficient HACCP plan, capable of preventing biological, chemical and physical risks specific to the use of vegetable raw materials. In the first stage, a detailed analysis of the production flow was carried out, identifying critical control points, with a focus on the reception of ingredients and the heat treatment stage. Given the high moisture and sugar content of sweet potato and pumpkin, monitoring water activity and baking parameters becomes essential for the microbiological stability of the finished product. The results of the study indicate that maintaining a constant temperature in the thermal center of the product and strict compliance with hygiene in the cooling and packaging circuit significantly reduce the likelihood of contamination with fungi or sporulated bacteria. Good storage practices are also evaluated to preserve the antioxidant properties offered by the beta-carotene present in the composition.

The conclusions highlight that the implementation of proper safety management not only guarantees consumer health but also optimizes the shelf life of this innovative pastry product. Through rigorous process control, the sweet potato and pumpkin cake can be successfully integrated into wide consumption, representing a safe and valuable nutritional alternative.

Keywords: Critical control points, HACCP plan, biological, chemical and physical risks

P58

Utilization of residual fruit peels as functional ingredients in sustainable food products

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Abstract

This research aims to enhance the value of apple, pear, peach, and apricot peels by transforming them into natural nutritional additives for the modern food industry. The scientific approach is based on the premise that by-products of the fruit processing industry constitute an underutilized source of bioactive substances with therapeutic and technological potential. The methodology involved stabilization through controlled dehydration and grinding of the peels, followed by a rigorous physicochemical characterization of the resulting powders. Laboratory analyses confirmed a remarkable pectin content in apple and pear peels, as well as a high density of polyphenolic compounds and carotenoids in peaches and apricots. The study investigates how these functional ingredients influence the rheology of doughs and the oxidative stability of high-fat products. The results demonstrate that incorporating these plant residues not only increases the intake of insoluble fiber but also acts as a natural preservative, extending the shelf life of foods by inhibiting oxidation processes. From the

perspective of sustainable development, this study proposes a circular economy model that minimizes the environmental impact of organic waste and optimizes production costs for fortified foods. Consequently, fruit peel powders represent a viable solution for clean labeling, providing natural colorants and antioxidants in a bioavailable form. Thus, the research underscores the importance of reintroducing residual biomass into the human food chain in the form of sustainable and innovative food products. This integrated approach simultaneously addresses global challenges regarding food security and environmental protection.

Keywords: Apple, pear, peach, and apricot peels, circular economy, organic waste

P59

Innovative And Functional Ice Cream Formulations. Physicochemical And Nutritional Evaluation

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Abstract

This research primarily aimed to develop innovative ice cream variants by replacing cream (a traditional fat source) with plant-based creams obtained from pine nuts, pumpkin seeds, sunflower seeds, and hazelnuts, in order to improve the nutritional profile and assess the impact on the physicochemical characteristics and sensory potential of the final product. In this context, the study aligns with current trends in the food industry focused on functional products and alternatives to animal-derived ingredients. In terms of materials and methods, blueberry jam and apple jam without added sugar were used, along with cream for the control sample and four types of plant-based raw materials (pine nuts, pumpkin seeds, sunflower seeds, and hazelnuts), processed into creams with an equivalent lipid content (35%) to ensure formulation comparability. Six ice cream variants were developed (one control sample and five experimental samples), obtained through standard technological processes (homogenization, pasteurization, maturation, and freezing). Subsequently, the products were analyzed from a physicochemical perspective, evaluating parameters such as dry matter content, proteins, lipids, ash, acidity, pH, soluble solids, and water activity.

The results highlight significant differences between samples, determined by the type of plant-based ingredient used. In general, the variants containing seeds and nuts exhibited higher dry matter and protein contents compared to the control sample, suggesting a denser texture and superior nutritional value. In particular, the pumpkin seed sample stood out due to its high protein and dry matter values, indicating a favorable balance between stability, creaminess, and nutritional quality.

Moreover, the mineral content (ash) was significantly higher in the plant-based variants, especially in the hazelnut sample, suggesting an increased intake of micronutrients. Acidity and pH values varied among samples, influencing both microbiological stability and sensory profile. Soluble solids were higher in certain variants, contributing to a more pronounced sweetness and a softer texture. Water activity remained relatively constant across samples, indicating overall good microbiological stability.

It can be concluded that replacing cream with plant-based sources is feasible and can lead to products with improved functional properties. However, significant variations exist depending on the raw material used, which implies the need for recipe optimization to balance texture, taste, and stability. Among the tested variants, the pumpkin seed ice cream showed the most promising characteristics,

representing a viable alternative both technologically and nutritionally. The study's limitations include the lack of detailed analytical methods and sensory evaluation, which should be addressed in future research for comprehensive validation.

Keywords: nutritional profiles, plant-based ingredient, sensory properties, sugar-free ice cream

P60

Cherry Tomato Jam – The Surprising Balance of Sweet and Aromatic Flavors

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Abstract

Tomatoes (*Solanum lycopersicum*) are vegetables of high nutritional and functional importance due to their rich content of bioactive compounds such as lycopene, polyphenols, and vitamin C. These compounds contribute to antioxidant activity and potential health benefits, particularly through the reduction of oxidative stress. The content of these substances may vary depending on the degree of ripeness and processing conditions, influencing the nutritional value of derived products.

Cherry tomato jam is an unconventional food product obtained by the slow thermal processing of fruits from *Solanum lycopersicum* var. *cerasiforme* in a concentrated sugar solution, sometimes enriched with natural flavors such as lemon or vanilla. The controlled boiling process allows partial preservation of the fruit structure, resulting in a fine texture and a complex sensory profile characterized by a balance between intense sweetness and the mild acidity typical of tomatoes. This product is notable for its culinary versatility, being suitable both as a dessert and as an accompaniment to fine cheeses or gourmet dishes.

From a biochemical perspective, cherry tomato jam may retain part of these bioactive compounds; however, their concentrations are influenced by the applied heat treatment. Product quality evaluation can be performed through physicochemical, biochemical, and sensory analyses, including determination of pH, moisture content, dry matter, polyphenols, and antioxidant capacity using the DPPH method. Thus, the product represents an innovative way of valorizing tomatoes in functional food development.

Keywords: antioxidant, jam, tomatoes,

P61

Production and Characterization of Yellow Onion Syrup in Different Formulations

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Abstract

The aim of this study is the development and characterization of yellow onion syrup in two formulations, namely a simple formulation and one supplemented with onion skins, a by-product of onion processing. The study evaluates the influence of the technological process on the physicochemical, nutritional, and antioxidant properties of the final product.

The main raw material is yellow onion, processed through hot aqueous extraction, followed by filtration and sugar concentration. In the modified variant, onion skins are added during the boiling stage in order to assess potential differences in composition and antioxidant activity. Several parameters were determined, including moisture content, dry matter, ash content, °Brix value, and antioxidant capacity, allowing a comparative evaluation of the two formulations.

The results indicate that the addition of onion skins slightly affects the product's characteristics without significantly modifying the technological process, confirming the functional potential of onion syrup as a natural food product.

Keywords: onion, syrup, antioxidant capacity, aqueous extraction, onion skins

P62

Quality and Antioxidant Evaluation of Tomato Juice with Plant Extracts

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Abstract

The present study focuses on the development and evaluation of tomato juice assortments flavored with medicinal and aromatic plants, aiming to enhance their functional and sensory properties. Two variants were formulated: tomato juice enriched with mint extract, intended as a refreshing beverage, and tomato juice flavored with thyme extract, designed for culinary applications. The experimental approach included the preparation of samples followed by physicochemical and functional analyses, such as soluble dry matter, total polyphenol content, antioxidant capacity, and pH determination. In addition, sensory evaluation was performed to assess consumer acceptability. The results indicated that the incorporation of plant extracts contributes to an increase in bioactive compounds and antioxidant activity, while maintaining suitable physicochemical characteristics. Differences between variants were observed depending on the type of extract used, influencing both functional properties and sensory perception.

The study demonstrates that the use of medicinal and aromatic plant extracts represents a viable approach for obtaining value-added tomato juice products with improved nutritional quality and consumer appeal.

Keywords: polyphenols; thyme; mint; functional beverages; plant extracts;

P63

Effect of Plant-based Stabilizers on the Quality Characteristics of Yogurt

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Abstract

Research background. Yogurt is a product obtained through a biological method of food preservation (fermentation), or more precisely, through the spontaneous or controlled acidification of milk. The acidification of the product occurs when lactose, the sugar in milk, separates into two simpler components, glucose and galactose, with the production of lactic acid. Plant-based stabilizers have gained significant attention in yogurt manufacturing due to their ability to enhance texture, improve water-holding capacity, and reduce syneresis while meeting consumer demand for clean-label, natural ingredients. Market analyses confirm that plant-based stabilizers dominate globally, representing approximately 58% of stabilizer use in high protein yogurt formulations, driven by consumer preference for natural, vegan friendly additives. This study evaluated the impact of adding three types of plant-derived stabilizers — modified tapioca starch (MTS), pectin (PC), and flax seeds mucilage (FSM) — at a proportion of 0.25% on the physico-chemical, sensory, and rheological properties of yogurt during three week storage period.

Experimental approach. Cow's milk was standardized to 3.2% protein and 3.0% fat, then subjected to a heat treatment of 90 °C for 10 min to ensure whey protein denaturation and improved gel firmness. The milk was cooled to 42 ± 1 °C, after which stabilizers (pectin, starch, gums) were added at concentrations between 0.25% (w/w). The mixtures were homogenized using a magnetic stirrer to ensure complete dispersion of stabilizers. Yogurt starter culture (*Streptococcus thermophilus* and *Lactobacillus delbrueckii* subsp. *bulgaricus*) was added at 2.5% (v/v). The inoculated milk was filled into identical polypropylene cups (diameter 45 mm, height 55 mm), sealed, and incubated at 42 °C until reaching pH 4.6 ± 0.05. A control sample was also obtained, in which the yogurt was produced in the same way described above, but without the use of stabilizers. All samples were stored at 4 °C for 24 h prior to analysis to allow complete gel setting. pH values were analyzed according to AOAC protocol using a pH-meter. The whey separation was determined using the discharge test method. Curd resistance was measured using a Vicat apparatus (Matest, model E055N), originally designed for cement consistency testing, and adapted for dairy applications. The sensory qualities of all treatments were assessed according to the grading table mentioned by Nelson and Trout. Statistical analyses were performed using SPSS statistical software program version 13. Data were expressed as mean ± standard deviation. Differences among treatments were evaluated using one-way ANOVA, followed by Tukey's post-hoc test at a significance level of $p < 0.05$.

Results and Conclusions. During the storage period, pH values of the yoghurt samples were reduced from 4.6 to 4.55, 4.50 and 4.47, respectively. The stabilizers had no effects on other chemical properties such as moisture or fat content. The whey separation (mL/100g) values decreased in control sample from 35.50 to 33.70 mL/100g. Compare to the control, the yogurt samples with stabilizers had

significant decreases in the separated whey volumes. Flax seeds mucilage performed the best, which decreased in whey separation after 3 weeks of storage at 15.40 mL. Curd resistance expressed as penetration depth (mm), varied from 27 mm to 20.5 mm for the control samples, after three weeks of storage. In contrast, for the yogurt samples with added stabilizers, the penetration depth values after in the same storage period, were in the range of 13.7 mm (MTS); 14.40 mm (PC) and 10.1 mm (FSM). As the results showed the pectin-treated yogurt samples were superior in sensory properties compared to all others. In conclusion, a variety of plant- based stabilizers can be used to improve the textural properties of yogurt.

Keywords: modified tapioca starch, pectin, flaxseed mucilage, syneresis, curd resistance

P64

Exploring the Nutritional, Sensorial and Health Benefits of Avocado Cream Cheese

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Abstract

Research background. Cream cheese is a fresh dairy product with growing economic importance in the food industry, having a global market size estimated at approximately 8.3 billion USD by 2026. A mild taste of buttery cream and a slight sour dairy flavor, the total absence of bitterness, together with a creamy texture and a consistency that ranges from fragile to spreadable with a glossy appearance, characterize this acid-coagulated fresh cheese product. Its versatility allows for many different applications throughout the food industry. The cheese provides an adequate matrix to add flavors, fibers, herbs, spices, or fruits. Avocado (*Persea americana* Mill.) is defined as a pear-shaped fruit with a single seed that can be considered compatible in flavor, taste, and texture with cream cheese. Cream cheese-type products with added avocado are not currently available on the market. The aim of this project was to develop a cream cheese incorporated with avocado that can be acceptable in appearance and quality for consumers. The study's specific objectives were to determine the effect of different proportions of cream cheese and avocado puree on physico-chemical characteristics, and to carry out consumer sensory evaluation tests.

Experimental approach. The raw materials and ingredients used in the production of cream cheese in the Dairy Industry Technologies laboratory (Faculty of Food Engineering) were the following: i) homogenized whole cow's milk (Olympus, Braşov) with the following chemical composition containing 3.3% protein, 3.4% fat, and 4.8% carbohydrates; ii) organic concentrated milk (Half & Half, Olympus, Braşov) containing 2.8% protein, 18% fat, and 3.8% carbohydrates; iii) natural sea salt, purchased from a local store specializing in materials for cheesemaking; iv) lyophilized fresh cheese starter culture containing *Lactococcus lactis* subsp. *cremoris*, *Lactococcus lactis* subsp. *lactis*, *Lactococcus lactis* subsp. *lactis* biovar *diacetylactis*, and *Leuconostoc* (FD DVS R-704, Chr. Hansen™) and rennet (CHY-MAX Extra NB powder, 2,235 international milk coagulation units/g). The avocado puree was made from fresh frozen avocado by blending it in a small clean glass bowl using

a hand mixer. The avocado cheese samples were obtained by adding the avocado puree to the cream cheese in different proportions (0, 5, 10, and 15%) and mixing them evenly with the hand mixer. The moisture content of the cream cheese samples was measured using the direct drying method, the protein content was analyzed using the Kjeldahl method, and the fat content was measured using the Rose-Gottlieb method. The soluble nitrogen content was determined according to the method of Kuchroo and Fox (1982) with some modifications. The sensory properties of the cream cheese products were evaluated using quantitative descriptive analysis.

Results and Conclusions The water content, fat, and product yield increased significantly ($P < 0.05$) as the amount of avocado pulp increased, while the protein content showed a significant decrease ($P < 0.05$). The soluble nitrogen content first decreased and then increased, with the lowest values found in AVP10 and AVP15. The amount of avocado pulp significantly influenced the sensory properties of cream cheese products. At the same storage time, the scores for flavor and sour taste increased in the cheese products with avocado pulp compared to the control. In contrast, the cream flavor score decreased and the spreadability score initially increased but decreased in the later stages of storage. In samples with added avocado, the overall score was higher in the samples obtained with the addition of 10% and 15% pulp, respectively. The flavor compounds present in avocado managed to improve the product's flavor profile, resulting in a product with a subtle avocado flavor. The results of this study could expand the use of avocado fruit in cheese products and will provide a theoretical basis for creating cheese varieties adapted to the preferences of Romanian consumers.

Keywords: functional cheese, self life, avocado puree, physico-chemical properties, flavor characteristics

P65

Smart Biotechnology Management for the Production of Innovative Ecological Bakery Products

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Abstract

The experiment aimed to identify organically certified flours, which were used as raw materials in baking biotechnologies. The research used 5 types of organic flours and one standard reference flour. The experimental results focused on the hydration capacity of the organic flours: organic Spelt flour T630 49.85%, organic white flour T650 52.74%, organic Spelt flour 1050 51.12%, organic wholemeal flour 49.28%, organic multigrain flour 54.73%, as well as the standard T650 which had 50.79%, while black flour with seeds had 62.58%. This, correlated with the flour moisture, forms the specific consumption for organic flours. Due to certain costs of 9 lei/kg for organic wholemeal flour, 10 lei/kg for organic multigrain flour, 11-12 lei/kg for Spelt flour T630, T1050, black flour with seeds, and 15 lei/kg for organic white wheat flour T650. For the organic flours Spelta T630 and T650, a higher specific flour consumption is observed compared to the T650 benchmark flour. The specific consumptions were 0.667–0.669 kg of T630, T650 organic flour/kg dough compared to 0.681 kg of T650 flour/kg dough, and for T1050, wholemeal organic/kg dough, the specific consumption was 0.655 kg/kg dough. So that, the cost of bread will be higher, from 2.021 lei/piece to 9.86 lei/piece for 500 g. The reason is the price of organic flour, which is 50% higher than the benchmark T650 flour, and the

cost of the finished product has increased by 79.5%. Thus, green business management will correlate the impact of bioactive compounds in bakery with their beneficial nutritional effects.

Keywords: smart biotechnology and innovative bakery products

P66

Innovation of biscuits made from nutritive-bio flours and biotechnological efficiency of processing

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Abstract

The research work aimed to design and innovate some organic biscuit assortments, from certified organic flours. The experimental results targeted the specific consumption of organic flours: organic Spelt T630 flour, organic white flour T650, organic Spelt 1050 flour, organic whole meal flour, organic multigrain flour. When designing the biscuit assortments, 2 newly created recipes were used. A specific flour consumption between 0.655 -0.667 kg of organic T630, T650 flour/kg of dough was found. It is observed that we have similar specific consumptions. However, processing efficiency was found to be better in the case of biscuits obtained from T650 flour because organic flours are more expensive and implicitly the cost of the raw material will influence the cost of the finished product. Overall, the costs of organic products are higher than the cost of traditional products, which is why the design of technological transfer of innovative products, today, is done at a rate of 8% at the European Union level. The reason being the processing efficiency, measured by flow productivity, production yields, which change depending on the innovative recipes and finally the additional costs brought by organic raw materials. Experimental applied research showed that the three elements of bioeconomy which influence the increase in costs of innovative biscuits by 50% in the case of the recipe for biscuits with corn flakes, up to 70% in the case of biscuit recipes with the addition of almonds and chocolate.

Keywords: bioeconomy of innovative organic biscuits

P67

Influence of Red Pepperoni Addition on the Quality Characteristics of Kashkaval Cheese

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Abstract

This study aims to conduct an analytical and comparative evaluation of a traditional Kashkaval cheese and a Kashkaval cheese flavored with red pepperoni. Two types of Kashkaval cheese were produced under similar technological conditions: a control sample (classic Kashkaval) and an experimental sample with the addition of red pepperoni. The inclusion of pepperoni was intended to enhance the sensory profile and introduce functional compounds such as capsaicinoids and natural antioxidants. From a sensory perspective, the pepperoni-enriched sample demonstrated improved flavor complexity, with a balanced combination of mild lactic taste and moderate spiciness, as well as enhanced visual appeal due to the presence of red inclusions. Comparative analysis indicated that the addition of pepperoni did not negatively affect the texture or structural integrity of the cheese, while contributing positively to aroma and overall acceptability. The study highlights the potential of incorporating natural flavoring agents in Kashkaval cheese to diversify the product range and meet consumer demand for innovative dairy products with distinctive sensory attributes.

Keywords: Kashkaval cheese; pepperoni; flavored cheese; physicochemical analysis; sensory evaluation; comparative study.

P68

Analytical and comparative study applied to different types of cheese-filled sausages

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Abstract

This study aims to lead an analytical and comparative assessment of different types of cheese-filled sausages, with focus on their physicochemical properties and sensory attributes. Characteristics such as moisture, ash content, salt concentration, texture, color, and flavor profile are assessed using specific methods. By comparing these characteristics across multiple samples, the study seeks to identify variations in quality, consistency and consumers acceptability. Three sausage samples with different cheese concentrations (5%, 10% and 20%) were prepared. Each sample was subjected to the smoked process and analyzed compared to the unsmoked samples. Variations in cheese content influenced significantly the texture and flavor, with higher cheese levels contributing to increased juiciness.

Additionally, smoked samples exhibited enhanced aroma and color characteristics compared to non-smoked variants. The study highlights the importance of optimizing these factors to improve product quality and consumers acceptability.

Keywords: cheese-filled sausages; smoked sausages; unsmoked sausages; pressed cheese; cheese concentration.

P69

Identification and monitoring of critical control points for the product "Jebel Pudding Pie"

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Abstract

The present work aims at designing and implementing a food safety plan for the Jebel custard pie, an artisanal pastry product with a high degree of perishability due to the moisture and composition of the cream. The main objective consists of identifying, assessing, and monitoring the Critical Control Points (CCPs) throughout the entire technological flow, from the reception of raw materials to distribution to the final consumer. The hazard analysis highlights two major critical stages: thermal treatment (baking), essential for eliminating pathogenic microorganisms, and post-processing cooling/storage, a vital stage for preventing the proliferation of spores and cross-contamination in the custard filling. The study establishes strict critical limits for temperature and time, proposing a system of continuous monitoring and immediate corrective actions. The research results demonstrate that the rigorous application of HACCP monitoring not only ensures compliance with European safety standards (Regulation EC 852/2004), but also contributes to maintaining the specific sensory quality of the traditional recipe from the Jebel area, providing a model of good practices for small pastry producers with dairy fillings.

P70

Particularities of the product Smoked lard with paprika and garlic from Vâlcea. Obtaining a specifications sheet - Case study

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Abstract

The paper analyzes the certification process and technological particularities of Smoked Lard with Paprika and Garlic from Vâlcea, a product representative of the gastronomic heritage of Oltenia de sub Munte. The case study aims to structure a specification that supports the superior quality of the product, based on three pillars: raw materials sourced from short supply chains, the dry-salting maturation technique (14-21 days), and artisanal finishing with local ingredients.

The central element of the study is demonstrating the causal link between the geographical area and the sensory profile (creamy texture, cold smoke aroma, and the natural antiseptic scent of garden garlic), providing a methodological model for producers seeking official recognition (Traditional Product/PGI) and protecting cultural identity against industrialization processes.

The paper also highlights the strategic role of this product in the rural development of Vâlcea County, demonstrating how the use of local resources (the salt from Ocnele Mari and hardwood) contributes to increasing the added value in small processing units. The study concludes that obtaining certification is not only a legal protection measure but also a territorial marketing tool, capable of supporting regional agritourism by strengthening a prestigious brand, recognized for food safety and the purity of the ingredients used in the ancestral recipe.

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Development of functional support products for confectionery products based on flours with higher protein density

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Abstract

The present, with its impact on the future and shaped by socio-economic „stress” strongly underscores the need to diversify, adapt, and reformulate the food groups commonly found in the diet. This category also encompasses products that are marketed as low in gluten, fat, and carbohydrates, a trend that has been driven by contemporary lifestyles. These considerations and needs formed the basis for the subsequent identification, adaptation, and reformulation of a common food product, which was intended for use as a base for various types of desserts. The target population for this product was identified as those individuals who were at risk of developing cardiovascular and metabolic diseases, as well as autoimmune disorders. An example of the latter would be gluten intolerance (celiac disease), a disorder triggered by the presence of gluten in food, with an adverse reaction in the intestinal lining

resulting in malabsorption of nutrients, which can lead to long-term negative consequences. The combination of these factors with dietary habits has been demonstrated to disrupt the body's physiological systems, potentially contributing to the onset and development of chronic degenerative conditions that place a significant burden on healthcare systems. One potential solution to this problem is the partial or total substitution of one or more ingredients high in gluten, fats, or carbohydrates with alternatives that keep the product within the consumer's acceptable range. Typically, wheat flour is the preferred choice for this purpose. The proposed study involves the replacement of a proportion of the wheat flour with three distinct gluten-free flours, namely rye, flax, and chickpea, which are characterised by elevated protein density. This approach aims to identify a technological equilibrium by assessing specific behavioural characteristics. Subsequently, a sensory analysis is conducted to evaluate the acceptability of the *newly adapted base*, with the constraints imposed by the characteristics of the raw materials employed in the production process. These characteristics contribute to the structure of the final product.

Keywords: gluten-free support, behavioral skills, consumer acceptance, nutritional value.

P72

Low-Glycemic Ice Cream Enriched with Wild *Prunus spinosa* Fruit Powder

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Abstract

Diabetes currently affects approximately 10.5% of the adult population (ages 20–79), and estimates indicate an increase to 12.2% by 2045. The development of functional foods with antidiabetic and antioxidant potential, based on the use of wild fruits and low glycemic index sweeteners, may contribute to the prevention of this condition.

The present study aimed to characterize the polyphenolic profile of wild *Prunus spinosa* fruit powder, to evaluate its antidiabetic potential, and to incorporate it into an ice cream formulation.

The analysis revealed the presence of 17 phenolic compounds, with catechin (122.38 ± 0.53 $\mu\text{g/mL}$), epicatechin (6.59 ± 0.32 $\mu\text{g/mL}$), and chlorogenic acid (11.12 ± 0.90 $\mu\text{g/mL}$) as the predominant constituents. α -amylase inhibitory activity was observed at a concentration of 6.59 ± 0.01 mg extract/mL (IC_{50}), while *in silico* analysis suggested a possible competitive inhibition mechanism.

Principal component analysis showed that the first two components explain 87.8% of the variation in the color parameters, polyphenolic profile, and antioxidant activity of the ice cream formulated using different proportions of powder (2% and 6%), cream (10% and 30%), and xylitol (3.5%).

The results support the development of a functional ice cream using wild *Prunus spinosa* powder as a natural alternative to synthetic colorants, providing antioxidant properties and potential antidiabetic effects. Moreover, the substitution of sugar with xylitol represents a viable strategy for the formulation of products intended for people with diabetes.

Keywords: diabetes, antioxidant, functional food, α -amylase

P73

Histological and immunohistochemical assessment of two methanolic 2% *G. glabra* L. hydrogel formulation

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Abstract

Traditional herbal medicine has served as the foundation for many modern plant-based treatments. However, to safely assess the new drug, several key steps must be taken. This study evaluates the dose-dependent cytocompatibility and molecular expression of two *Glycyrrhiza glabra* L. topical gel (2%) formulations (S1 and S2) on human keratinocytes. HaCaT cytoblocks were treated with concentrations ranging from 25 to 200 µg/mL and analysed via Hematoxylin and Eosin (HE) staining and immunohistochemistry (IHC) for CD44, VEGF, and Caspase-3. Histological analysis of S1 revealed viable aggregates with preserved nucleocytoplasmic ratios at 25–100 µg/mL, whereas 200 µg/mL induced distinct cytoplasmic eosinophilia, signalling intracellular acidification and the onset of apoptosis. In contrast, S2 demonstrated a superior safety profile; although eosinophilia was observed at 200 µg/mL, cellular integrity remained sufficient for complete IHC profiling. Regarding molecular markers, CD44 membrane intensity was higher at lower concentrations in both groups, but S1 showed a significant loss of intensity and adhesion at the highest dose, whereas S2 maintained relatively intense expression. Notably, both formulations induced minimal-to-low VEGF expression across all concentrations. In non-stimulated keratinocytes, this profile confirms that the formulations do not trigger pro-angiogenic signalling, corroborating the anti-angiogenic potential previously observed in the CAM assays. Caspase-3 expression was absent at lower doses but became detectable at 100 µg/mL, correlating with the morphological shifts toward controlled apoptotic turnover seen in HE staining. Overall, S2 exhibits higher cytocompatibility and a broader therapeutic window, making it a promising candidate for managing inflammatory dermatoses without compromising epidermal barrier or vascular homeostasis.

Keywords: *Glycyrrhiza glabra*, cytocompatibility, CD44, VEGF, HaCaT

P74

3D-printed composite scaffolds with optimized surface topography and bioactive coatings for improved cell adhesion and osteogenesis

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Abstract

Bone tissue represents the second most frequently transplanted tissue, posing a significant challenge for regenerative medicine due to the clinical drawbacks of current grafting standards [1]. The field of Biotechnology is capable of addressing these challenges through the development of biomimicking scaffolds that act not only as mechanical support but also as biointeractive systems, able to simulate the cellular microenvironment. Central to this evolution is 3D printing technology, which enables the fabrication of customized, porous architectures that replicate the hierarchical complexity of human bone [2].

Cognizant of the significance of relevant biotechnology in biomedical engineering, the herein undertaken investigation has been carried out on the biotechnological potential of 3D-printed composite scaffolds, incorporating biocompatible polymers and inorganic agents, such as hydroxyapatite (HA), which effectively mimic the native mineral composition of bone tissue. Recognizing that the biological efficacy of an implant is mostly based on the cell-material interface, a bimodal surface engineering strategy was adopted. Initial chemical modification was performed to optimize surface topography and roughness at the micro-scale, followed by the application of a bioactive coating, consisting of bioactive molecules. This modification aims to trigger biological signals that promote cell adhesion and osteogenic differentiation [3].

The aforementioned directives were pursued experimentally to afford the corresponding materials-scaffolds. In that respect, the integration of additive manufacturing with advanced surface modification represents a promising biotechnological approach for bone tissue engineering. Characterization through high-resolution imaging, biological assays and physicochemical analysis confirms that the combination of tailored nanoroughness and bioactive interfaces significantly enhances the osteogenic capacity of the scaffold. These collective findings highlight the importance of surface-interfered biological responses in the design of future implants.

Keywords: Biomaterials, 3D printing, biomimicry, scaffolds, cell-growth, tissue engineering

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P75

Comparative Evaluation Of *Prunus* Fruit Flours As Partial Substitutes For Wheat Flour In Bakery Products

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Abstract

It is currently well known that the addition of fruit to bakery products is important because it improves nutritional value by providing fiber, vitamins, and bioactive compounds, while also contributing to diversifying the taste, colour, and functional properties of the final products. This study comparatively evaluated six types of flour obtained from fruits belonging to the genus *Prunus* (plums, sour cherries, sweet cherries, apricots, peaches, and nectarines), with the aim of determining their potential as substitutes for wheat flour in bakery products. Physicochemical analyses were conducted to characterize the properties of each type of flour.

The results highlighted significant differences among the samples in terms of moisture, protein, lipid, ash, and carbohydrate content. Plum and sour cherry flours showed a higher content of fiber and bioactive compounds, which gives them increased antioxidant potential. In contrast, apricot and peach flours had higher levels of natural sugars, influencing the taste and colour of the final products. Technological properties varied among the types, indicating the need to adjust recipes when they are used as partial substitutes for wheat flour. Additionally, the lack of gluten in these flours affects the structure and texture of bakery products, limiting their use in high proportions. In conclusion, flours derived from *Prunus* fruits show promising potential for the development of functional bakery products; however, their optimal use requires combining them with wheat flour or other structuring agents to ensure appropriate technological properties.”

Keywords: bakery products, bioactive compounds, functional and technological properties

P76

Spent coffee ground as a natural source of antioxidant compounds: a mechanistic approach towards valorization

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Abstract

Coffee post-consumption results each year in the production of millions of tons of spent coffee ground (SCG), a waste material currently recognized as a valuable source of various unextracted bioactive compounds, with beneficial properties for human health, among which the antioxidant effect. Several mechanisms have been reported in the literature as underlying the antioxidant effect of phenols and diterpenes, such as: metal chelation, free radical scavenging and neutralization, upregulation of several antioxidant enzymes, and inhibition of pro-oxidant enzymes. With respect to the last effect, a couple of bioactive compounds from SCG have been reported to inhibit monoamine oxidase (MAO), a mitochondrial enzyme with two isoforms, MAO-A and B, in experimental settings (cell lines and animal models) with subsequent neuroprotective effects. While MAO inhibition has demonstrated unequivocal cardiovascular protection in both animal models and *ex vivo* analysed human samples, there are no studies in the literature that addressed the capability SCG compounds to interact with MAO in the cardiovascular tissues. The doctoral study is purported to: i) provide a comprehensive characterization of the SCG bioactive compounds using high-performance liquid chromatography tandem mass spectrometry (HPLC/MS), ii) assess the antioxidant effects of the individual phenolic compounds (chlorogenic and caffeic acids) and diterpenes (cafestol and kahweol), as well as means to enhance their antioxidant properties, and iii) investigate the capability of SCG- extracted compounds to modulate *in vitro* the MAO-related oxidative stress in human vascular and cardiac samples harvested from patients with indication of revascularization and cardiac surgery. MAO inhibition could represent a novel mechanism by which SCG compounds exert cardiovascular benefits.

Keywords: spent coffee ground; bioactive components; phenolic compounds; diterpenes; HPLC/MS; antioxidant effect; monoamine oxidase; cardiac and vascular human samples

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Benefits of essential oils as natural antimicrobial agents in food processing

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Abstract

The growing concern regarding synthetic additives has accelerated the search for plant-derived alternatives in food processing. Essential oils from aromatic plants like oregano, thyme, and rosemary offer significant advantages due to their complex bioactive profiles. These natural extracts function as potent antimicrobial agents capable of inhibiting major foodborne pathogens, including *Listeria monocytogenes*, *Salmonella*, and *Escherichia coli*. Their hydrophobic properties facilitate the disruption of bacterial cell membranes and the leakage of intracellular components, ensuring enhanced safety in dairy, meat, and fresh produce. Beyond pathogen inhibition, these oils provide secondary antioxidant benefits that preserve the nutritional and sensory characteristics of the food matrix. Technical advancements, such as nanoencapsulation, further optimize these benefits by protecting volatile components and ensuring uniform distribution. Integrating these botanical resources into modern food production represents an effective, sustainable strategy that prioritizes consumer health by utilizing broad-spectrum natural resources without compromising the chemical or physical integrity of the final

products.

Keywords: bioactive compounds, food safety, natural preservatives, plant extract, technological innovation

P78

Assessment of Nitrite Levels in Fruits, Vegetables, and Herbs from Different Agricultural Sources

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Abstract

In the present study, the nitrite content in plant-derived products (fruits, vegetables, and leafy greens) purchased from a supermarket and an agricultural market during the spring season was investigated, considering the frequent use of nitrogen-based fertilizers in agriculture and their accumulation in plants, which increases their toxic potential [1]. Nitrites exert significant biological effects, including the induction of methemoglobinemia, inhibition of mitochondrial respiration and oxidative phosphorylation, reduction of protein and lipid absorption, depletion of hepatic vitamin A reserves, decreased tissue levels of folic acid, thiamine, and pyridoxine, as well as the formation of carcinogenic nitrosamines [2]. The analysis was performed spectrophotometrically using the Peter–Griess reagent, based on the formation of a pink-colored compound in the presence of nitrite ions [3]. A variety of samples were analyzed: fruits from perennial plants (cherries), fruits grown on or near the soil (strawberries), root vegetables (potato, red beetroot, celery, carrot), leafy vegetables (lettuce, spinach), salad vegetables (tomato, bell pepper, cucumber), and herbs (parsley, lovage, dill, red sorrel, and sorrel), assuming the origin declared by producers. The results revealed the highest nitrite concentrations in parsley, in contrast to other herbs from the same producer, which showed nearly negligible values, suggesting a higher capacity for accumulation or in situ synthesis of nitrogen compounds. High concentrations were also observed in beetroot and carrot, indicating enhanced uptake in root vegetables due to direct soil contact, with the exception of celery and especially potato, which exhibited low levels. Elevated values were also recorded in strawberries, suggesting fertilizer application and possible contamination through soil contact, although one variety showed low concentrations, reflecting different agricultural practices. Furthermore, some vegetables grown under controlled conditions (bell pepper, lettuce, spinach) exhibited high nitrite levels, whereas others (cucumber, tomato) showed very low concentrations, indicating more environmentally friendly cultivation conditions. In all analyzed samples, nitrite concentrations were lower than the maximum levels established for drinking water [4], highlighting the influence of plant type and agricultural practices on contamination levels.

Keywords: plant-derived foods; Griess method; agricultural practices; contamination; fertilizers

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P79

Incorporation of amla powder (*Phyllanthus EMBLICA*) in wheat bread: effects on technological quality, nutritional value and antioxidant capacity

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Abstract

The growing consumer demand for functional foods has stimulated the development of bakery products enriched with natural sources of bioactive compounds. The fruits of *Phyllanthus emblica* (amla) are recognized for their high content of vitamin C, polyphenols, and hydrolysable tannins, which contribute to their strong antioxidant potential. In this context, the present study investigated the potential use of amla powder (AP) as a functional ingredient in wheat bread and evaluated its effects on technological quality, nutritional value, and antioxidant properties. Wheat flour was partially substituted with AP at levels of 0.25%, 0.5%, and 1% (w/w). Standard analytical methods were used to determine proximate composition, physical quality parameters, sensory characteristics, total phenolic content (TPC), and antioxidant capacity (AC) of the bread samples. The results demonstrated that the incorporation of AP improved the nutritional and antioxidant profile of the bread, as indicated by increased phenolic compounds and antioxidant capacity. A slight increase in dietary fiber and ash content was also observed, reflecting the contribution of amla powder to the nutritional profile of the enriched samples. Total phenolic content increased from 32.09 mg GAE/100 g in the control bread to 75.12 mg GAE/100 g in the enriched samples, while antioxidant capacity increased from 7.20 to 10.24 mmol TEAC/100 g. From a technological perspective, the addition of 0.25% AP slightly improved loaf volume, porosity and elasticity, while the 0.5% substitution level maintained values comparable to the control sample. At the highest addition level (1%), a slight decrease in these physical quality parameters was observed. Sensory analysis indicated that bread samples with up to 0.5% AP maintained good overall acceptability. Overall, the results indicate that amla powder can be successfully incorporated into wheat bread as a natural functional ingredient, contributing to the development of bakery products with improved nutritional and antioxidant properties while maintaining acceptable technological characteristics.

Keywords: amla powder, wheat bread fortification, bioactive compounds, functional food.

P80

Functional enrichment of wheat bread with chestnut flour and amla powder: effects on physicochemical, nutritional and antioxidant properties

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Abstract

The increasing demand for functional foods has encouraged the development of bakery products enriched with natural ingredients rich in bioactive compounds. Chestnut flour (CF) is a valuable source of complex carbohydrates, dietary fiber and minerals, while amla powder (AP) is recognized for its high content of vitamin C, polyphenols and hydrolysable tannins, which contribute to its strong antioxidant potential. Their complementary nutritional profiles make them suitable for the functional enrichment of wheat bread. The aim of this study was to evaluate the effect of partial substitution of wheat flour (WF) with CF and AP on the physicochemical, nutritional, sensory and antioxidant properties of bread. WF was partially replaced at 0%, 5%, 10%, and 15% (w/w), corresponding to CF and AP additions of 4.75% + 0.25%, 9.5% + 0.5%, and 14% + 1%, respectively. Standard analytical methods were used to determine proximate composition, physical quality parameters, sensory characteristics, total phenolic content (TPC), and antioxidant capacity (AC) of the bread samples. The results indicated that the incorporation of CF and AP improved both the nutritional and functional profile of the bread. A gradual increase in dietary fiber, ash and fat content was observed with increasing substitution level, reflecting the compositional profile of chestnut flour and amla powder. A slight decrease in energy value was also noted (from 246.24 to 240.43 kcal/100g), a characteristic that may be considered beneficial in the context of functional food development. Total phenolic content increased from 32.22 mg GAE/100 g in the control bread to 86.40 mg GAE/100 g in the enriched samples, while antioxidant capacity increased from 7.44 to 13.20 mmol TEAC/100 g. The increase in antioxidant capacity was associated with the combined contribution of phenolic compounds from CF and AP, even at low levels of amla incorporation. From a physical perspective, the 9.5% CF + 0.5% AP formulation maintained loaf volume, porosity, elasticity and height-to-diameter ratio within acceptable quality limits, while higher substitution levels led to a slight reduction in loaf volume. Sensory analysis revealed that enriched bread exhibited a darker crumb color and a slightly acidic and mildly astringent taste due to amla, while samples containing up to 10% total substitution were considered acceptable. In conclusion, the combined use of chestnut flour and amla powder represents an effective strategy for the development of functional wheat bread with improved nutritional and antioxidant properties. A substitution level of 10% provides an optimal balance between enhanced functional value and acceptable physical and sensory characteristics.

Keywords: *chestnut flour, amla powder, functional bread, antioxidant capacity.*

P81

Obtaining and evaluating the quality of the pork sausages with vegetable oils additions

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Abstract

The aim of this work was to obtain, in the household, the ordinary and with vegetable oils additions pork sausages and to evaluate their sensory and nutritional characteristics. Cooked sausages are traditional meat products, mainly elaborate with pork lean and fat, salt, garlic, sugar, nitrite, and different spices [1]. However, fat and/or cholesterol content are major concerns in processed meat products [2], and many consumers are aware of the health risks due to high intake of animal fat. The increasing concerns for healthier meat products have given rise to the reformulation of this type of products [3]. This means a change in favor of unsaturated fats, increasing the intake of polyunsaturated fatty acids, especially n-3 fatty acids at the expense of n-6. Olive oil is characterized by low saturated fatty acid content (< 23%) and high unsaturated fatty acids in its composition (> 71%), oleic being the major fatty acid (> 63%) [4]. This fatty acid has beneficial properties for human health, associated with reducing the risk of cardiovascular diseases. In addition, the presence in its composition of important amounts of tocopherols, especially α -tocopherol, and polyphenols makes it a perfect substitute for animal fat in meat products, even improving their shelf-life [5].

Three types of homemade sausages were obtained: traditional (THmS), with soybean oil (SHmS), and with olive oil (OHmS). Vegetable oils replaced 5% of the amount of meat in the recipe. In order to estimate the quality, the samples obtained were evaluated from a sensory and nutritional point of view. The results of sensory evaluation shown small differences between the three analysed products, the variation range being between 4.67 and 4.33 points from five. The best result (4.67 points from five) has noticed for THmS, followed by SHmS with 4.43 points from five and OHmS (4.33 points from 5). The nutrient content of the samples varies within fairly wide limits. Sausages with soybean oil have the lowest values, for all the characteristics analyzed. Thus, SU (51.6%) is lower by 1.6 percentage points compared to those with olive oil (53.2%), respectively by 20 percentage points compared to traditional sausages. In the case of fats, the range of variation is between 31.3% in sausages with soybean oil and 39.3% in traditional ones. Sausages with olive oil have a fat content of 32.0%. The protein content of the samples ranges from 15.3% in soybean oil sausages to 25.3% in traditional sausages. Sausages with olive oil occupy an intermediate position, having 15.7% protein, but being much closer to those with soybean oil. The highest content of mineral substances is obtained for traditional sausages (5.1%), followed by those with olive oil (3.9%) and those with soybean oil (3.6%).

Traditional homemade sausages were more appreciated, compared to those with the addition of soybean oil and olive oil, as evidenced by the very high average (4.66) obtained at the sensory assessment. However, it is worth mentioning the intake of unsaturated fatty acids, beneficial for the body, brought by replacing part of animal fats, fats that can be harmful.

Keywords: health, fat replacement, olive, soybean, nutrition

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The comparative study of cakes' quality: raw vegan vs. ordinary cakes

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Abstract

The aim of this work was to obtain, in the household, raw vegan cakes and to evaluate a series of sensory and nutritional characteristics, compared to the usual cakes bought from confectioneries.

Vegetarianism in its different forms has become popular in recent years. These forms include vegans, who have the strictest dietary exclusions, omitting any animal-source foods and their by-products from the diet. The raw vegan diet is a diet based on vegetables, fruit, nuts and seeds, legumes, and sprouted grains, in which at least 75% of the food a person eats is not cooked or the temperature has never reached above 47°C [1]. The vegan diet is mainly associated with religious and ethical beliefs, environmental concerns, cultural and social values, as well as potential health benefits [2]. Such health benefits have been suggested to include, among others, a lower incidence of non-communicable diseases (NCD), such as colon cancer, type 2 diabetes mellitus (DMT2), as well as obesity, non-alcoholic fatty liver disease (NAFLD) and cardiovascular diseases (CVD) [3, 4]. On the other hand, other studies suggested that subjects following this type of diet are more likely to show deficiencies in macro- as well as micronutrients and there is debate on whether a vegan diet should be supplemented with various nutrients, including iron, zinc, iodine, selenium, calcium, long-chain n-3-fatty acids, vitamin B12, vitamin D and vitamin B2 [5, 6]. Dimitra et. al., 2021 [1] have shown that vegan diets are lower in protein intake compared with all other diet types. Veganism is also associated with low intake of

vitamins B2, Niacin (B3), B12, D, iodine, zinc, calcium, potassium, selenium. Vitamin B12 intake among vegans is significantly lower (0.24e0.49 mg, recommendations are 2.4 mg) and calcium intake in the majority of vegans was below recommendations (750 mg/d).

The obtained samples were evaluated from a sensory and nutritional point of view. Analysing the nutritional value of raw vegan cake compared to fruit and whipped cream cakes, large differences were obtained for the analysed characteristics, respectively +34.78% for dry matter, +71.88% for protein, +56.73 for fat content and +45.95 for total mineral substances. Moreover, it should be mentioned the lack of sugar in the vegan cake recipe and the use of vegetal fat that are potentially beneficial for health.

Keywords: Health, raw vegan, fruit, nutritive

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P83

Comparative analysis of fatty acid composition: *urtica dioica* and *lamium purpureum*

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Abstract

Fatty acids are naturally present in plant lipids and are vital for the proper growth and development of plants. In medicinal plants, their role goes beyond providing structural support, as they are also connected to various biological functions, nutritional value, and potential benefits for human health. Their profile is not constant and may vary depending on factors such as the plant part studied, the stage of development, environmental conditions, and the extraction techniques applied.

The aim of this study was to comparatively examine the fatty acid composition of *Urtica dioica* and *Lamium purpureum* based on data reported in the scientific literature. Particular attention was given to identifying the main saturated and unsaturated fatty acids and to highlighting differences in their relative proportions.

Urtica dioica is characterized by a higher content of polyunsaturated fatty acids, especially linoleic and α -linolenic acids, whereas *Lamium purpureum* tends to present a comparatively higher proportion of saturated fatty acids. These variations may reflect species-specific metabolic traits as well as differences in environmental and methodological conditions reported across studies.

The results emphasize the nutritional and biological relevance of fatty acids in these two species and support their potential value as natural sources of bioactive compounds with possible applications in nutrition and phytotherapy. Moreover, these results may serve as a basis for future research focused on the valorization of these plants in functional foods and therapeutic applications.

Keywords: phytochemistry, lipid profile, bioactive compounds, chemical variability, plant metabolism.

P84

Eco senolytics: replacing exotic bioactives with local antioxidant resources

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Abstract

The accumulation of senescent cells and their associated secretory phenotype (SASP) is a key contributor to cellular dysfunction and biological aging. In search of natural anti-aging solutions, the mango fruit (*Mangifera indica*) has been noted for its rich bioactive profile, particularly its high content of mangiferin. This xanthone, abundant mainly in the peel and kernel, has demonstrated the ability to selectively induce apoptosis in senescent cells. However, the environmental impact generated by the import of exotic fruits highlights the need to identify sustainable, locally available alternatives.

The aim of this paper is to evaluate the benefits and functional applications of mangiferin, with a focus on the efficiency of green extraction methods such as ultrasound-assisted extraction and the use of deep eutectic solvents. Furthermore, the study seeks to identify edible wild plants that contain polyphenols with senolytic effects comparable to those of mangiferin, such as fisetin and quercetin, commonly found in wild berries and widely distributed herbs.

By applying the same principles of eco-friendly extraction, the paper demonstrates that local plant resources can provide nutraceutical and anti-aging solutions with comparable efficacy, yet with a significantly reduced environmental footprint. These findings support the integration of circular economy principles into food biotechnology and promote the development of sustainable functional ingredients.

Keywords: mangiferin, senolytics, wild plants, polyphenols, circular bioeconomy

P85

Chemical-biological profiling of Ti(IV) metal-organic compounds with chrysin in human (patho)physiologies

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Abstract

Over the past seven decades, transition metal-based complexes have been used as treatment agents in the administration and therapy of different forms of cancer. Severe side-effects, however, associated with the administration of the employed metallodrugs have since long burdened (limited) the use of specific metallocomplexes exhibiting therapeutic potential [1]. To that end, there is an urgent need for developing alternative drug that are atoxic, soluble and bioavailable, and target specific. The idea rests on their ability to exhibit fewer side-effects and higher selectivity and specificity in antitumor or antidiabetic activity [2].

Poised to pursue work in the specific field, we launched research in our Lab, focusing on the development of Ti(IV) metal ionic complexes that resist hydrolysis or afford hydrolysis products that can be defined physicochemically, thus linking the actual species with the biological function, starting from titanium dioxide. The challenge in this specific research has been the employment of the flavonoid chrysin as natural product with distinct antioxidant, anti-inflammatory, and anti-cancer properties.

Titanium(IV)-flavonoid systems have been investigated synthetically in aqueous media, employing chrysin in binary systems as well as ternary systems with 1,10-phenanthroline as an auxiliary ternary aromatic chelator. The emerging crystalline materials have been fully characterized in the solid-state and in solution through elemental analysis, Fourier Transform Infrared spectroscopy (FT-IR), Nuclear Magnetic Resonance (¹H, ¹³C NMR), and Electron Spray Ionization Mass Spectrometry (ESI-MS). Finally, their 3D structure was determined through single crystal X-ray crystallography. Subsequently, their luminescence properties were investigated in the solid-state. The well-defined and well-characterized compounds have been further employed in in vitro testing for the delineation of their anti-inflammatory and antibacterial properties. The collective experimental results formulate a well-defined physicochemical profile on the hybrid Ti(IV)-flavonoid species, with enhanced anti-inflammatory properties, concurrent exhibiting antibacterial properties against Gram(+) and Gram(-) bacteria. The collective experimental results formulate a distinct biological profile in cancer cell lines (lung and breast), thus setting the basis for their potential use in future therapeutics.

Keywords: Titanium, natural product flavonoids, synthesis of metal-organic materials, antimicrobial, anti-inflammatory, antioxidant properties

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Orange-fleshed sweet potato (ofsp): mineral composition and potential for food fortification

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Abstract

This study evaluated the mineral composition of OFSP and its contribution to dietary mineral intake, highlighting its potential as a functional ingredient for food fortification. Sodium (Na), potassium (K), calcium (Ca), magnesium (Mg), iron (Fe), manganese (Mn), zinc (Zn), and copper (Cu) concentrations were analyzed in OFSP samples from local retail markets. Results, expressed on a dry matter basis, showed a balanced distribution of macro- and microelements. Potassium was predominant (768–1422 mg/100 g), confirming OFSP as a key source of electrolytes for fluid balance and muscle function. Calcium (68.6–130 mg/100 g) and magnesium (57.8–91.7 mg/100 g) support bone health and metabolic enzyme activity. Iron (3.86–9.07 mg/100 g) and zinc (2.11–5.02 mg/100 g) contribute to erythropoiesis, immune function, and enzymatic processes, while manganese (1.05–3.76 mg/100 g) is essential for antioxidant mechanisms and connective tissue formation. Copper (0.87–1.61 mg/100 g) and sodium (45.8–71.3 mg/100 g) provide additional physiological support. Estimated intake from typical consumption demonstrates that OFSP can significantly contribute to essential mineral intake. In conclusion, OFSP is a valuable plant-based source of essential minerals, supporting its use as a natural functional ingredient in mineral-fortified foods.

Keywords: orange-fleshed sweet potato (OFSP); mineral composition; dietary intake; food fortification; functional ingredient

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Nutritional variability of figs assessed by pca and hierarchical clustering

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Abstract

Figs (*Ficus carica* L.) are recognized globally for their high nutritional value, including essential minerals, dietary fibers, and carbohydrates. However, the chemical composition can vary significantly depending on the source and processing standards of different providers. The aim of this study was to evaluate and differentiate the nutritional profiles of figs obtained from five distinct providers based on six key parameters: moisture, proteins, fats, fibers, minerals, and carbohydrates. To achieve a comprehensive understanding of the data, multivariate statistical techniques were employed. Principal Component Analysis (PCA) was used to reduce dimensionality and identify the primary variables driving the differences between providers. Hierarchical Cluster Analysis was subsequently performed to group providers based on nutritional similarities, ensuring a robust classification of the samples. Preliminary findings indicate significant variability across the providers. For instance, Provider 5 exhibited the highest fiber content (12.10%) and fat levels (1.25%), while Provider 4 showed the lowest moisture content (19.68%), suggesting a different drying degree or shelf-life potential. The PCA effectively mapped the nutritional landscape, highlighting how specific components like carbohydrates and moisture inversely correlate in defining the samples' characteristics. The integration of PCA and Cluster Analysis proved to be a powerful tool for the quality standardization and nutritional characterization of figs. These results provide valuable insights for both consumers and food industry partners in selecting sources that meet specific nutritional requirements.

Keywords: *Ficus carica* L., Multivariate analysis, PCA, cluster analysis, nutritional composition, quality control.

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