



**INTERNATIONAL SCIENTIFIC SYMPOSIUM “Young
Researchers and Scientific Research in Life Sciences” for
Bachelor, Master and Ph.D. Students
13-14 November 2025 Timisoara**



**INTERNATIONAL SCIENTIFIC SYMPOSIUM
Young Researchers and Scientific Research in Life
Sciences for
Bachelor, Master and Ph.D. Students
*Section: Food Chemistry, Engineering & Technology***

BOOK OF ABSTRACT

2025

ISSN: 2821 – 4307
ISSN – L: 2821 – 4307



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ORAL PRESENTATION

OP1

**Analytical Chemistry for Public Health: Assessment of the Impact of Food
Cooking on the Fate of Chemical Contaminants,**

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Current approaches typically used in chemical risk assessment related to food consumption rely almost exclusively on the information retrieved based on the composition of the raw food items. However, various cooking procedures may influence the chemistry of the contaminants, including potentially toxic trace elements (PTTEs), as well as the nutritional quality of food. Actually, the assessment of the impact of food cooking on the fate of both toxic and essential inorganic chemical species is scarcely carried out and knowledge in this field is lacking.

The present study aims to contribute to a better understanding of the impact of the on the fate of potentially toxic trace elements such as Pb, Cd, Hg, As, Cr, Al, Sb, Mn, Co and Ni and the speciation analysis of As and Hg (in both cases, inorganic and organic species will be studied) in food. For this purpose, various food matrices of vegetable origin (lentils, rice) and animal origin (beef steak, beef liver, salmon and swordfish) were subjected to different domestic cooking methods depending on their type (these included e.g. boiling, steaming, deep-frying, and oven baking). Then, raw and cooked samples were analysed in parallel to evaluate the impact of the cooking procedure on the concentrations of different TE (potential losses, transformations, or enrichments).



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In order to accurately assess the impact of food cooking on the risk/benefit balance, the variation in levels of the most important nutrients, such as P, S, I, Na, K, Ca, Mg, Se, Fe, Mo, Cu and Zn were also investigated. The analytical approach was based on the quantification of total levels of 22 elements by ICP-MS and speciation analysis of As and Hg by HPLC-ICP-MS.

Preliminary results in terms of lentils and rice cooking impact showed limited changes in total concentrations for most elements. A slight increase in chromium was observed in lentils, while the levels of other elements remained stable. In rice, reductions were noted for several elements, with inorganic arsenic decreasing, consistent with existing literature.

Keywords: food cooking, toxic trace elements, speciation analysis of arsenic and mercury

OP2

**Therapeutic evaluation of standardized aronia extracts
through the prism of the inorganic element determination**

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One of the most worrying aspects of global health is cardiovascular disease (CVD), the cause of mortality of one third on a global scale, and more than half of those reported in Romania [1,2]. Modifiable behavioral factors, such as poor diet, inactivity, alcohol intake, and tobacco use, are linked to a significant percentage of these outcomes. Vascular homeostasis and blood pressure regulation are critically dependent on the vascular endothelium. One of the main causes of hypertension and other cardiovascular diseases (CVDs) is premature endothelium aging, which is brought on by cardiovascular risk factors. Therefore, the main recommendation for the prevention and management of CVDs and metabolic disorders before considering medical treatments is to address modifiable risk factors.

Phytotherapy has garnered more clinical and scientific interest in recent years. Herbal remedies are frequently thought of as safer, less expensive, and more nutrient-dense substitutes for traditional therapies. Berries have become well-known among plant-based goods because of their low calorie content and strong antioxidant, vitamin, and mineral content. These plants' characteristic blue, red, and purple coloring results from high concentrations of anthocyanins, a subclass of polyphenols that has drawn a lot of interest because of its established promise as a nutraceutical. [3].

For a long time, the black chokeberry has been used for both medicinal and nutritional purposes. It has been added to functional foods, drinks, natural preservatives, colorants, and products for metabolic or cardiovascular health. The inorganic element composition of three standardized Aronia extracts—frozen berries (FrozArs), dried berries (DryArs), and evaporated juice (EvArJ)—is being reported for the first time in this work. Numerous elements, including aluminum (Al), cadmium (Cd), chromium (Cr), copper (Cu), iron (Fe), manganese (Mn), and zinc (Zn), were found to be present in detectable amounts by elemental analysis. Iron was the most common element, especially in juice (597.665 $\mu\text{g/g}$), while cadmium was found in trace amounts (0.026 $\mu\text{g/g}$ in FrozArs).

Moreover, all three extracts have shown antiproliferative properties over the investigated dose range (1–10 $\mu\text{g/mL}$) in biological experiments using human pulmonary artery endothelial cells (HPAECs).

These results highlight the elemental composition and bioactive properties of



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aronia extracts, highlighting their possible significance for vascular health and recommending more research into their potential use as dietary supplements with therapeutic or preventive effects in cardiovascular settings.

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OP3

Quality and authenticity of saffron and sensory aspects

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Saffron possesses a valuable composition of chemicals and distinct sensory properties. This review examines the chemical composition, sensory qualities, and the importance of detecting adulteration within saffron. Recent studies have shown that saffron contains several bioactive substances, such



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as safranal, picrocrocin, and crocin; these constituents offer various health benefits due to their antioxidant, neuroprotective, and anti-inflammatory effects. The spice's colour comes from water-soluble apocarotenoids, namely the crocin and crocetin sugar esters, which confer the food yellow hues. Picrocrocin is a monoterpene glucoside responsible for the bitter taste of this spice. On the other hand, safranal is the volatile component that gives the spice's aroma. The food industry values saffron's flavour and vivid colour, often using it to make high-end products and functional foods.

Based on minimal quality requirements, the International Organization for Standardization (ISO) has developed a system for classifying saffron in merchandise categories. However, there have been concerns about the accuracy of the results obtained through ISO methods. Because of this, research has been conducted to determine saffron's safranal and crocin levels using the ISO methods compared to other methods.

In summary, saffron is a valuable source of bioactive constituents, frequently used to manufacture functional foods. However, it is imperative to establish and employ reliable methods to identify adulteration so that consumers benefit from the quality and authenticity of this precious spice. Implementing these techniques will help maintain high standards in the food industry, thus ensuring public health protection and consumer confidence.

Keywords: crocin, nutraceutical properties, picrocrocin, quality control, safranal, saffron



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OP 4

***Pork salami with pumpkin and walnut press cakes exhibits increased
pufa content but reduced lipid stability during storage***

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Pumpkin and walnut press cakes abound in polyunsaturated fatty acids (PUFA), making them promising ingredients for enhancing the content of these beneficial fatty acids in pork salami. This study is the first to investigate the impact of these oil press cakes, used as replacements for raw meat, on the fatty acid content and oxidative status of pork salami during refrigerated storage. To this aim, five formulations of pork salami were prepared [Sc (control salami), S2.2%pp (with 2.2% pumpkin powder), S2.2%wp (with 2.2% walnut powder), S3.5%pp (with 3.5% pumpkin powder), and S3.5%wp (with 3.5% walnut powder)] and stored at 7°C for 30 days. Even at the lowest concentration of powder used in the finished product (2.2%), both press cakes improved the salami's fatty acid composition, particularly in PUFA, thereby increasing the PUFA/saturated fatty acids (SFA) ratio. The incorporation of pumpkin powder augmented the ratio of n-6 (omega-6)/n-3 (omega-3) PUFA in the pork salami, while walnut powder lowered it. However, the salamis made with these two powders demonstrated reduced lipid stability during storage. This instability is attributed to the oxidation of oleic acid, a major fatty acid in these salamis, which led to the formation of more secondary oxidation compounds during storage than in the control salami. In



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conclusion, although pumpkin and walnut cakes can ameliorate the lipid profile of pork salami, they are not recommended as ingredients for products with a long shelf life.

Keywords: salami, oil press cakes, storage, fatty acids, oxidative indicators

OP5

**Optimization of a high-protein energy bar formulation using
linear programming**

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The growing demand for functional foods with enhanced nutritional profiles has stimulated significant interest in the development of high-protein snacks, particularly energy bars. These products combine convenience, portability, and targeted nutrition, making them ideal for athletes, active individuals, and consumers seeking healthy alternatives to traditional snacks. Achieving an optimal formulation, however, requires careful balancing of multiple factors such as protein content, caloric density, sugar level, texture, and cost.

Mathematical modeling and optimization techniques provide valuable tools for addressing such complex formulation problems. In particular, linear programming



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can be used to determine the ideal combination of ingredients that maximizes a specific nutritional objective—such as protein content—while satisfying given constraints related to calories, sugar, total weight, or ingredient availability. Traditionally, such problems have required specialized software or advanced programming skills; however, modern spreadsheet tools like Microsoft Excel include built-in optimization capabilities through the Solver add-in, which allows researchers and practitioners to perform optimization without the need for complex coding.

In this study, Excel’s Solver was employed to optimize the formulation of a high-protein energy bar. The objective was to maximize total protein content per 50 g serving, under constraints of energy (≤ 250 kcal), sugar (≤ 12 g), and cost (≤ 0.80 €). Six common ingredients—oats, whey protein powder, honey, peanut butter, dried fruits, and mixed nuts—were used as model components to simulate a realistic energy bar composition. By applying the Simplex Linear Programming method within Solver, an optimal combination of ingredient proportions was identified, illustrating how simple computational tools can support rational product design in the food industry.

The approach presented here demonstrates the educational and practical value of numerical optimization in food engineering, offering an accessible framework for formulation design, cost analysis, and nutritional improvement. Such methodologies can be extended to a variety of food systems, supporting innovation in the development of sustainable and nutritionally optimized products.

Keywords: Protein enrichment; Energy bar; Nutritional optimization; Food formulation; Linear programming; Cost-effective design.



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OP6

**Nutritional and microbiological characterization of three varieties of
lentils (*lens culinaris medikus*) from madagascar**

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The aim of this study focused on the nutritional characterization of three varieties of lentils (*Lens culinaris Medikus*) from Madagascar to determine the effects of variety and germination stage on their nutritional properties. The varieties analyzed were coral, green, and black lentils. Chemical analyses during germination determined macro and micronutrient contents, individual polyphenols, tannins, and antioxidant activities. The antifungal and antimicrobial activities of the lentils were evaluated using the Broth Microdilution Method against selected reference strains, including *Candida* spp., *Escherichia coli*, *Staphylococcus aureus*, and *Salmonella typhimurium*, *Shigella flexneri*, *Listeria monocytogenes*, and *Clostridium perfringens*. Physicochemical analyses and the presence of anti-nutritional factors were also assessed. The results showed that the water content of the seeds ranged from 10.33 % for the black lentils to 11.70 % for green lentils, and it increased substantially during germination stages reaching 66.7 % in germinated seeds. Crude protein content ranged from 23.29 % to 25.81 % in dried seeds and rose to 24.93 % - 28.33 % after germination, representing almost a quarter of the total composition. The results confirmed that lentils are an important source of carbohydrates, with a content of around 60 % and contained low levels of lipids. They have a high fiber content, but it decreased after germination showing the



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lowest value for the black lentils. Essential minerals, including Ca, Mg, K, Fe, Cu, Zn, Na, and P, were present, with particularly high levels of K in non-germinated black lentils and for the Mg in non-germinated coral lentils and rose after germination. The antimicrobial activities revealed that after germination, lentils had been shown to be highly effective against *Escherichia coli* and *Salmonella* at volume 10 μ L. The study highlights significant differences in the nutritional composition of the three varieties and demonstrates that germination enhances their nutritional and functional potential.

Keywords: nutritional quality, germination, *Lens culinaris* Medikus, minerals, protein, Madagascar

OP7

**Development of an olive oil-based spread functionalized with
bioactive compounds from olive pomace**

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The growing production of olive oil generates increasing amounts of olive pomace, a phytotoxic by-product of this industry, highlighting the need for sustainable strategies such as green extraction methods to recover bioactive compounds, minimizing environmental impact [1].

This study reports the development of an olive oil-based spreadable cream functionalized with an extract obtained from a mixture of fresh olive pomace from Trás-os-Montes and Alentejo (Portugal) by mechanical pressing (international patent application PCT/IB2018/060111 (2019)).



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The extract was incorporated into two formulations (A and B) composed primarily of 70% olive oil, water, and technological agents, with or without the addition of coconut oil.

The fatty acid profiles (GC-FID), total phenolic content (TPC), hydroxytyrosol content (HPLC-DAD-FLD), ferric reducing antioxidant power (FRAP), and 2,2-diphenyl-1-picrylhydrazyl radical (DPPH•) scavenging activity [1] of the resulting formulations and three commercial vegetable creams (C1, C2, and C3) available on the market were evaluated for comparison.

Regarding the results, samples A, B, and C2 showed a predominance of oleic acid (62%, 61%, and 42%, respectively), which is the main fatty acid in olive oil. Conversely, the commercial creams C1 and C3 showed a predominance of linoleic acid (40% and 39%, respectively) and lower contents of oleic acid (31% and 34%, respectively). Samples A and B showed significantly higher levels of total phenolics, hydroxytyrosol, and antioxidant activity compared to C1, C2, and C3 ($p < 0.05$).

In conclusion, these results demonstrate that olive pomace extract is an effective natural functional ingredient for enhancing the nutritional and antioxidant profile of vegetable spreads, due to their richness in oleic acid, a fatty acid associated with cardiovascular health protection, and hydroxytyrosol, a potent natural antioxidant that protects against oxidative stress and inflammation.

Furthermore, the spreads developed with olive oil and olive pomace are distinct from those currently available on the market, as their main ingredients are obtained without the use of solvents, and their production contributes to reducing the environmental impact of olive oil production.

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



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Educação, Ciência e Inovação) through the project UID/50006 - Laboratório Associado para a Química Verde - Tecnologias e Processos Limpos. Diana Melo Ferreira thanks FCT/MCTES for the PhD grant (doi.org/10.54499/2022.13375.BD).

OP8

**Revealing the potential of apple pomace as a sustainable and
innovative functional ingredient**

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Apple pomace (AP), the primary bio-residue generated during juice and cider production, represents an abundant and underutilized source of bioactive compounds, particularly dietary fiber and phenolic constituents. This study aimed to provide an in-depth phytochemical characterization of AP and to assess its antioxidant and antimicrobial properties to explore its potential as a multifunctional ingredient in sustainable product development. Compositional analysis revealed that AP is rich in total phenolics, with phloridzin, epicatechin, quercetin glycosides, and caffeic acid derivatives identified as major components through HPLC-DAD-MS. Although juice processing reduced the concentration of some phenolics, the remaining matrix retained substantial bioactive content



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associated with its fiber fraction. The hydroethanolic extract of AP exhibited pronounced antioxidant activity, confirmed by ORAC and TBARS assays, indicating strong radical-scavenging and lipid peroxidation inhibitory effects. Moreover, AP extract displayed notable antibacterial activity against Gram-positive strains such as *Staphylococcus aureus* and *Listeria monocytogenes*, as well as moderate antifungal activity against *Candida albicans*, suggesting potential for natural preservation applications. These findings demonstrate that apple pomace retains significant functional value even after industrial processing. Its combination of fiber and bioactive phenolics highlights its promise as a sustainable ingredient for food, nutraceutical, and cosmeceutical formulations. Valorizing AP contributes to waste reduction and supports circular economy strategies, aligning with current goals of sustainable resource management and bio-based innovation.

Acknowledgments

National funds supported this work through FCT/MCTES (PIDDAC): CIMO, UIDB/00690/2020 (DOI: 10.54499/UIDB/00690/2020) and UIDP/00690/2020 (DOI: 10.54499/UIDP/00690/2020); and SusTEC, LA/P/0007/2022 (DOI: 10.54499/LA/P/0007/2020). The authors are grateful to FEDER Cooperación Interreg VI A Espanha – Portugal (POCTEP) 2021-2027 for financial support through the project TRANSCoLAB PLUS 0112_TRANSCoLAB_PLUS_2_P. The authors also thank the National Funding by FCT - Foundation for Science and Technology, through the institutional scientific employment program contract with L. Barros and the individual scientific employment program contracts with F.S. Reis (2021.03728.CEECIND) and J.C.M. Barreira (CEECIND/04479/2017). National funding by FCT through the individual research grant (UI/BD/153745/2022) of L.A. Pascoalino.



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OP9

**Ensuring the safety of beehive products: comprehensive insights into
mycotoxin contamination and analytical detection strategies**

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Increasing reports of mycotoxin contamination in beehive products have raised food- safety concerns. Although honey, bee pollen, propolis, and royal jelly are valued for their nutritional and bioactive properties and traditionally regarded as safe, they may be vulnerable to mycotoxin contamination. Consequently, interest has grown in assessing their occurrence and potential implications for consumer health. This review summarises current knowledge on mycotoxin occurrence and reviews the analytical strategies used for their determination, with focus on sample preparation/extraction, and detection approaches.

A growing trend toward the simultaneous determination of multiple analytes within a single analytical procedure has been observed, with honey and bee pollen representing the most studied matrices. Typical sample preparation includes solid–liquid extraction using appropriate solvents after sample homogenisation often combined with clean-up steps with immunoaffinity columns being the most mentioned. QuEChERS method is used to extract a wide range of mycotoxins, while immunoassays remain common in some studies. Only a limited number have reported the development and optimisation of biosensor-based detection methods. During the years, liquid chromatography has continued to be the principal separation method, with mass spectrometry emerging as the dominant detection technique in recent research.



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Most occurrence studies have focused on honey and bee pollen, with fewer addressing other beehive products. Aflatoxins were the most frequently detected group, occurring at high levels in honey and in nearly all examined pollen samples. Royal jelly was primarily contaminated with deoxynivalenol, zearalenone, fusarenon-X, sterigmatocystin, and ochratoxin A, whereas T-2 toxin was more commonly identified in propolis.

Funding/Acknowledgments: This work received financial support from the PT national funds (FCT/MECI, Fundação para a Ciência e Tecnologia and Ministério da Educação, Ciência e Inovação) through the project UID/50006/2025 - Laboratório Associado para a Química Verde - Tecnologias e Processos Limpos. This work was also supported by a PhD grant from the Fundação para a Ciência e a Tecnologia (FCT) under grant number 2024.05767.BDANA.

The authors would like to acknowledge the European Union’s Framework Programme for Research & Innovation as part of the COST Action CA22105-BEEkeeping products valorization and biomonitoring for the SAFETY of BEEs and HONEY (BeSafeBeeHoney), as supported by the COST Association (European Cooperation in Science and Technology).

OP10

Obtention of bioactive compounds from coffee silverskin: optimization of ultrasound assisted-extraction using response surface methodology

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Background & Aim: Coffee production generates substantial amounts of by-products, among which coffee silverskin (CSS) has attracted growing scientific attention due to its abundance, distinctive composition, and health-promoting properties [1]. Valorising this residue through environmentally friendly extraction technologies supports the transition toward a circular economy and sustainable coffee processing. This study aimed to evaluate the effect of ultrasound-assisted extraction (UAE) on recovering bioactive compounds from CSS, maximizing caffeine and chlorogenic acids (CQAs) yields while minimizing 5-hydroxymethylfurfural content (HMF), a potentially harmful compound [2].

Methods: Optimization was performed using Response Surface Methodology (RSM) with a Central Composite Design (CCD). UAE was conducted using 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 analysed for caffeine, HMF, and total CQA (Σ CQA = 3-, 4-, and 5-O-caffeoylquinic acids) using HPLC-DAD. Statistical significance ($p < 0.05$) and model fit were evaluated through ANOVA, regression analysis, and lack-of-fit tests.

Results: CSS extracts were characterized by a high caffeine content, substantial levels of CQAs, and relatively low HMF formation. Among the studied variables, ethanol concentration had the greatest impact on caffeine and Σ CQA extraction yields, whereas the solid-to-liquid ratio mainly affected HMF formation. Extraction time showed a smaller yet significant effect. These findings highlight the importance of tailoring UAE conditions to the specific characteristics of CSS.

Conclusions: Optimized UAE conditions enabled the selective recovery of beneficial bioactive compounds from coffee silverskin while limiting HMF contents. The results confirm UAE as an efficient and sustainable extraction method for CSS valorisation, contributing to waste reduction, resource recovery, and the development of high-value functional materials in the coffee chain.

Keywords: Coffee by-products; ultrasounds; green extraction; bioactives; sustainability.

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

UID/50006/2025 -Laboratório Associado para a Química Verde - Tecnologias e Processos Limpos. T.F.S. acknowledges FCT/MCTES for PhD funding (<https://doi.org/10.54499/2022.13829.BD>).

OP11

Development of a functional bakery product

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Functional bakery foods play a crucial role in supporting health and preventing metabolic disorders by delivering bioactive compounds that go beyond basic nutrition. This project presents the development of a functional bakery product aimed at people with an increased risk of metabolic disorders, combining nutritional innovation with sustainable food engineering and a viable business approach. The purpose of this research was to design a product based on lupin flour, selected for its high-quality plant proteins, fiber, and bioactive compounds that can help regulate blood sugar levels and promote digestive well-being, and to explore its potential for market introduction through a structured business model.



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When nutrition science, technology, and entrepreneurship come together, they open the door to creating food products that truly serve both people and the planet. Such an approach transforms innovation into something tangible—products that not only improve health and well-being but are also sustainable and accessible. It shows that science can move beyond the laboratory to meet real needs, connecting research with everyday life. Functional foods, in this context, become more than just a trend; they represent a bridge between knowledge, creativity, and social responsibility. They help respond to the growing challenges of modern lifestyles, encouraging collaboration between scientists, food engineers, and entrepreneurs. At the same time, this mindset promotes adaptability and a willingness to learn, proving that progress in biotech and food innovation depends as much on human values and perseverance as it does on technology itself.

The project was conducted as part of the 1Health BioTech Startup Bootcamp 2025, which took place from September 1 to 19 in Timisoara, Romania. The program included two weeks of online courses followed by a one-week in-person session at BIOMENTORHUB & 1Health Incubator and CREO Incubator. During this time, participants gained essential foundations in biotech innovation and entrepreneurship, learning practical tools to advance early-stage projects. Within this framework, the study focused on optimizing ingredients, processing parameters, texture, moisture balance, and sensory quality to ensure a consistent and appealing bakery product.

At the conclusion of the bootcamp, the business model and product concept were presented to a jury of industry experts. The results highlighted both the scientific and entrepreneurial aspects of developing functional foods, demonstrating the importance of integrating food chemistry, sustainable production practices, and market-oriented strategies. Through this experience, we learned how to secure funding, present a new functional bakery product, follow trends in functional foods, interpret market data, and apply these insights to research, production, and sales. More importantly, the process strengthened the value of persistence and creativity when bringing innovative ideas to life.

Acknowledgements: This project was funded by the University of Life Sciences "King Mihai I" from Timisoara", BioMentorHub and One Health Incubator.



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Keywords: lupin flour, cookies, glycemic index, food systems, sustainable processing

OP12

***Beyond the nettles: morphological and chemical divergence in two
Lamiaceae weeds with nutritional potential***

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Modern research on food emphasizes the importance of natural antioxidants and phytochemicals in promoting health and preventing disease. The Lamiaceae family, commonly known as the mint family, includes numerous aromatic and medicinal plants characterized by remarkable chemical diversity and ecological adaptability.

The Lamiaceae is a family of largely green and aromatic herbs that have conquered mild and temperate-climate regions. Most of the time, *Galeopsis tetrahit* and *Lamium purpureum* are the most common co-habitants and are even visually indistinguishable. A closer look, however, shows that they differ in the features of their genes, growth habits, and chemical composition.

The aim of the study is to analyze the potential differences between these two species concerning their nutritional value.

G. tetrahit is a typical summer plant and loves wet, rich soil. On the other hand, *L. purpureum* is an early riser of nature and very often it finds the freshness of the earth after a cold night or a freshly disturbed ground as its perfect growing conditions. This conclusion was drawn from direct field



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observations and a review of ecological literature describing the preferred growing conditions of both species.

According to data reported in the literature, *Galeopsis tetrahit* generally contains higher levels of phenolic compounds and flavonoids compared to *Lamium purpureum*. These chemical differences are thought to play a role in helping each species cope with environmental stress within their specific habitats.

Experimental data revealed that the antioxidant assays (DPPH, ABTS, and FRAP) confirmed the superior radical-scavenging capacity of *Galeopsis tetrahit* compared to *Lamium purpureum*, particularly in root tissues. The observed biochemical variation between the two species highlights distinct metabolic adaptations linked to their ecological niches and evolutionary backgrounds.

Both Galeopsis tetrahit and Lamium purpureum contain a variety of natural compounds and antioxidants that can contribute to maintaining good health when included in the human diet. Their distinct biochemical compositions indicate that each plant may provide different nutritional advantages, making them potential candidates for use in natural supplements or functional food products. Evaluating the nutritional potential of these wild plants underlines their possible role in enriching modern diets with diverse and health-supportive plant resources.

To sum up, the two look-alike plants employ different strategies. The research connects genes to real changes in chemistry and ecology. This is one of the ways which help explain how closely related species in the Lamiaceae family can adapt and survive.

Keywords: *Lamium purpureum*, *Galeopsis tetrahit*, bioactive compounds, adaptation, morphological differentiation



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OP13

**Development and characterization of biodegradable packaging based
on food by-products**

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The continuous increase in global plastic consumption, exceeding 200 million tons annually, highlights the strong dependence of the plastics industry on petroleum resources and its detrimental environmental impact.

In recent years, interest in replacing conventional petroleum-based plastic packaging, such as polyethylene terephthalate (PET), polyvinyl chloride (PVC), and polyethylene (PE), has increased. Alternatives include biodegradable and biocompostable raw materials based on biodegradable compounds and bioplastic materials.

A promising direction is the valorization of food by-products (fruit peels, bran, whey, plant stems, etc.) and gradually replacing conventional petroleum-based ones. High environmental concerns regarding plastic pollution have intensified the search for sustainable alternatives to conventional packaging. This study focuses on developing and characterizing biodegradable packaging materials. These are derived from food industry by-products, such as fruit peels, vegetable residues, and cereal bran.

The results indicate that the incorporation of food by-products not only increases the sustainability of packaging, but also contributes to waste recovery. The developed packaging films demonstrate promising potential for applications in the food sector, as they can provide an environmentally friendly alternative with acceptable barrier and mechanical properties.

Keywords: raw materials, bioplastic materials, packaging films



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OP14

**Sustainable valorisation of sea buckthorn pomace: current
applications and promising directions in food systems**

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In recent years, growing attention has been directed toward the sustainable valorization of sea buckthorn (*Hippophae rhamnoides*) pomace (SBP), a by-product mainly obtained after juice and oil extraction. Despite being traditionally treated as industrial waste, SBP is a valuable source of bioactive and nutritional compounds such as polyphenols, flavonoids, carotenoids, vitamins, essential fatty acids, minerals, and dietary fiber. These constituents exhibit strong antioxidant activity and contribute to enhancing the nutritional profile, texture, and functional properties of food products. The utilization of sea buckthorn pomace has gained increasing interest as it transforms a processing residue into a low-cost yet highly functional ingredient, supporting waste reduction and advancing the principles of the circular economy. SBP can be effectively employed both as a natural antioxidant and as a fortifying agent in the formulation of functional and value-added foods. Various studies have demonstrated its ability to improve the nutritional and sensory quality of different food matrices, including bakery, confectionery, dairy, and fiber-enriched products. When incorporated in suitable proportions, SBP enhances the content of bioactive compounds and contributes to the development of nutritious, sustainable foods with added health benefits. Due to its complex chemical composition and technological versatility, sea buckthorn pomace offers wide application potential across the food industry. Extracts obtained from SBP can be used as nutraceutical ingredients, functional additives in



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dairy products such as ice cream and fruit-enriched yogurts, and as a source of natural antioxidants in various food formulations. Its high dietary fiber content further supports the development of products promoting digestive health and overall well-being. A particularly promising direction for future research is the use of sea buckthorn pomace extracts to improve the oxidative stability of fats and oils, including butter, margarine, and vegetable oils. This approach could expand the applications of SBP beyond its current uses and contribute to the development of more stable, health-promoting fat-containing foods. Overall, the recovery and use of sea buckthorn pomace and its extracts represent a sustainable strategy that combines environmental responsibility with economic and nutritional benefits, fostering innovation in the development of healthy, functional, and eco-friendly food products.

Keywords: sea buckthorn pomace; sustainable valorization; nutraceutical ingredients; functional foods, bioactive compounds

OP15

Obtaining and characterisation of mango–papaya jam

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The study aimed to evaluate the physicochemical and antioxidant properties of mango–papaya jam obtained from a controlled formulation. The jam was prepared using 60% fruit pulp (a 1:1 ratio of mango and papaya), 40% sucrose, and a small quantity of citric acid (0.3%) to adjust pH and enhance preservation. The mixture



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was heated to 105°C until the desired soluble solids content was reached, then hot-filled into sterilized jars and cooled to room temperature. Moisture analysis was performed using a KERN DAB moisture analyzer, resulting in a dry matter content of 75.46%, consistent with standard jam specifications that ensure optimal texture and microbial stability. Color parameters were measured with a Konica Minolta CM-5 spectrophotometer in the CIELAB color space, yielding average values of $L = 29.53^*$, $a = 7.96^*$, and $b = 30.62^*$, indicating an intense yellow-orange hue characteristic of tropical fruit-based products.

The antioxidant capacity, determined by the DPPH radical scavenging assay, revealed a high inhibition percentage, confirming the presence of natural antioxidants. The vitamin C (ascorbic acid) content, determined by titration with 2,6-dichlorophenolindophenol, showed a moderate concentration that contributes to the jam's antioxidant potential and nutritional value.

Overall, the results demonstrate that mango–papaya jam exhibits favorable physicochemical properties, attractive color characteristics, and significant antioxidant activity, making it a functional product with both sensory appeal and health-promoting attributes.



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Posters

P1

**Exploring the macro- and microelement profile of *Geranium
robertianum* L.**

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Mineral elements are fundamental to human health, ensuring the smooth functioning of vital biological processes. The body depends on macronutrients such as calcium, potassium, and magnesium to maintain strong bones, stable nerve activity, and balanced metabolism. In smaller amounts, trace elements like iron, zinc, copper, and manganese play equally important roles, supporting enzymes, strengthening the immune system, and protecting cells from oxidative stress. When present in the right proportions, these nutrients contribute to overall well-being and help prevent various metabolic and nutritional disorders.

Geranium robertianum L., commonly known as herb-Robert, is a medicinal plant traditionally used in European folk medicine for its anti-inflammatory, antioxidant, and antimicrobial properties. The present study aims to review and synthesize current knowledge regarding the macro- and microelement composition of *Geranium robertianum*, in order to highlight its nutritional and therapeutic application.

Data were collected and analyzed from existing scientific literature. The obtained results revealed significant concentrations of essential elements such as calcium, magnesium, potassium, and iron, as well as trace amounts of zinc, copper, and manganese. Differences in elemental



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composition were observed between aerial parts and roots, suggesting a distinct accumulation pattern that may influence the plant’s pharmacological activity. The data support the idea that *Geranium robertianum* represents a valuable source of bioavailable minerals with potential applications in phytotherapy and nutritional supplementation. Its balanced composition of macro- and microelements highlights the plant’s potential role in supporting human health through natural sources.

Keywords: medicinal plant, mineral composition, nutritional value, phytotherapy.

P2

**Evaluation of nutritional composition and total polyphenols
content in avocado seeds (*Persea americana*)**

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Avocado (*Persea americana*) is a fruit recognized for its high nutritional value and rich content of bioactive compounds. The avocado seed, a by-product of pulp processing, presents a complex composition, including proteins, fats, fibers, ash, carbohydrates, and water, alongside bioactive compounds such as flavonoids, tannins, saponins, total phenolics, oxalates, phytates, alkaloids, vitamins, and minerals. The aim of this study was to obtain and nutritionally characterize avocado seed powder,



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as well as to determine its total phenolic content, with a view to its potential use as a food additive or as a material for active packaging with antioxidant properties.

Results showed values ranging from 11.31–14.42% for moisture, 2.11–3.42% for ash, 4.37–5.32% for protein, 11.10–12.31% for fat, 3.96–6.64% for crude fiber, 51.81–55.82% for carbohydrates, and 28.62–31.58 mg GAE/g d.m. for total phenolic content (TPC).

These values confirm that avocado seed powder is a valuable source of nutritional and bioactive compounds, with potential applications as a functional ingredient or as a base material for biodegradable and active food packaging. The valorization of this by-product also contributes to reducing food waste and minimizing the environmental impact of agro-industrial residues.

Keywords: avocado seed, nutritional parameters, total polyphenols, functional ingredient, active packaging

P3

Study on the nutritional benefits of coconut based products

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The goal of this paper was to highlight the nutritional benefits of coconut (*Cocos nucifera*), using databases such as USDA and scientific papers. The more studied coconut based products are coconut flour and flakes. These products are rich in proteins, fats, carbohydrates, fibers, minerals and vitamins. There are many studies on the cholesterol lowering effect of these products. On the other hand, coconut flour is considered by many researchers



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a functional food based on his high fibers content. Coconut flour is a good source of fiber (10 – 30%) and protein (16 – 21%) unlike wheat flour. Many researchers considered that coconut flour can be incorporated (up to 20%) into wheat flour products (noodles) in order to improve its health benefits. The average ash content in this products is approximately 4%. The predominant mineral is potassium, followed by phosphorus and magnesium. The minerals content in coconut flour and flakes has the following trad:K>P>Mg>Na>Ca>Fe>Mn>Zn> Cu. In conclusion, the studies reveals that, due to the high fiber content and protein, coconut based products have many nutritional benefits.

Keywords: databases, fibers, functional food

P4

**The technology of obtaining an agluten-free product enriched
with bioactive principles from cranberries**

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The paper aims to develop an innovative gluten-free pastry, intended for people with gluten intolerance, based on buckwheat and cranberry flour, fruits recognized for their high content of bioactive compounds and their antioxidant properties. In a context in which the incidence of autoimmune diseases and interest in functional nutrition is increasing, the theme of the paper is part of the



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current trends of the food industry oriented towards sustainability and health. The introductory part highlights the role of gluten in traditional bakery products and its negative impact on sensitive people, justifying the need to formulate gluten-free alternative products. The literature review addresses the nutritional and functional properties of buckwheat flour and cranberries, highlighting their potential to improve the nutritional and functional value of food products.

His own contributions consist in the development of the technology for obtaining the **product FIA_CRANBERRY_DESERT**, a gluten-free dessert with a layered structure (buckwheat and cranberry flour top, coconut and raspberry yogurt cream, respectively coconut and blueberry yogurt cream). The technological stages, characteristics of raw materials, manufacturing scheme, nutritional value and sensory analysis were described.

The experimental results have shown that the product obtained has a balanced nutritional value, with a high content of fiber and antioxidants, sensory properties appreciated by consumers and a stable structure. The hedonic evaluation confirmed the high acceptability of the dessert in terms of appearance, taste and texture.

In conclusion, the research highlights the possibility of making gluten-free products with superior functional properties, which contribute to diversifying the food offer for people with dietary restrictions and promoting a healthy lifestyle. The paper makes a relevant contribution in the field of functional nutrition, by integrating cranberry flour into modern recipes, balancing the nutritional value with the technological and sensory requirements.

Keywords: gluten-free product, cranberries, buckwheat flour, bioactive compounds, FIA_CRANBERRY_DESERT, functional nutrition, antioxidants, sensory analysis, cranberry flour, innovative gluten-free products, nutritional value.



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P5

**Capitalization of by-products from the fruit juice industry in the
bakery industry**

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The main purpose of the work is to capitalize on the by-products resulting from the fruit juice industry, especially apple peels and citrus fruits, by integrating them into pastry recipes, thus contributing to the development of a circular economy and reducing food waste. In the current context of the food industry, where sustainability and resource efficiency are becoming major priorities, the topic addressed is of particular importance both from an ecological and economic point of view.

The introductory part highlights the problem of massive waste generation from fruit processing and the potential for its recovery due to its rich content of bioactive compounds, fiber and antioxidants. The bibliographic study highlights the chemical composition and benefits of apple pomace and citrus peels, as well as their applications in the food field.

Its own contributions consist in the development of the technology for obtaining the product 'FIA_BYPROD DESSERT', a dessert with three layers (top, cream and jelly), in which apple peel flour and citrus peel jam were used. The work includes detailed technological schemes, nutritional value analysis, sensory evaluation according to the hedonic scale and elaboration of the final product label.



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The results obtained show that the dessert has a high fiber content (8.43%), a balanced energy value (338.5 kcal/100g) and sensory properties appreciated by consumers, obtaining maximum ratings in most organoleptic analyses.

In conclusion, the research demonstrates the technological and nutritional viability of integrating by-products from the fruit juice industry into the human diet, contributing to obtaining value-added products and reducing the negative impact on the environment. The paper confirms that such solutions can support the transition to a sustainable food system, based on the principles of the circular economy.

Keywords: by-product recovery, apple pomace, citrus peels, circular economy, food sustainability, apple peel flour, citrus peel jam, functional pastries, bioactive compounds, food waste reduction

P6

Study on the nutritional value of lentil (*Lens Culinaris*)

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This study has the aim to highlight the nutritional value of lentil (*Lens Culinaris*). In this work we used many information resources (databases such as USDA) and scientific papers. There are several assortments of lentils for consumption (red, green, yellow, gray and black). For 100 g of raw lentil, the following quality parameters vary within the following limits: proteins (22.1 - 24.4g); fats (1.77 - 2.02g); carbohydrates (60 - 62g); ash (2.76 - 2.99g); calcium (56 - 65 mg); iron (6.52 - 7.94mg); magnesium (102 - 110 mg); potassium (909 - 968 mg); zinc (3.04



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- 4.34 mg); copper (0.761 - 0.881mg); manganese (1.21 - 1.84). Lentils contain vitamins such as vitamin A, vitamin B1, vitamin B2, vitamin B3, vitamin B6, vitamin C, vitamin E, and vitamin K, as well as both soluble and insoluble fiber. Both types of fiber support a healthy digestive system. Studies suggest that regular consumption of lentils supports health and reduces the risk of chronic diseases, such as diabetes, obesity, heart disease and cancer. The cooking improves the protein quality by destruction the anti-nutritional factors. In conclusion, due to its nutritional composition, the use of lentil in food industry increased.

Keywords: databases, health benefits, minerals, processing effects

P7

**Mathematical modeling and cost minimization in functional
dairy product development. A case study on fruit yogurt**

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In recent years, the food industry has placed increasing emphasis on cost efficiency and nutritional quality, driven by consumer demand for affordable yet healthy products. Among dairy-based functional foods,



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fruit yogurt has become one of the most popular fermented products due to its balanced nutritional profile, sensory appeal, and versatility. However, developing an optimal formulation that maintains quality while minimizing production costs remains a key challenge in dairy process engineering.

Yogurt formulation involves a combination of ingredients such as milk, sugar, stabilizers, fruit puree, and starter cultures, each contributing differently to the final product’s composition and cost. The balance between protein content, fat level, total solids, and fruit ratio must meet both regulatory standards and consumer preferences, while raw material prices fluctuate based on market conditions. Traditional trial-and-error methods for adjusting formulations can be time-consuming and resource-intensive, making mathematical optimization an effective alternative for rational decision-making.

Microsoft Excel’s Solver provides a powerful and accessible platform for performing such optimization tasks. Through linear programming techniques, Solver allows users to define an objective function—such as minimizing total cost—and apply constraints related to ingredient composition, nutritional requirements, and sensory limits. This method can quickly identify the most cost-effective formulation that still meets quality criteria, offering both educational and industrial benefits.

The present study focuses on minimizing the production cost of fruit yogurt by applying Solver to determine the optimal proportions of key ingredients. The model incorporates economic and nutritional parameters, such as cost per unit weight, protein and fat content, and total solids, to ensure a technically feasible and market-competitive formulation. The results demonstrate how the integration of numerical optimization tools in food technology can support sustainable production strategies, reducing costs while maintaining the high nutritional and sensory standards expected by modern consumers.

Keywords: Mathematical modeling; Numerical optimization; Microbial fermentation; Bioprocess engineering; Excel Solver; Metabolite production.



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P8

**Application of natural antioxidants in the development of
nitrite-free meat products with improved stability and
nutritional properties**

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The paper analyzes the role and effectiveness of natural antioxidants in preventing oxidative processes that affect the quality of meat products. Lipid oxidation, a process that transforms unsaturated fatty acids into volatile compounds, degrades the sensory and nutritional properties of the product. Natural antioxidants interrupt oxidative reactions, thereby maintaining product stability during storage.

Amid concerns regarding the safety of synthetic antioxidants (BHT, BHA), research has focused on natural sources such as rosemary, oregano, sage, garlic, grape seeds, and pomegranate, which, due to their high phenolic content, may provide superior antioxidant activity. However, their effectiveness depends on the extraction method, concentration used, and compatibility with the food matrix, requiring a balance between antioxidant action and the preservation of sensory attributes.

In thermally processed or high-pressure treated products, natural antioxidants can reduce the formation of oxidative compounds; for instance, extracts derived from tomato by-products and rosemary have been shown to extend the oxidative stability of chicken meat treated at 600–800 MPa.

Horseradish (*Armoracia rusticana*) also exhibits antioxidant, antimicrobial, and antifungal properties due to its essential oils rich in limonene and phthalides. Owing to its high nitrate content, it is used as a natural curing agent in the meat



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industry, although its intense aroma limits the permissible dosage.

The main objective of this study was to develop an innovative “nitrite-free” meat product, designed to provide additional functional and nutritional value while offering protection against lipid oxidation. The production technology followed specific processing stages, after which the final product was analyzed from a physico-chemical and sensory perspective.

The physico-chemical analysis focused on determining the main compositional parameters—moisture, protein, carbohydrate, lipid, and energy content—while the sensory evaluation assessed the product’s appearance, taste, odor, and texture. The results demonstrated that replacing nitrite with natural antioxidants in meat products contributes to maintaining their quality, stability, and safety, aligning with current trends in the modern food industry.

Keywords: natural antioxidants, lipid oxidation, meat products, nitrite-free, functional food

P9

**Plant-derived proteins as partial replacements for animal
proteins in meat products: functional, nutritional, and
technological perspectives**

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This study investigates the potential of plant-derived proteins as a partial alternative to animal proteins in the meat industry, with the aim of enhancing both the economic efficiency and nutritional quality of meat products. Plant proteins possess significant functional properties, including fat emulsification,



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water binding, and texture enhancement, making them widely applicable in emulsified meat products such as sausages, pâtés, and salamis. Soy, pea, and wheat are the primary sources of plant proteins due to their high protein content and favorable technological characteristics. Soy protein isolates (SPI), in particular, provide excellent water retention and structural stability, and are the most commonly used ingredients for partial replacement of lean meat.

During injection and marination processes, plant proteins contribute to improved product juiciness and tenderness, reduce cooking losses, and enhance overall yield. In minced meat products, such as meatballs, sausages, and nuggets, textured plant proteins—especially soy-based—impart a meat-like texture, allowing for fat reduction while preserving sensory qualities. In fermented and dried sausages, plant proteins serve both to reduce production costs and to develop low-fat products with enhanced functional properties.

Additionally, the study underscores the potential of chickpea (*Cicer arietinum*) as a valuable source of plant proteins, vitamins, and minerals. Chickpeas also exhibit antioxidant, digestive, and hypocholesterolemic effects, representing a sustainable and nutritionally rich alternative to animal proteins.

The primary objective of this research was to develop an innovative plant-based meat product designed to provide enhanced functional and nutritional benefits. The production process followed specific technological stages, after which the final product was subjected to comprehensive physico-chemical and sensory evaluation. Physico-chemical analysis focused on determining key compositional parameters, including moisture, protein, carbohydrate, lipid, and energy content, while sensory evaluation assessed appearance, taste, aroma, and texture.

In conclusion, the partial replacement of animal proteins with plant-derived proteins in meat products contributes to cost optimization, improves nutritional quality, and maintains desirable sensory properties, offering an innovative and sustainable approach to meat product formulation.

Keywords: Plant proteins, meat alternatives, soy protein isolates, functional properties, nutritional quality.



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P10

**Pork sausages reformulated by replacing cured meat with rosehip
waste powder: effects on their quality**

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Introduction: Rosehip waste powder contains high levels of fibres, polyphenols, and carotenoids. Given the preservative and antioxidant properties of polyphenols, the natural colouring capacity of carotenoids, and the powder's inherently low pH1, this ingredient shows potential for application in meat products, either as a natural alternative to synthetic nitrites or to prolong shelf life.

Aims: This study aimed to evaluate how partially replacing cured meat with this powder impacts the quality of pork sausages.

Materials and Methods: To evaluate the potential of rosehip waste powder as a functional ingredient, three sausage formulations were developed: a control sample (PSc – pork sausages without powder), and two variants containing 2.7% (PS2.7%rp) and 5.5% (PS5.5%rp) rosehip waste powder, respectively. These formulations were analysed throughout storage for their physicochemical properties, colour, texture, sensory attributes, and levels of polyphenols and carotenoids.

Results: The incorporation of rosehip waste powder into pork sausages led to a significant reduction in both moisture and protein levels, while contributing to an increase in total carbohydrate content, as well as in polyphenols and carotenoids. Furthermore, this addition caused a significant decrease in pH and easily hydrolysable nitrogen content, indicating its preservative potential. The reformulated sausages also exhibited improved colour characteristics, with



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enhanced red and yellow tones, and showed reduced gumminess and chewiness. Although slight modifications in taste and texture were observed, the overall consumer acceptance of the sausages remained at a satisfactory (reasonable) level.

Conclusion: In the present research work, we demonstrated that this powder obtained from rosehip waste is a promising functional ingredient in pork sausage reformulation.

P11

**Development of functional waffle cones enriched with fibres,
polyphenols, and carotenoids derived from rosehip waste powder**

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Introduction: The waste that remains after processing the rosehips to obtain rosehip purée (raw material for rosehip jam) can be a valuable source of fibres, carotenoid pigments, phenolic compounds, and micro- and macro-elements¹. Therefore, it could be recovered as a powder (Rp) for later use as an ingredient in the food industry.

Aims: The aim of this study was to use such a powder in the formulation of ice cream waffle cones by partially replacing (10, 15, and 20%, respectively) the wheat flour in a consecrated manufacturing recipe that uses a minimum amount of sugar necessary to obtain this product.

Materials and Methods: Four waffle cone formulations were prepared: a control (WCc) and three samples containing 3.7% (WC3.7%rp), 5.6% (WC5.6%rp), and 7.5% (WC7.5%rp) rosehip powder, respectively. They were analysed for proximate composition, pH, colour, techno-functional and textural properties, and



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sensory characteristics to identify the formulation preferred by consumers. In addition, the contents of carotenoids and polyphenols were determined, as well as the contribution of rosehip powder to the production cost of these ice cream cone formulations.

Results: The results showed that using rosehip waste powder as an ingredient reduced the waffle cones powder’s capacity to hold water (from 3.11 g/g to 2.64-3.08 g/g) and to swell (from 4.98 mL/g to 4.23-4.48 mL/g), while it increased their oil-holding capacity (from 0.93 g/g to 0.96-1.19 g/g) and the content in fibre (from 1.58% to 3.41-4.83%), polyphenols (from 400.70 µg/g to 1732.26-2715.69 µg/g), and carotenoids (from n.d. to 6.86- 14.28 µg/g); however, the solubility (72.65-75.33%), hardness (2.31-2.83 N), and fracturability (6-8) were not significantly influenced. The sensory acceptability of enriched waffle cones (92- 93%) was higher than that of control waffle cones (90%). The production cost of a waffle cone increased by EUR 0.004-0.009 when wheat flour was substituted by rosehip powder in concentrations of 10-20%.

Conclusion: In conclusion, to enrich waffle cones with fibres, polyphenols, and carotenoids, at least 10% of wheat flour must be substituted with rosehip waste powder in their manufacturing recipe.

Keywords: proximate composition, rosehip powder, sensory analysis, techno-functional properties, waffle cones.

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P12

**Sustainable use of by-products from cold-pressing of hazelnut
oil: functional bar without added sugars**

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Hazelnuts are some of the most popular oilseeds in the world, consumed raw or roasted. As global hazelnut production increases, the amount of secondary products also grows, leading to significant waste and environmental stress. Hazelnuts and their by-products are rich in bioactive compounds with antioxidant, antibacterial, and prebiotic effects.

By-products represent a special category of food residues. They include the “cold-pressed hazelnut cake”, the residue obtained after the cold pressing of hazelnut oil. Normally, processing of 1 kg of hazelnuts results in a maximum of 400 g of oil, the remaining 600 g being by-products, rich in proteins, lipids, fibers, and polyphenolic compounds, which could be valorized by repurposing into new, sustainable foods.

The present study aims to valorize the cold-pressed hazelnut cake into a functional, organic, sugar-free bar. The by-product was used in the form of flour, combined with ingredients rich in fibers and antioxidants. Five product variants were created, in the form of compact bars. In addition to proximate analysis (proteins, lipids, ash, and moisture), total polyphenols (Folin–Ciocâlțeu method), individual polyphenols (high-performance liquid chromatography – HPLC), and antioxidant activity (DPPH method) were determined for optimal product formulation.

Acknowledgements: The authors would like to thank Holiv Ecoplant for their support in carrying out this study, by providing the raw material and



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logistic assistance.

P13

Phytochemical profile of some consumed medicinal plants

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Herbal teas are a widely consumed beverage that can be easily prepared by infusing dried herbs in hot water. This study aims to characterize the phytochemical, physicochemical, and nutritional properties of some commonly used medicinal plants: *Matricaria chamomilla* (chamomile), *Tilia cordata* (linden), *Robinia pseudoacacia* (black locust), *Sambucus nigra* (elderberry), *Lavandula angustifolia* (lavender), *Rosmarinus officinalis* (rosemary), *Hypericum perforatum* (St. John's wort), and *Achillea millefolium* (yarrow).

Phytochemical analyses focused on identifying and quantifying the total antioxidant capacity and the main bioactive compounds, such as flavonoids, tannins, and polyphenols. In parallel, physicochemical and nutritional determinations were performed, including dry matter content, moisture, and ash. The results show that the studied plants exhibit a complex and diverse chemical profile, associated with antioxidant, anti-inflammatory, and antimicrobial activities, while their physicochemical characteristics highlight their quality and stability as raw materials for herbal preparations and functional products. The high content of polyphenols and flavonoids emphasizes the therapeutic potential of the studied plants, supporting their traditional and modern use in various herbal formulations.

The study underlines the importance of phytochemical characterization for the



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scientific validation of the medicinal effects of plants and provides useful information for future research in the nutraceutical and pharmaceutical fields.

Keywords: medicinal plants, polyphenols, total antioxidant capacity

P14

**Development and evaluation of functional cookies with
turmeric and rosemary**

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Pastry products are very popular due to their taste, price, and availability, but they are not the healthiest option for regular consumption. Cookies enriched with turmeric and rosemary provide a healthier alternative to traditional pastries. These cookies can be considered functional foods because they contain natural ingredients with antioxidant, anti-inflammatory, and digestive properties, along with other positive effects on overall health. Rosemary is rich in rosmarinic acid and essential oils, which have antimicrobial properties and act as natural preservatives, helping to extend the shelf life of the cookies. It may also support digestion and reduce oxidative stress in the body. Turmeric contains curcumin, a compound known for its anti-inflammatory and antioxidant activity. Curcumin may help reduce inflammation, support metabolic functions, and strengthen the immune system. The aim of this study is to examine the effects of turmeric and rosemary on the sensory, physicochemical, and nutritional characteristics of cookies. The study also



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aims to highlight the functional benefits of these ingredients and provide scientific justification for their inclusion in baked goods, offering consumers healthier options.

Keywords: turmeric, rosemary, functional cookies, antioxidant properties, nutritional benefits

P15

**Analytical study on the influence of meat mixture on the
quality of smoked sausages**

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This study aims to analyze the processing and quality characteristics of smoked sausages formulated from a balanced recipe using different proportions of meat mixtures consisting of pork, beef and mutton. Furthermore, it evaluates the influence of meat composition on product quality through sensory and physicochemical analyses. The results are intended to provide a better understanding of how different meat combinations affect the technological, physicochemical, and sensory properties of smoked sausages. The sausages were manually processed by grinding the meat and fat, blending them with spices, stuffing them into natural casings, and smoking over hardwood. The findings indicate that the composition of the meat mixture plays a significant role in determining physicochemical and sensory quality. The formulation with 25% mutton provided the best balance between physicochemical parameters and sensory attributes, making it the most suitable option for obtaining a stable and



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acceptable traditional product. Additionally, all formulations maintained appropriate pH and mineral content levels, ensuring good technological performance and microbiological stability.

Keywords: sausages, smoked sausages, meat mixture sausages, pork, beef and mutton sausage

P16

**Effect of fenugreek and seed mix addition on the
physicochemical and sensory properties of bread**

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This study investigated how the addition of fenugreek powder and a mix of seeds affected the physicochemical and sensory characteristics of wheat flour bread. A mix of seeds composed of: sunflower, pumpkin, flax, sesame and chia was used to prepare the bread, added in a proportion of 5% of the flour mass. Fenugreek powder was added in a proportion of 5%, this concentration being established as the optimal variant following preliminary testing. The combined addition of fenugreek and seeds did not affect the elasticity of the dough but allowed for a uniform porous structure of the core after baking. The loaves thus obtained were analyzed both from a physicochemical point of view (moisture, acidity, porosity, NaCl content) and sensory (appearance, aroma, taste, texture). The results showed that the addition of fenugreek powder and seed mix influences the quality of bakery products, thus contributing to the improvement of nutritional value and the development of a functional bread with balanced sensory properties and potentially beneficial for health.



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Keywords: fenugreek, bread, seed mix, physicochemical analysis, sensory evaluation, functional foods

P17

Mint–orange peel jam: process and properties

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Sugar-based preservation techniques have been used for centuries to inhibit microbial growth, prevent spoilage, and maintain the sensory and nutritional properties of preserved goods. Mint is known for its aromatic compounds, antioxidant activity, and potential antimicrobial effects, while dried orange peel is a valuable source of dietary fiber, vitamin C, and flavonoids such as hesperidin and naringin. Combining these two ingredients in a sugar-preserved product not only enhances its sensory appeal but also increases its functional potential, offering a novel approach to developing value-added, plant-based preserves with potential health benefits. This study explores the development and characterisation of an innovative sugar-preserved product: mint and dried orange peel jam. First, the product formulation was designed, and the technological process was established and implemented. The final product showed a process yield of 31.73%, a high energy value of 255 kcal/100 g, and a carbohydrate content of 65 g/100 g (of which 64 g are sugars). The jam also contains 1.5 g/100 g of dietary fiber, primarily from the orange peel, while protein, fat, and sodium levels are minimal. The vitamin C content was determined to be 7.2 mg/100 g, and total acidity reached 0.56% (malic acid equivalents). The results confirm the product's compliance with the standards for sugar-concentrated fruit preserves, highlighting its nutritional profile and potential for commercialisation in the artisanal or niche food market.



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P18

**Trace metal evaluation in mint teas: balancing nutritional benefits and
toxicological risk**

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In the current context of concerns about healthy and balanced nutrition, aromatic and medicinal plants, such as mint species (*Mentha* spp.), represent a valuable source of bioactive compounds and essential minerals, with multiple applications in the food and pharmaceutical industries. Mint teas, appreciated for their pleasant aroma and therapeutic properties, contain active compounds such as menthol, polyphenols and flavonoids, along with macroelements (Ca, K, Mg) and microelements (Fe, Cu, Mn, Zn), which contribute to maintaining the health of the body.

The objective of this study was to evaluate the mineral composition of some mint tea varieties available on the Romanian market, using modern analytical methods. The water content was determined by the thermogravimetric method using a Sartorius thermobalance, and the mineral analysis was performed by X-ray fluorescence spectroscopy, using the Hitachi MET8000 equipment.

The results revealed significant differences between the analyzed mint tea samples (CM1–CM5), determined by origin, degree of processing and drying conditions. Sample CM4 was distinguished by a high content of essential minerals, also



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increased levels of cadmium, which affects its food safety. CM5 had the lowest content of nutrients, while CM1 demonstrated the best balance between nutritional value and consumption safety, with optimal intake of calcium, iron and copper and without exceeding the limits for toxic metals (Hg, Pb, Cd).

By calculating the relative score of essential minerals and toxic metals, it was confirmed that CM1 presents the best integrated quality-food safety profile. The study highlights the importance of evaluating minerals in teas for identifying superior quality products and for developing innovative products with real nutritional and functional benefits.

The general conclusions show that mint teas constitute an important natural source of minerals, and careful selection of species and technological control can contribute to optimizing nutritional value and promoting a healthy and sustainable diet. The results obtained support the valorization of mint not only as an aromatic ingredient, but also as a functional component in the development of innovative food products, which have beneficial potential for consumers' health.

Keywords: food safety, functional product, teas and beverages

P19

**Sustainable valorization of apple pomace generated during fruit
brandy production – transforming waste into a valuable resource**

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Introduction: Romania has a long-standing tradition in the production of fruit brandies [1]. During the apple brandy production process, apple pomace is



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generated, which is rich in dietary fiber, pectin, simple sugars, polyphenols, and essential minerals [2].

Aims: This study reviews recent research (2017–2025) on apple pomace, focusing on its biochemical composition, bioactive compound recovery, and potential use as a functional ingredient within the circular economy framework.

Literature review: The review analyzed recent studies from major databases (ScienceDirect, Web of Science) on the biochemical composition and valorization of apple pomace, identifying current trends and perspectives for its use in food and biotechnological applications within the circular economy.

Results: A recent study by Ciurlă et al. (2025) characterized apple pomace extracts and reported that the total phenolic content reached 26.94 ± 3.76 mg GAE/g DW (gallic acid equivalents per gram of dry weight), while the antioxidant capacity was determined as 193.26 ± 0.24 mmol TE/g DW (Trolox equivalents) [3]. These results demonstrate the substantial antioxidant potential of apple pomace extracts, attributable mainly to polyphenolic constituents. Moreover, a review by Vandorou et al. (2024) highlighted the successful incorporation of apple pomace extracts and powders into various food matrices, including bakery, dairy, and meat products. Such enrichment resulted in increased phenolic content, elevated dietary fiber levels, and enhanced antioxidant activity of the final formulations, confirming the functionality and bioefficacy of apple pomace-derived ingredients [4].

Conclusion: Apple pomace is a rich source of polyphenols and dietary fibers with strong antioxidant properties. Its sustainable valorization through extraction, fermentation, or incorporation into foods supports the circular economy and enhances the nutritional and functional quality of food products, offering a viable strategy for innovation in the agri-food sector.

Keywords: apple pomace, brandy production, valuable resource, circular economy.

Acknowledgments: This work was supported by the project entitled Enhancement of Agro Food Chain Byproducts through Innovative and Sustainable Methods (no 2024-1-RO01-KA220-HED-000246776) co-funded by the European Union.

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P20

**Development and characterization of two varieties of vegan
soup concentrates with natural ingredients**

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A vegan alternative to soup concentrates was designed and developed from an organoleptic and physicochemical point of view in two varieties: with basil, oregano, and thyme (S1) and with ginger and turmeric (S2).

The two variants of the vegan alternative to soup concentrates (with basil, oregano, and thyme, and with ginger and turmeric) are defined by organoleptic



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properties that are distinct from those of classic soup concentrates, due to the healthy ingredients added to the composition of the products obtained, with an aroma distinct to these ingredients.

The calculated values for water content, NaCl, and acidity of the vegan alternative to soup concentrates comply with the standards specific to this range of food products. The energy value of the vegan alternative to soup concentrates is due to the caloric elements: lipids, carbohydrates, and proteins in its composition. After processing, the two types of vegan alternatives to soup concentrates were packaged in 30 g jars and Al foil, stored at freezing temperature.

The study successfully developed two varieties of vegan soup concentrates that offer a clean and nutritious alternative to products currently on the market. S2 stands out for its superior functional potential, while S1 appeals for its balanced sensory qualities. The integration of these ingredients not only improves the flavor but also fortifies the products with natural antioxidants, contributing to the nutritional value of the concentrates. These products can be an industrial-scale alternative to meet the demand in the "plant-based" segment.

Keywords: vegan soup concentrates, natural ingredients, basil, oregano, thyme

P21

**Design and development of a range of chicken and turkey
sausages**

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Poultry meat is one of the most nutritious, characteristic, and popular foods on the market, a top-quality raw material that helps meet the needs of the human



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body. Poultry meat plays an essential role in the harmonious development of the human body and is considered an indispensable food product in a defined and balanced diet. Consuming turkey meat helps strengthen the immune system due to the tryptophan it contains. Some studies have shown that the manifestations of certain autoimmune diseases begin to decrease when exposed to this amino acid, which is beneficial for a healthy body.

The production and consumption of chicken sausages have increased worldwide, becoming increasingly popular due to their sensory characteristics and manufacturing technology.

The purpose of this paper was to document and analyze the current state of research in the field, to obtain and evaluate the organoleptic properties of two types of sausages: chicken and turkey, and to determine their energy value.

The research confirmed that it is feasible to develop a range of sausages with an improved nutritional profile (low fat, high protein) using chicken and turkey meat. By precisely adjusting the meat ratio and including natural emulsifiers, a product with competitive physical, chemical, and sensory characteristics was obtained. The optimized range represents a valuable alternative to traditional products, meeting market demands for healthy meat products.

Keywords: chicken and turkey meat, sausages

P22

Flavored alcoholic beverages with natural ingredients

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In recent years, in alcoholic beverages market from European countries



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"clean label" claims include showcasing transparency through the absence of additives or preservatives and the use of organic and natural ingredients. The most popular flavours in flavoured alcoholic beverages include exotic fruits such as orange, lemon and lime, as well as some berries, such as blackberries. Alcohol by volume can range between 5.0 - 34.4%. The alcoholic beverage industry shows that flavoured alcoholic beverages are prepared with a base of vodka. The purpose of this study was to design and characterize alcoholic beverages with improved antioxidant properties by adding flavouring from natural sources. The sensory properties, total acidity, total dry extract and relative density of the flavoured alcoholic beverages were analysed. The beverage preferences of consumers are currently shifting towards from innovative drinks.

Keywords: alcoholic beverages, natural sources

P23

**Evaluation of the nutritional and functional properties of
pumpkin jam enriched with ginger and lemon**

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This study was motivated by the objective to enhance the value of an often-underutilized vegetable, the pumpkin, by processing it into a novel product that is more palatable, nutritionally superior, and readily accepted



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by consumers. The combination of pumpkin with functional ingredients such as ginger, lemon, and raisins led to the successful development of a jam with an improved nutritional profile and a distinct sensory identity. For the comprehensive characterization of the developed product, a series of analytical and sensory determinations were conducted. The analytical results demonstrated that the polyphenol content in the final jam product was elevated compared to the principal raw materials (pumpkin and ginger), a finding attributed to the inclusion of lemon juice. Similarly, the antioxidant activity, assessed via the DPPH free radical scavenging assay, showed superior values in the final product. This enhancement is explained by the high concentration of antioxidant compounds in the lemon juice, which are efficient DPPH radical scavengers. The addition of lemon juice also affected the jam's pH level, with the resulting values remaining consistent with published literature. Furthermore, the jam exhibited higher moisture content than values previously reported for similar products by other researchers. Consequently, the product's lower reducing sugar content resulted in a soluble solids value that was below the typical range documented in the literature. Despite the reduction in sugar content, the pumpkin jam achieved a high degree of consumer acceptance. Sensory evaluation revealed that consistency and taste were the most highly rated attributes, while appearance and aroma received comparatively lower scores, indicating areas for future formulation refinement. In conclusion, the final product is considered a success, primarily due to its favorable nutritional composition, its appealing sensory characteristics, and the utilization of a cost-effective raw material.

Keywords: pumpkin, jam, polyphenols, antiradical activity, sensory analysis.



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**Nutritional and Functional Characterization of Black Lentil
Seed and Germinated Powder and Their Utilization in
Bread Fortification**

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The present study aimed to evaluate the nutritional, mineral (micro- and macroelement), total polyphenol, and phytic acid contents of *Lens culinaris* L. (black lentil) seed powder and germinated black lentil powder, as well as to assess their potential as functional ingredients in breadmaking. The germinated lentil powder was obtained after controlled sprouting (72 h, 25 °C), dried, and milled to a fine powder, while the seed powder was prepared from non-germinated seeds. Both matrices were characterized for their compositional and bioactive profiles. The results revealed a significant reduction in phytic acid and a marked increase in total polyphenols and mineral bioavailability in the germinated powder compared to the non-germinated seeds.

To evaluate their technological applicability, two bread formulations were developed: one using sourdough fermentation and another using baker's yeast. In each system, the non-germinated lentil seed powder was incorporated at 10%, 20%, and 30%, while the germinated lentil powder was added at 2.5%, 5%, and 7.5%. The obtained bread samples were analyzed for proximate composition (moisture, protein, lipids, ash, carbohydrates), mineral content, total polyphenols, and phytic acid levels.

The inclusion of germinated lentil powder significantly enhanced the nutritional value and antioxidant potential of the breads while lowering the phytic acid content, particularly in sourdough-based formulations, which exhibited improved



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mineral bioavailability. The findings demonstrate that partial substitution of wheat flour with black lentil germinated powder represents a promising approach for developing nutritionally enhanced and functionally active bakery products.

Keywords: black lentil, germinated powder, phytic acid, polyphenols, minerals, sourdough bread, functional foods

P25

**Multidimensional characterization of a raw vegan bar based on seeds
and dried fruits: physicochemical, functional, and sensory analysis**

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The primary objective of this research was the development and comprehensive characterization of a raw vegan bar. The formulation utilized common, nutrient-dense ingredients, specifically sunflower seeds, oat flakes, wheat bran, raisins, dried plums and carob. Following production, the bars underwent a series of physicochemical and bioactive analyses. Standard parameters, including moisture content, acidity, soluble solids, and salt content, were determined, and the resulting values were found to be consistent with previously published data. Furthermore, the product's functional properties were assessed by measuring its polyphenol content and its antiradical scavenging activity (RSA), determined via the DPPH assay. The results established that the final product possessed a superior nutritional profile, exhibiting a very good RSA percentage and a higher polyphenols content compared to values reported in the existing literature. The



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analysis of the proximate composition revealed that the carbohydrate content was aligned with literature values. However, the protein content was found to be lower, while the lipid content was higher than the data reported for similar products. The bar was subsequently evaluated through sensory analysis, which demonstrated high consumer appreciation. In conclusion, the bars developed in this study represent a nutritionally and sensorially attractive alternative. They are specifically positioned to meet the demands of consumers seeking no-added-sugar products, the vegan demographic, and individuals prioritizing healthier food options.

Keywords: bar, nutritional value, polyphenols, antiradical activity, sensory analysis.

P26

Effect of vegetable peel powders on the nutritional, phytochemical and sensory characteristics of pasta

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Pasta is a widely consumed staple, valued for its nutritional content, versatility, and sensory appeal. Conventional pasta made from refined wheat flour is often low in bioactive compounds and dietary fiber, highlighting the potential of functional ingredients to improve its nutritional and functional properties. This study evaluated the effect of partially substituting white wheat flour with powders derived from red beet, sweet potato, and celery peels on pasta composition, antioxidant activity, and sensory attributes. Four pasta formulations were prepared: PM – control (100% wheat flour), P1 – 5% red beet peel powder + 95% wheat



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flour, P2 – 10% sweet potato peel powder + 90% wheat flour, and P3 – 15% celery peel powder + 85% wheat flour, all containing egg, olive oil, and salt. Proximate analysis revealed minor variations in protein content: 10.35 g/100 g in P2, 10.45 g/100 g in P3, and 10.89 g/100 g in P1. Moisture was constant at 11.5 g/100 g. Energy values slightly decreased from 367.5 kcal/100 g (P1) to 364.5 kcal/100 g (P3). Total phenolic content rose from 20 mg GAE/100 g in the control to 58 mg GAE/100 g in P3, while DPPH antioxidant activity increased from 18% to 52%, demonstrating enhanced functional properties. Sensory evaluation showed that moderate substitutions (P1 and P2) maintained optimal acceptability, preserving texture, color, and flavor, whereas P3 exhibited a more intense color and pronounced taste. In conclusion, partial substitution of white wheat flour with vegetable peel powders significantly improved the nutritional and functional profile of pasta, offering a valuable alternative to conventional products while effectively valorizing vegetable by-products. These results highlight the potential of agro-industrial waste in developing nutrient-enriched, functional pasta.

Keywords: pasta, vegetable peel powders, functional properties, sensory evaluation

P27

Nutritional and phytochemical characterization of gluten-free bread based on tapioca flour, almond flour and apricot kernel flour (*Prunus armeniaca* L.)

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Bread is one of the most widely consumed food products worldwide, valued for its nutritional contribution, versatility, and sensory acceptability. However, conventional bread made from wheat flour lacks certain essential nutrients and is unsuitable for individuals with celiac disease or gluten intolerance. Consequently, the development of gluten-free bakery products enriched with functional ingredients represents an important area of research in food science. The objective of the present study was to investigate the effect of substituting tapioca flour (TF) with increasing proportions of apricot kernel flour (AKF) in combination with almond flour (AF), on the nutritional and phytochemical characteristics of gluten-free bread. The formulations were prepared using tapioca flour (TF), almond flour (AF), apricot kernel flour (AKF), salt, eggs, olive oil, yeast, sugar, almond milk, water, xanthan gum, and apple vinegar. Four bread variants were developed according to the following ratios: Control (PM: 0% AKF : 28% AF : 72% TF), P1 (2% AKF : 28% AF : 70% TF), P2 (4% AKF : 28% AF : 68% TF), and P3 (6% AKF : 28% AF : 66% TF). Significant differences were observed in the proximate composition and phytochemical profile as the proportion of AKF increased. Protein content increased from 9.4% in the control sample to 11.2% in P3, while total lipid content rose from 8.6 to 12.1%, reflecting the high concentration of unsaturated fatty acids in AKF and AF. Mineral levels (particularly potassium, magnesium, phosphorus, and iron) were also higher in enriched samples, ranging between 1.66% and 1.78%. The total phenolic content increased significantly from 34.2 mg GAE/100 g in the control to 58.5 mg GAE/100 g in the P3 sample, accompanied by enhanced antioxidant activity determined through the DPPH radical scavenging assay. Sensory analysis indicated that the bread samples with moderate levels of AKF substitution (P1–P2) exhibited the best balance between nutritional enhancement and sensory acceptability, maintaining desirable texture, volume, and flavor. The incorporation of apricot kernel flour, alongside tapioca and almond flours, significantly improved the nutritional and functional profile of gluten-free bread. This combination provides a promising alternative to conventional wheat bread, contributing to the diversification of gluten-free bakery products and supporting the sustainable use of plant-based raw materials.



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Keywords: gluten-free bread, tapioca flour, almond flour, apricot kernel flour, functional product

P28

Expertise of the soft drink juices Coca-Cola and Pepsi with sugar and without sugar

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The carbonated soft drinks have become among the most appreciated soft drinks worldwide, representing not only a food product, but also a cultural and economic symbol of modern society. The research experiment aimed to assess these varieties, both classic ones with sugar and those without sugar, from the perspective of chemical composition, nutritional values and organoleptic properties. Coca-Cola Classic contains approximately 10.6 g/100 ml, while Coca-Cola Zero Sugar promises a taste close to the original, without containing calories or sugar. In turn, Pepsi-Cola has a similar sugar content of 11.0 g/100 ml, while Pepsi Max is sweetened with aspartame and acesulfame K, offering zero calories. When authenticating branded products, it was also identified how consumers perceive some sensory characteristics - foaming index, acidity, PH index, nitrite level and radiation. The experimental results recorded were: variation in acidity (0.27-0.3 g/100 ml) in Coca-Cola lemon and Pepsi with lemon, and 0.315-0.34 g/100 ml in Pepsi with sugar/without sugar. A correlation is noted between the soluble substance and the extract of the 10.1% Coca-Cola with sugar and 90% extract, 10.2% Pepsi lemon with 85% extract. The sugar concentration in the analysed samples evolved between 5.9% -10.2% for Pepsi and between 9.9-10.1% for Coca-Cola. The pH ranged from 2.38 to 3.12, so an acidic range. Regarding the suspicions of sample adulteration, a significant decrease in the alkaloid is observed from 10-11 mg/100ml to 7.0-7.5 mg/100 ml, a nitrite level between 2790-3260 ppm for Coca-Cola, 1190-1689 ppm for Pepsi



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compared to the admissible nitrite limit of 70 ppm. This is exceeded 20-30 times. There is also suspicion of fraud in juices related to the radiation level UR/h which was 11-13 UR/h in Pepsi and Coca-Cola because the radiation level in juices should tend towards zero. Then, the food additives, the E150d caramel colorant and the synthetic sweeteners aspartame acesulfame K used in the preparation of the Coca Cola zero sugar-free assortment and the Pepsi Max assortment, as artificial additives, are suspected of harmful effects on health, this being associated with the level of nitrites and the radiation recorded.

Keywords: expertise, adulteration of soft drinks

P29

Expertise on the bioactive compounds of tomato juice and concentrate products

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The purpose of this work was to evaluate and compare the quality, sensory and physico-chemical characteristics of tomato juice and concentrated products, both homemade and industrially obtained. In the context of increasing consumer demands, in order to identify quality differences and contribute to the improvement of tomato juice and concentrated products, a comparative analysis of the sensory qualities of homemade tomato juice and concentrated products (tomato juice, tomato paste, broth and ketchup) was carried out, with commercial ones (tomato juice (Ciao) and broth (Răureni)). The level of pesticides and the level of radiation in tomatoes were determined to verify the permissible limit of pesticide concentrations used in tomato cultivation. Through the analysis of quality characteristics, tomato juice and concentrated products obtained from tomatoes were tested, by determining total acidity, pH, reducing sugar content, soluble dry



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matter content and salt content to characterize the quality and stability of the products. The variation in vitamin C levels and sulfur dioxide (SO₂) content in homemade versus commercial products provided clues about the nutritional, bioactive quality of the studied products.

Keywords: Tomatoes and bioactive compounds from tomatoes products

P30

**Development of a NADES-SPE Extraction Approach for Oliver
pomace: Selectivity and Antibacterial Evaluation**

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Background & Aim: Recovering bioactive compounds from agrifood by-products promotes a circular economy because of its potential in disease prevention, antioxidant and biopesticide properties, with promising applications in the pharmaceutical and biotechnology industries. Conventional organic solvents have limited efficiency in extracting compounds of varying polarity and can exhibit toxicity. Natural Deep Eutectic Solvents (NADES) offer an alternative, but their removal from extracts is challenging, as they cannot be evaporated like organic solvents [1]. This study investigates the removal of NADES from olive pomace (OP) extracts to recover phenolic compounds and determines the minimal inhibitory concentration (MIC) of the extract



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obtained under the best solvent.

Methods: A NADES was prepared and used to extract OP, with a 1:1 ethanol/water solution as control. Five different solidphase extraction (SPE) cartridges were tested for NADES removal using different conditioning and desorption solvents. Efficiency was assessed via spectrophotometric analyses of total phenolics and flavonoids content (TPC and TFC, respectively) and antioxidant activity (FRAP, DPPH-SA) [2]. MIC was determined by serial dilution in *S. aureus*, *E. coli*, and *P. aeruginosa* with a control.

Results: TPC and TFC in the NADES extract exceeded the contents obtained with ethanolic extraction. C18 and HLB cartridges with acidified methanol desorption achieved the highest recovery rates for TPC, TFC and best antioxidant activity, but a little below at the extract without SPE. Conditioning with ethanol and desorption with acidified ethanol resulted in slightly lower recoveries. MIC for *S. aureus*, *P. aeruginosa*, *E. coli* was 12.25, 50.00, 100.00 (mg/mL) respectively.

Conclusions: SPE effectively purifies NADES OP extracts, enabling the recovery of phenolic compounds free from the extracting solvent. The extract showed significant antibacterial activity in the assay.

Keywords: Bioactive compounds, green solvent, purification step

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Acknowledgements:

This work was supported by the Faculty of Pharmacy of the University of Porto, FCT/MECI and LAQV/REQUIMTE (UID/50006). T.F.S. acknowledges FCT/MCTES for PhD funding (<https://doi.org/10.54499/2022.13829.BD>).



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**Adding innovative ingredients to traditional bread - Bread with
beetroot and sunflower seeds**

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It is known that traditional bread, made from wheat flour, yeast, water and salt, has a low content of micronutrients, therefore there is an increased interest in adding ingredients that would increase the nutritional value and meet the demands of modern consumers.

Studies on compounds in beetroot have found numerous positive effects in preventing chronic diseases, but also in reducing the toxic effects of various substances in the body. The addition of beetroot to bread increases the nutritional value of the final product due to the increased content of polyphenols, including flavonoids and phenolic compounds, and mainly betalains.

Sunflower seeds are rich in healthy fats, beneficial plant compounds, but they are also a rich source of: Vitamin E, Vitamin B1, Vitamin B6, Selenium, Iron, Copper, Manganese, Zinc, Potassium. The increased interest in oilseeds, as an ingredient in bakery products, is a result of all the research in the field, which has demonstrated that these seeds have a high content of: vegetable proteins, polyunsaturated fatty acids, vitamins, minerals and phytoestrogens.

100 g of bread with beetroot and sunflower seeds contains: 7.33 g protein, 40 g carbohydrates, 1.66 g lipids, 2.3 g fiber and an energy value of 202 kcal.

The sensory analysis of the product presented in this paper was carried out using the 5-point hedonic scale method. Following the evaluations made by the 10 tasters, it was observed that the bread with beetroot and sunflower seeds was most appreciated in terms of texture, chewing behavior and overall acceptability.

Keywords: nutritional value, sensory analysis, beetroot



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**Adding innovative ingredients to traditional bread - Bread with
charcoal and pumpkin seeds**

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To obtain edible charcoal, raw materials such as: tobacco stalks, coffee bean husks, walnut shells, pistachio shells, coconut shells, etc. are used. The addition of this ingredient, less used in the kitchen, also attracted the curiosity of researchers to observe the final characteristics of the product and the behavior of this ingredient throughout the technological process. At a maximum amount of 1% activated charcoal, added to 100 g of wheat flour, better starch digestibility, lower bread hardness and a stable crust were found. The benefits of consuming vegetable activated charcoal are: it helps eliminate toxins, being of great help in treating kidney diseases, reduces LDL cholesterol and total cholesterol levels, reduces intestinal gas, and can treat diarrhea.

Seeds, in general, maintain their nutritional values even when subjected to a heat process. According to some studies, heat can even increase the availability of certain nutrients in seeds. The use of pumpkin seeds as an ingredient in bread is due to their high content of antioxidants, healthy fats and minerals. The benefits of consuming pumpkin seeds are: strengthening the immune system, improving digestion, maintaining the health of blood vessels, maintaining healthy bones, etc. 100 g of bread with charcoal and pumpkin seeds contains: 8 g protein, 45 g carbohydrates, 1,1 g lipids, 1,6 g fiber and an energy value of 221 kcal.

The sensory analysis of the product presented in this paper was carried out



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using the 5-point hedonic scale method. Following evaluations by 10 tasters, it was observed that bread with vegetable charcoal and pumpkin seeds was most appreciated in terms of texture, smell and taste.

Keywords: nutritional value, sensory analysis, charcoal and pumpkin seeds

P33

**The science of refinement: unveiling the chemical and sensory
signatures of matcha and gyokuro teas**

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Matcha and Gyokuro are two of the most refined varieties of Japanese green tea, recognized for their unique cultivation methods, complex chemical composition, and health-promoting properties. Both teas originate from traditional Japanese agriculture, where careful shading techniques, precise harvesting, and meticulous processing contribute to their distinctive taste and nutritional value. The evaluation of Matcha and Gyokuro demonstrates how traditional agricultural expertise merges with modern analytical science to create teas of exceptional quality, safety, and nutritional value. Their composition, characterized by high concentrations of amino acids, polyphenols, and antioxidants, supports their reputation as functional beverages with numerous health benefits. The rigorous processes of cultivation, processing, and laboratory verification ensure that these teas remain among the most sophisticated and beneficial products of Japanese tea culture, combining scientific precision with centuries-old craftsmanship.

The aim of our study encompasses an interdisciplinary perspective, combining



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analytical chemistry and food safety to evaluate composition, quality, and potential risks associated with heavy metal contamination.

The analysis was performed on tea samples available on the Romanian Market. The determination of polyphenols and antioxidant capacity was completed using UV-VIS spectrophotometric methods through Folin-Ciocalteu and CUPRAC assays. Heavy metal analysis was conducted using XRF spectrometry measuring concentrations of lead, cadmium, mercury, and chromium of samples. Sensory analysis complements the chemical evaluation by examining color, aroma, flavor, and aftertaste.

The results show a high content of polyphenols and antioxidants, but also a potential risk of heavy metals contamination.

Keywords: Food safety, Japanese green tea, Heavy metals, Risk assessment, Functional beverages

P34

**Phytochemical characterisation and antioxidant activity of
anthocyanins from edible flowers**

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Introduction: Anthocyanins, a subclass of flavonoids, are water-soluble pigments responsible for the characteristic red, purple, and blue hues of many plants, including edible flowers. Beyond their role in pigmentation and plant defense mechanisms, anthocyanins are increasingly recognized for their



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significant biological activities in humans, including potent antioxidant properties and therapeutic potential. Their structural diversity—shaped by different glycosylation and acylation patterns—strongly influences both their color stability and bioavailability, as well as their antioxidant efficacy [1]. Consequently, comprehensive phytochemical characterization of anthocyanins in edible flowers combined with antioxidant activity assessment is essential to identify novel natural sources of bioactive pigments for use in functional foods, pharmaceuticals, and cosmetic applications.

Aims: This study aimed to comprehensively characterize the anthocyanin profiles and evaluate the antioxidant activity of petal extracts from diverse edible flower species using advanced analytical techniques. The research sought to establish correlations between anthocyanin composition and antioxidant capacity to provide insights for selecting botanical sources with enhanced bioactive properties.

Materials and Methods: Petal extracts from edible flowers including violet (*Viola* sp.), passionflower (*Passiflora* sp.), tulip (*Tulipa* sp.), and rose (*Rosa* sp.) were analyzed for phytochemical composition and anthocyanin profiling using liquid chromatography—mass spectrometry (LC-MS). Antioxidant activity was assessed using the 2,2'-azino-bis(3-ethylbenzothiazoline-6-sulfonic acid) (ABTS) radical scavenging assay. Standard analytical protocols for compound identification and antioxidant evaluation were employed to ensure reproducibility and reliability of results.

Results: LC-MS analysis revealed the presence of diverse anthocyanin derivatives across all flower species examined, including delphinidin-, pelargonidin-, cyanidin-, petunidin-, peonidin-, and malvidin-based glycosides and acylated conjugates. Significant inter-species variations were observed in both anthocyanin composition and structural diversity, reflecting distinct biosynthetic patterns and enzymatic regulation of pigment synthesis. Antioxidant capacity determined by ABTS assay demonstrated substantial radical scavenging activity in flower petal extracts, with notable differences in antioxidant efficacy among the various botanical sources. Strong correlations were established between the presence of specific anthocyanin structures and their corresponding antioxidant potential.

Conclusion: This LC-MS-based analytical approach effectively characterized



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the anthocyanin profiles and antioxidant capacity of edible flowers, providing comprehensive biochemical data for the rational selection of anthocyanin-rich botanical sources suitable for functional food, nutraceutical, and cosmetic applications. The integration of structural identification with antioxidant activity assessment demonstrates the potential of edible flowers as valuable sources of bioactive natural compounds with significant therapeutic and industrial applications.

Keywords: anthocyanins, phenolic compounds, edible flowers, LC-MS, antioxidant activity, ABTS, phytochemical profiling

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Whipped by nature: aquafaba – amaranth mousse

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This study presents the development of a plant-based mousse that integrates food wastes like aquafaba, combined with residual amaranth solids, upcycled into a crunchy base layer, thereby enhancing texture and contributing to a zero-waste design.

The created functional vegan model system, shows strong nutritional and technological synergy between its components. The formulation was optimized with amaranth milk and fruit ingredients to achieve desirable sensory, nutritional and stability characteristics while maintaining a fully sustainable profile. Figs (*Ficus carica* L.) impart a caramel-like flavor, replacing refined sugar, while frozen sour cherries (*Prunus cerasus* L.) contribute moisture retention, and enrich the mousse with polyphenols and antioxidant compounds. Together, these balanced components demonstrate how fruits, legume and pseudocereal by-products can be transformed into high-quality vegan desserts, providing plant-based proteins, essential fatty acids, fibers, antioxidants, and minerals, and highly achievement: the reduction of animal-derived ingredients dependence.

The product concept embodies a novel example of circular food innovation, meeting not only the demands of society, but also showing a positive environmental impact, by minimizing the waste, increasing food security and sustainability by lowering the greenhouse gas footprint.

Keywords: vegan innovation, sustainability, zero waste, circular economy

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**Heavy metal contamination in legumes: food safety
evaluation of lentils, chickpeas, and beans**

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Lentils, chickpeas, and common beans represent three of the most important grain legumes, providing essential plant-based proteins, carbohydrates, fibers, and minerals that support global nutrition and food security. Their security can be compromised by heavy metal accumulation resulting from soil composition, irrigation water, and environmental pollution. Heavy metals like lead (Pb), cadmium (Cd), mercury (Hg), and arsenic (As) may enter the food chain through root uptake, showing potential health risks when exceeding regulatory limits. The level of contamination depends on different environmental factors including soil pH, organic matter content, and agricultural practices such as fertilizer or pesticide use.

The aim of the study was to evaluate the level of heavy metals in lentils, chickpeas, and common beans using X-ray fluorescence (XRF) in order to quantify metal concentrations and ensure the compliance with Codex Alimentarius and EU standards. The regular analysis of vegetables is crucial to protect consumers and sustain their nutritional and environmental value.

Keywords: Food safety, XRF analysis, Contamination assessment, Risk evaluation



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**Comparative study of antioxidants and polyphenols in
two amaranthus species**

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Polyphenols and antioxidants are naturally occurring compounds that play a vital role in protecting the human body from oxidative damage. They help maintain cellular balance by reducing the harmful effects of free radicals and contribute to overall metabolic and immune health. Beyond their biological importance, these compounds also influence the flavor, color, and aroma of many plant-based foods, linking nutrition to sensory quality. Exploring their presence and activity in different plant species offers a better understanding of how natural compounds can support well-being and promote healthier dietary choices.

Amaranthus retroflexus and Amaranthus caudatus are two related plant species valued for their nutritional and medicinal properties. The aim of this study is to compare the polyphenol content and antioxidant activity in their leaves and seeds, targeting to understand which parts of the plants are richest in bioactive compounds. By reviewing and synthesizing available scientific literature, we found that leaves generally contain higher levels of polyphenols and exhibit stronger antioxidant activity than seeds, although differences between the species were noticeable. In particular, Amaranthus caudatus seeds showed significant phenolic content, while Amaranthus retroflexus leaves stood out for their antioxidant potential. These patterns suggest that the choice of plant part is important when considering their use in diets or as natural health supplements. The results also highlight the value of these species as accessible, local sources of antioxidants that can contribute to a healthier lifestyle and functional food development.



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Keywords: bioactivity, edible plants, natural antioxidants, plant extracts.

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*A comparative perspective between *Chenopodium album* and *Atriplex hortensis*: perception and nutritional value*

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Traditional leafy plants have been from long times part of local diets, appreciated for their adaptability and rich nutritional profiles. Even though some species are often overlooked today, they hold important bioactive compounds, minerals, and antioxidants that contribute to a balanced diet and sustainable food practices.

The aim of this study is to compare the nutritional importance of *Atriplex hortensis* and *Chenopodium album*, due to their high mineral content. The paper highlights how these species differ in rappsorts of nutrition but also how they have been used over time in human food. The investigation showed that *Atriplex hortensis* stands out for its higher protein and antioxidant content, while *Chenopodium album* offers higher amounts of vitamin C, minerals and fiber. In terms of tradition, both species were used as supplementary food sources. *Atriplex hortensis* was more commonly cultivated, while *Chenopodium album* usually grew wild and was gathered from spontaneous vegetation. Recent findings emphasize that both plants could play a meaningful role in contemporary nutrition, as locally available and nutrient-dense foods that may help enrich the diet and support a balanced, healthy lifestyle.

Exploring the composition and nutritional qualities of these plants draws attention to valuable yet often neglected local resources that have the potential to enrich



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modern diets. Their content in essential minerals, antioxidants, and bioactive compounds reflects a remarkable nutritional versatility that fits well within today’s pursuit of sustainable and functional food options. At the same time, understanding how these species are perceived in contemporary food culture offers insights into the changing relationship between tradition, health, and innovation. Reviving the use of such plants may not only diversify dietary choices but also strengthen local food systems and encourage a more conscious, balanced approach to nutrition.

Keywords: plant diversity, functional value, nutritional sustainability, traditional use

P39

**Studies on the influence of seasonal and collection factors on
the quality of raw cow's milk and halloumi cheese**

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Research background. Quality can be defined as the extent to which a set of inherent characteristics meets the requirements. The dairy industry must ensure the production of high-quality dairy products, ensuring the safety, nutritional value and specific sensory characteristics of these products. Milk and dairy products in the cheese category are an important source of subsidiary income for small farmers, respectively traditional producers. In this regard, it is very important to assess the effects of certain factors on milk quality at different stages of marketing channels and community participation in raising awareness of quality products manufactured according to standards. The aim of this work was to investigate the effect of seasonal changes and storage temperature of cow's milk, as raw material,



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on the composition of pasteurized milk and halloumi cheese, as well as the sensory characteristics of this cheese assortment. Halloumi is a semi-hard cheese, known for its firm texture, and its high melting point, making it ideal for grilling and frying.

Experimental approach. The raw milk samples were taken from the milk cooling tanks belonging to a local producer of traditional cheeses in Bihor County (Marghita city area). The samples taken monthly for 6 months were analyzed from the point of view of chemical composition in the Milk Technologies laboratory belonging to the Faculty of Food Engineering within USV 'King Mihai I' in Timisoara. The microbiological analyses were carried out by the producer within the microbiological analysis laboratory of the Bihor Veterinary Health and Food Safety Directorate based on the contract he has with the respective agency. The samples of Halloumi cheese were obtained in the milk processing section for cheeses belonging to the same producer. Halloumi cheese samples were obtained from milk samples selected on the same day for 6 months. For each type of sample, 10 L of whole milk was used. Each sample of milk and cheese was labeled and stored in the refrigerator at 4-6°C until the analyzes were performed.

Results and Conclusions. Variations in fat, dry matter, pH, and sensory characteristics (halloumi cheese only) of the samples were analyzed over a production period of six months. Experimental results showed that the composition of milk and halloumi cheese samples was affected by these seasonal changes. The pH value of halloumi cheese was stable during this production period. Also, milk analyses indicated that, at both temperatures (2°C and 6°C), total substances, fat, protein, total calcium, total phosphorus, total ash and non-protein nitrogen remained unchanged during storage of up to 7 days. Non-casein nitrogen increased slightly after 7 days at 2°C, but increased even after 2 days in milk stored at 6°C. Storing milk at 2°C for seven days and up to 4 days at 6°C did not affect soluble calcium, soluble phosphorus and titratable acidity. pH showed a significant decrease in milk stored for 4 and 7 days at 6°C. The cheeses produced from milk stored at 2°C contained more calcium and slightly more protein and fat, but in contrast, these samples had a lower water and soluble nitrogen content than the control cheese (made from milk from the day of delivery). Cheese produced from milk stored at 6°C retained less calcium, protein, soluble nitrogen and had a slightly lower fat content. The results of whey analyses showed that storing milk at



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2°C did not produce significant differences in whey composition. Following these studies, we can conclude that the seasonal factors and storage temperatures of raw cow's milk affect the functional properties of both milk and halloumi cheese.

Keywords: raw milk, Halloumi cheese, seasonal factors, stored temperature, quality

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**Tenebrio molitor Larvae: A Functional and Sustainable
Protein Source for Human and Animal Nutrition**

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The growing demand for alternative and sustainable protein sources has driven interest in edible insects [1]. Among these, *Tenebrio molitor* stands out for its high protein content, balanced lipid profile, and versatility, showing potential for use in innovative food products and sustainable production chains [2]. Its consumption for human and animal use is approved by the European Union under Regulation (EU) 2015/2283 on novel foods, recognizing it as a safe and sustainable nutritional source [3].

Total fat, protein, and ash were determined using AOAC methods [4], total carbohydrates estimated by difference, and energy value calculated. Fatty acid



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profiles were analysed by GC- FID [5], and total amino acids were released via acidic and alkaline hydrolysis, then derivatized and quantified by RP-HPLC [6]. Results showed that *T. molitor* exhibits a high protein content (47%) indicating that it is an excellent source of high-quality protein, for human and animal diets. Total fat content of 37% contributes significantly to the energy value, resulting in a high energy density (574 kcal/100 g). The lipid profile is dominated by oleic acid (48%), linoleic acid (23%), and palmitic acid (18%). Notably, monounsaturated fatty acids (50%) predominated over saturated (26%) and polyunsaturated (24%) fatty acids, reflecting a nutritionally favourable pattern associated with cardiovascular health and lipid balance.

The amino acid profile revealed high concentrations of glutamic acid (49 mg/g), aspartic acid (34 mg/g), and arginine (41 mg/g), important for metabolic, protein synthesis, and growth. Total amino acids were 396 mg/g, reflecting a high protein content and quality. Of this total, 145 mg/g were essential amino acids, with leucine (30 mg/g) and valine (26 mg/g) standing out. These branched-chain amino acids (BCAAs) are fundamental for muscle synthesis, recovery, and energy metabolism. These results demonstrate that *T. molitor* larvae provide complete proteins, with a balanced and nutritionally relevant amino acid profile, suitable for human and animal consumption.

T. molitor proved to be a highly nutritious protein source, combining high-quality proteins, essential amino acids, a balanced lipid profile, and high energy density. Its predominant monounsaturated fatty acids and the presence of BCAAs provide important nutritional benefits for human and animal health. These characteristics make it suitable for innovative food products and protein supplementation, aligning with sustainable and safe food practices.

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Acknowledgments

PT national funds (FCT/MCTES, FCT and Ministério da Ciência, Tecnologia e Ensino Superior) through the project UID/50006 -Laboratório Associado para a Química Verde - Tecnologias e Processos Limpos. AIProSos (Sustainable regional protein-rich foods), funded by CYTED (ref. 125RT0165).

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Development and characterization of high-protein bars enriched with edible insect flour

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As the global population continues to grow, the need to ensure sustainable and nutrient-rich food sources is becoming increasingly important. Edible insects such as *Acheta domestica* (house cricket) and *Tenebrio molitor* (mealworm) represent a promising alternative to conventional protein sources due to their high protein content, essential fatty acids, and complex mineral profile.

This study investigates the development of protein bars obtained by incorporating varying concentrations of insect flour (10%, 20%, and 30%), combined with oat



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flour and coconut oil. Standard analytical methods, including Kjeldahl, Soxhlet, and gravimetric analyses, were employed to determine the content of proteins, lipids, carbohydrates, and ash. The results showed that increasing the proportion of insect flour led to higher protein content (up to 19.03% in cricket-based bars and 18.05% in mealworm-based bars), while also influencing lipid and carbohydrate levels. Mealworm-enriched bars exhibited the highest lipid content (22.64%), whereas carbohydrate levels decreased with increasing insect flour concentration. Sensory evaluations revealed a high degree of acceptance, with the 30% mealworm-based bar being the most appreciated. These results highlight the nutritional and environmental advantages of insect-based protein bars, positioning them as a viable and sustainable food option.

Future research will focus on evaluating consumer acceptance on a larger scale and optimizing formulations to further improve sensory characteristics.

Keywords: sustainable protein, edible insects, alternative nutrition, food innovation, consumer acceptance

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**Formulation and physicochemical profiling of novel
vegan appetizer fortified with *Inonotus obliquus* (Chaga)
powder**

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The present study aimed to utilize Chaga (*Inonotus obliquus*) powder in



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the creation of an innovative, functional appetizer. The functional mushroom Chaga is recognized for its antioxidant and immunomodulatory properties. A spreadable appetizer formulation consisting of button mushrooms (*Agaricus bisporus*), lentils, and walnuts was developed and enriched with functional Chaga powder at two distinct incorporation levels: 4% (P%) and 8% (P%). A control sample (M), devoid of Chaga addition, was simultaneously prepared for comparative analysis. The obtained products were analyzed for their total polyphenol content (TPC), DPPH free radical scavenging activity (RSA), proximate composition, and sensory attributes. The products with added Chaga powder demonstrated significant superiority in terms of both TPC and RSA. This is essential, as these indicators are closely linked to the protective action and functional properties of foods. The best result was recorded for the P8% product. In terms of proximate composition, the P8% product registered the highest values for protein, total carbohydrates, and dietary fiber content; however, the P4% variety also demonstrated superior concentrations compared to the control (M). Concurrently, it was determined that the energy value of the products was inversely proportional to the incorporated Chaga powder percentage, with the control (M) providing the maximum caloric contribution. The sensory evaluation conducted on the P8% product demonstrated outstanding organoleptic attributes, with scores for all analyzed characteristics ranging from 4.80 to 4.95.

Keywords: Chaga powder, vegan appetizer, polyphenols, antioxidant activity, sensory properties



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*Effect of black pepper and turmeric fortification on the
antioxidant, nutritional, and organoleptic characteristics
of a natural citrus-ginger juice blend*

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A growing trend in the consumption of functional natural juices has been observed in recent years, stimulated by heightened public interest in promoting a healthy lifestyle and preventing chronic diseases. Juice derived from ginger, lemon, and orange falls within this category, offering a valuable contribution of bioactive compounds, vitamins, and minerals recognized for their protective physiological role. Within this work, an innovative natural juice (SN) was formulated using oranges, lemons, ginger, turmeric, and black pepper. This product was analyzed comparatively with the raw materials and a control juice (M) (orange, lemon, and ginger only) for its ascorbic acid content, total polyphenols, and DPPH free radical scavenging activity. Additionally, both juice formulations were assessed for their proximate composition, nutritional value, and sensory attributes. Among the raw materials, lemon pulp had the highest Vitamin C content, followed by oranges and ginger, while turmeric and black pepper registered insignificant concentrations of ascorbic acid. Consequently, the SN juice exhibited a lower Vitamin C concentration than the control juice. Regarding Total Polyphenol Content (TPC) and Radical Scavenging Activity (RSA), the maximal values were quantified in the turmeric powder, followed by ginger and black pepper. Consequently, the SN juice registered significantly higher values for these parameters compared to the control (M). Nutritionally, the fortification of the orange, lemon, and ginger juice with turmeric and black pepper led to elevated concentrations of protein, total carbohydrates, and dietary



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fiber, along with an increased energy value. The sensory analysis revealed that SN achieved superior scores across all evaluated organoleptic attributes compared to the control (M), despite the fact that the control product also secured notably high ratings.

Keywords: natural juice, black pepper, turmeric, antioxidant activity, sensory properties

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*Design, synthesis, and antioxidant evaluation of novel
Curcumin analogues for food-related applications*

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Curcumin, a natural compound known for its therapeutic properties, encounters significant limitations in practical applications due to poor solubility and low bioavailability in vivo. This study aims to overcome these challenges by synthesizing and characterizing novel asymmetrical curcumin analogues. Utilizing the Claisen–Schmidt condensation, a two-step reaction, we first conducted a base-catalyzed crotonic condensation between a ketone and an aromatic aldehyde, resulting in an intermediate with extended conjugation. The subsequent condensation, performed under acidic conditions, facilitated the formation of the desired asymmetrical analogues.

We successfully synthesized two new asymmetrical curcumin analogues in their flavylium form, characterized using 1D and 2D NMR spectroscopy and LC-MS analysis. Their pH-dependent behavior was investigated through UV-Vis spectroscopy, and antioxidant activity was assessed via the DPPH assay. The results validate the successful synthesis of these compounds and provide insights



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into their chemical stability and radical scavenging activity. These derivatives exhibit significant potential for applications in the food industry due to their enhanced stability and functional properties.

The flavylum form, recognized for its vibrant coloration, positions these analogues as promising natural food colorants with superior stability compared to native curcumin. Furthermore, curcumin-based films present an innovative approach to active and intelligent food packaging, capable of inhibiting microbial growth, extending shelf life, and providing real-time freshness monitoring via pH-sensitive colorimetric changes.

These findings underscore the potential of asymmetrical curcumin analogues as effective antioxidants and natural food colorants, paving the way for innovative applications in the food industry. The synthesis of these analogues not only addresses the limitations of traditional curcumin but also opens new avenues for their use in food technology and preservation.

Keywords: Curcumin, Asymmetrical Analogues, Food Packaging

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*Fig powder in the food industry: nutritional properties
and applications*

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Fig (*Ficus carica*) powder is increasingly used in the food industry due to its valuable functional and nutritional properties, which contribute to improving the



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nutritional quality and stability of food products. It represents an important source of carbohydrates (mainly glucose and fructose), dietary fiber beneficial for digestion and colon health, as well as vitamins (A, B1, B2, B6, K) and minerals such as calcium, potassium, magnesium, iron, and phosphorus. Fig powder is also rich in bioactive compounds, including polyphenols, flavonoids (such as quercetin and rutin), and carotenoids, which provide strong antioxidant activity. These compounds help combat oxidative stress and contribute to the prevention of chronic diseases. In addition, fig powder exhibits prebiotic properties, as its fibers can be fermented to produce short-chain fatty acids that support intestinal health, regulate immune and metabolic functions, and help maintain glucose balance. Compared with other dried fruit derivatives, fig powder has a moderate glycemic index, making it suitable for balanced diets. Furthermore, it possesses antimicrobial and anti-inflammatory effects, adding value to its use as a functional ingredient. Due to its complex biochemical composition, fig powder can be incorporated into a wide variety of food products to enhance both nutritional and sensory qualities. In bakery and pastry products, it improves fiber and antioxidant content, provides natural sweetness, and imparts a pleasant fruity aroma. In energy bars, it supplies natural sugars, minerals, and calories suitable for athletes. In dairy products such as yogurt, kefir, and cheese, it functions as a natural flavoring and sweetening agent, while also serving as a prebiotic. It can also enrich juices, smoothies, and functional beverages by improving nutritional value, texture, and antioxidant potential. In vegan and raw-vegan formulations, fig powder serves as a natural sweetener or binding agent, and in dietary supplements, it supports digestive health, immune function, and detoxification. Overall, fig powder is a versatile and valuable functional ingredient with multiple nutritional and technological benefits. Its inclusion in various food formulations contributes to cleaner labels, healthier and more balanced products, and increased consumer acceptance.

Keywords: fig powder; nutritional properties; functional ingredient; antioxidants; food applications

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Food safety of traditional products. Bihor cheese pie

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The increased interest in traditional products is also fueled by the farm-to-table movement and the desire to support local producers and small businesses. However, despite their intrinsic value, traditional products pose specific challenges in terms of food safety, often due to artisanal production methods, a lack of standardization of processes, and potential exposure to uncontrolled risk factors.

In this context, this paper aims to analyze the impact of food safety factors on traditional products, using Bihor cheese pie as a specific case study. Bihor cheese pie is an emblematic product of local gastronomy, appreciated for its unique taste and long tradition of preparation in the region. As a pastry product containing ingredients such as fresh cheese, eggs, and flour, and involving preparation and baking processes, it may be susceptible to certain risks if hygiene and safety standards are not strictly adhered to.

Modern food legislation, developed on the basis of sound scientific principles, aims to minimize these risks, protecting consumers from the potential dangers associated with poor nutrition. Ensuring a constant supply of safe and nutritious food is therefore not only an ethical requirement, but also an essential component of societal sustainability.

The main purpose of this paper is to draw up a HACCP plan appropriate to the manufacturing process, to identify and assess potential risk factors throughout the production chain of Bihor cheese pie, from the purchase of raw materials to the final product and storage, as well as to propose control and improvement measures to guarantee consumer safety, while preserving the traditional character of the preparation.



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Keywords: food safety, traditional products, Bihor cheese pie, HACCP plan

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*Obtaining and characterizing some varieties of bread with fruit and
vegetables. HACCP plan for the technological flow*

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Consumers are showing increased interest in functional foods enriched with natural nutrients. Bread, a staple food, is an ideal product for fortification with fruits and vegetables, thus improving its nutritional and sensory profile. This study aims to obtain and comparatively characterize three innovative bread varieties: pumpkin bread, beetroot bread, and blueberry bread, compared to a reference bread. The main objective is to evaluate the impact of these additions on the rheological properties of the dough, the quality of the finished product, and the content of bioactive compounds.

The three types of bread were obtained under laboratory conditions and evaluated from a sensory point of view. The energy value is explained by the nutrients: lipids, carbohydrates, and proteins in its composition. The pumpkin, beetroot, and blueberry bread varieties are defined by their distinctive organoleptic properties, due to the vegetables and fruits added during the preparation process, which give them a distinctive taste and aroma specific to the added ingredients.

A HACCP plan was developed for the technological flow of manufacturing pumpkin, beetroot, and blueberry bread assortments by identifying



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biological, physical, and chemical risks and analyzing critical control points. The principles of HACCP were followed in this study, establishing specific and effective procedures to ensure food safety for consumers.

Keywords: bread with fruit and vegetables, organoleptic properties, HACCP plan

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The effect of different goat's milk acidification treatments on the quality characteristics of Mozzarella cheese

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Research background. Milk acidification is an essential technological step in the process of making Mozzarella cheese that influences the texture, taste and spinning ability of the paste. In practice, this is carried out either by lactic fermentation (biological acidification), by inoculating the milk with starter cultures of lactic acid bacteria (*Lactobacillus delbrueckii* subsp. *Bulgaricus*, *Streptococcus thermophilus*), or by adding inorganic (hydrochloric, phosphoric acid) or organic (lactic acid, citric acid) acids to the milk (direct or chemical acidification). In the case of biological acidification, lactic acid bacteria convert lactose into lactic acid which leads to a decrease in the pH of the milk, preparing it for the subsequent stages of clotting processing. In the manufacture of Mozzarella cheese, thermophilic starter cultures (specific to those used to make yogurt) are used, to which *Lactobacillus helveticus* or *Lactobacillus casei* can also be added to intensify maturation. Direct acidification is a modern technique for the manufacture of



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mozzarella cheese in which specific acids are added directly to the milk in order to reduce the pH of the milk so as to reach the optimal value of 5.2-5.4. The aim of this study was to evaluate the effect of direct acidification treatment using 4 acids (hydrochloric, phosphoric, citric and lactic acid) compared to biological acidification on the yield and quality of Mozzarella cheese made from goat's milk.

Experimental approach. Fresh goat milk was obtained from a goat farm in Bihor County (Marghita city area). The samples of mozzarella cheese were obtained in the laboratory of Technologies in the Milk Industry, within the Faculty of Food Engineering. The fresh raw milk (20 L) was standardized to 3% fat and pasteurized at 62-65 °C for 20 minutes. The milk was then divided into 5 equal parts of 4 L each one. One part of the milk was cooled to 32-33°C, inoculated with thermophilic culture directly in the fermentation tank (0.008% [w/w], Easy-Set i482; Chr. Hansen) and kept at this temperature for 35 minutes. The other 4 parts were cooled to 4-6°C and acidified directly with hydrochloric acid (HCl), phosphoric acid (PA), citric acid (CA) and lactic acid (LA), 10%, until the pH reached the value of 5.3. The rennet (0.0045%, CHY-MAX® M 1000; Chr. Hansen) was added to all 5 valves and the mixture was allowed to harden for 30 minutes. After that, all five variants underwent the same technological processes for making mozzarella cheese. Cheese pH, total solids (TS), fat, protein, ash content and meltability were measured after one day of processing using the standard methods.

Results and Conclusions. The pH value of cheese samples made with HCl acidification followed by that acidified with PA were the highest among other treatments and control mozzarella cheese (5.19, respectively 5.20). Cheese made by direct acidification with CA gave the highest total solids (55.18%) followed by that made by direct acidification with lactic acid, while the lowest total solids content was at that made by direct acidification of HCl (51.10%). Also, all acidulates gained higher total solids content than control (51.00%). CA secured the highest values of fat content (23.92%) followed by that made by LA direct acidification (23.20%) when compared by other treatments and control mozzarella cheese. Mozzarella cheese manufactured by acidified using CA had a superior meltability compared to



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the control. Sensorily, Mozzarella cheese acidified using CA and PA obtained the highest mean score for all the sensory attributes and was significantly superior compared to the control. Therefore, the method of acidification of cheese milk are closely linked to the yield and the quality characteristics of Mozzarella cheese.

Keywords: goat raw milk, Mozzarella cheese, direct milk acidification, quality

P49

The impact of sweetener choice (raw vs. refined sugar) and botanical fortification (mint and ginger) on the antioxidant, nutritional, and sensory attributes of orange jam

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Concerted with contemporary societal preoccupations regarding healthful nutrition and sustainability, fruit jams present an optimal food matrix for integrating the hedonic experience of taste with the delivery of valuable bioactive compounds. Scientific literature consistently underscores the potential of jams to contribute meaningfully to the dietary intake of antioxidants and phenolic compounds, substances renowned for their capacity to mitigate oxidative stress and diminish the risk of chronic diseases. Consequently, the present study aims for the comprehensive development and characterization—encompassing physico-chemical, nutritional, and sensory analyses—of an innovative orange jam assortment fortified with ginger and mint, formulated in two distinct sweetening variants: utilizing refined white sugar (J1) and respectively, utilizing raw sugar (J2). For



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comparison, two simple variants of orange jam were also produced: one with white sugar (M1) and the second with raw sugar (M2). The J1 assortment recorded the highest content of ascorbic acid, total polyphenols, and the strongest antioxidant activity; the lowest values were signaled in the M1 product. These results highlight the importance of replacing white sugar with raw sugar in jam manufacturing, as well as the addition (even in reduced quantities) of ingredients rich in polyphenolic compounds and other antioxidants, such as mint and ginger, to obtain finished products that are more valuable in terms of natural antioxidant content. Additionally, J1 assortment is distinguished by a high content of dietary fiber in its composition, as well as an excellent sensory profile, being very highly rated by the panelists

Keywords: orange jam, polyphenols, antioxidant activity, sensory analysis, proximate composition.

P50

*Formulation, sensory, nutritional and physicochemical characterization
of a novel, plant-based kimbap fortified with *Hericium erinaceus* powder*

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Kimabap is an emblematic culinary component of Korean gastronomy, consisting of cooked rice and various fillings meticulously rolled in dried seaweed sheets and then sliced into small segments. While traditional



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kimbap incorporates meat and/or other animal-derived ingredients, this study develops a vegan kimbap variant that offers an innovative and nutritious culinary solution, aligning with current trends of increasing concern for health and sustainability. This kimbap formulation (KLM) substitutes the traditional meat component with Pleurotus mushroom, leveraging its recognized nutritional profile and textural similarity. Furthermore, Lion's Mane powder (*Herichium erinaceus*) was integrated into the accompanying dressing—a blend of vegan mayonnaise and gochujang (Korean chili paste)—to enhance the functional value of the final product. Fresh cucumber and carrot, along with Korean pickled yellow radish (danmuji), were also incorporated into the composition to optimize texture and flavor, while providing an augmentation of valuable bioactive compounds. Simultaneously, a control batch of vegan kimbap was prepared, which was identical in composition but lacked the incorporated *Herichium erinaceus* powder (K0). The raw materials and the final products were subjected to analysis for total polyphenol content and DPPH free radical scavenging activity. Additionally, the innovative product was characterized by its proximate composition and sensory attributes. Of the raw materials utilized, *Herichium erinaceus* (Lion's Mane) powder exhibited the highest total polyphenol content and superior antioxidant capacity, followed by Nori seaweed. This compositional difference resulted in the final product (KLM) demonstrating a distinct advantage over the control (K0) in terms of both polyphenol concentration and antiradical activity. The KLM product exhibited a high moisture level and was characterized by a low lipid profile. Its macronutrient composition was dominated by total carbohydrates, followed by protein, with a significant representation of dietary fiber. Organoleptic assessment, performed using a 5-point hedonic scale, indicated highly favorable results, as the product achieved very high scores for all evaluated sensory attributes.

Keywords: vegan kimbap, Lion's Mane, polyphenols, antioxidant activity, sensory analysis.



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Sous Vide Technique. Sustainable thermal process in the food industry

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The sous vide processing technique (from the French „sous vide” („under vacuum”), expresses the principle of the method)) represents a modern method of controlled heat treatment, widely used in gastronomy, with applications in the food industry for maintaining the sensory and nutritional qualities of products. The process primarily involves vacuum packaging, followed by gentle thermal treatment, monitored at moderate, constant temperatures (recommended within the range of 50÷90°C, using thermostated baths with water as the heating medium) and for a duration adapted to the matrix of the food material (red/white meat, vegetables, fruits, eggs), conditioned by physicochemical properties, thickness, and the targeted level of microbiological safety. The method requires interdisciplinary knowledge, based on thermodynamic principles and biochemical transformations. Understanding them contributes to the uniformity of the process, with minimal loss of water, volatile substances, and microbiological safety. By limiting contact with oxygen and using temperatures below the boiling point, significant reduction of fat oxidation, protein denaturation, and degradation of heat-sensitive vitamins is ensured. Research in the field supports that sous vide processing contributes to the improvement/intensification of the texture, tenderness, and juiciness of products by precise control of internal temperature and maintaining the structural integrity of tissues. Microbiologically, by carefully adhering to and monitoring the process parameters (vacuum/temperature/time), sous vide processing helps reduce common pathogenic flora (e.g., *Listeria*



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monocytogenes, *Salmonella* spp.). Therefore, the following advantages can be stated: 1. uniformity of processing; 2. extension of shelf life by inhibiting the growth of aerobic microorganisms; 3. the possibility of standardizing recipes and the reproducibility of results through digital control of process parameters. However, the efficiency of the technique is constrained by strict hygiene control throughout the processing chain, the tightness of packaging, and storage conditions (recommended temperatures, below 3°C to prevent the development of anaerobic microorganisms (e.g., *Clostridium botulinum*)) [1-6]. From a technological perspective, the translation and implementation of sous vide processing on an industrial scale require specialized equipment—vacuum sealers, thermostatic processing units, and HACCP monitoring systems—as well as personnel trained in the application of food safety protocols. Therefore, it can be stated that the sous vide technique represents an innovative method of controlled thermal processing, which "articulates" the requirements of modern diets with standards of food quality and safety. By optimizing time and temperature, this technology offers a balance between microbiological safety, nutritional value, and sensory quality of food, a major area of interest for applied research and sustainable development in the present and future food industry, serving as a sustainable alternative to intensive thermal treatments.

Keywords: sous vide technique, process parameters, quality indicators, reproducibility of results.

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P52

**Turning waste into value: eggplant and bell pepper byproducts
as potential ingredients for food and cosmetic
applications**

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The food industry generates vast amounts of by-products each year, resulting in significant economic and environmental challenges that demand urgent transformation of production systems and the agri-food value chain. Fruits and vegetables that fail to meet market standards, as well as processing residues such as leaves, stalks, pits, and peels, are frequently discarded, despite being rich sources of bioactive compounds with promising applications as natural, health-promoting ingredients in



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the food and pharmaceutical sectors [1]. Eggplant and bell pepper plants, once their production cycle ends, represent valuable by-products enriched in flavonoids and endowed with health-beneficial properties, particularly antioxidant activity, making them suitable candidates for incorporation into food products as functional ingredients [2]. Accordingly, this study aimed to characterize the phenolic compound profiles of eggplant and bell pepper leaves. Plant samples were cultivated in the Bragança region (Portugal), and extracts were prepared by dynamic maceration using three solvent systems: 100% water (aqueous extract), 100% ethanol (ethanolic extract), and an 80:20 (v/v) ethanol–water mixture (hydroethanolic extract). The phenolic composition was analyzed by HPLC-DAD-ESI/MS [3]. The resulting extracts exhibited a diverse and abundant phenolic profile, predominantly comprising caffeoylquinic acids and O-glycosylated derivatives of quercetin and kaempferol, compounds likely responsible for their bioactive potential. Overall, these findings highlight eggplant and bell pepper by-products as renewable, sustainable, and cost-effective sources of bioactive ingredients with promising applications in food and cosmetic formulations.

Acknowledgements: The authors are grateful to the Fundação para a Ciência e a Tecnologia (FCT) through national funds FCT/MCTES (PIDDAC): CIMO, UIDB/00690/2020 (10.54499/UIDB/00690/2020) and UIDP/00690/2020 (10.54499/UIDP/00690/2020); SusTEC, LA/P/0007/2020 (10.54499/LA/P/0007/2020); project UID/50006 - Laboratório Associado para a Química Verde - Tecnologias e Processos Limpos; and national funding by FCT, through the individual research grant (2024.04986.BD) of M. Rodrigues.

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P53

*From waste to resource: valorizing cereal by-products for enhanced
polyphenol recovery*

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Introduction: Cereal processing generates around 13% of global food waste, mainly in the form of bran and germ, which remain underutilized despite their richness in nutrients and bioactive compounds. These by-products are high in polyphenols, particularly ferulic, p-coumaric, and sinapic acids, known for their strong antioxidant activity. Valorizing them as functional ingredients or feed additives offers a sustainable strategy to reduce waste and improve resource efficiency [1].

Aim: This review is a literature-based research that is focused on evaluating the polyphenol valorization methods through fermentative and non-fermentative treatments for their possible applications in foods and feeds.

Literature review: To confirm our hypothesis, a comprehensive review of recent research published between 2017 and 2024 was carried out. In order to identify current trends, techniques, and knowledge gaps regarding the valorization of cereal by-products and their polyphenolic potential, the relevant information was evaluated.

Results: Recent studies show that cereal by-products, especially wheat, rice, and oat brans contain high levels of polyphenols (mainly ferulic and p-coumaric acids), with some fractions holding up to 90% of total phenolics



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[2]. Fermentation and mild pretreatments (enzymatic, ultrasonic, or deep eutectic solvent extraction) enhance the release and bioaccessibility of these compounds [3]. Biotechnological methods, including solid-state fermentation with *Lactobacillus* spp. or *Aspergillus niger*, can boost phenolic content by 20–40% and increase antioxidant activity (DPPH, ABTS) [2]. Additionally, fermentation generates bioactive peptides and phytosterols with anti-inflammatory and cholesterol-lowering properties [1]. Overall, cereal by-products show strong potential as sustainable sources of nutraceuticals and functional feed within a circular bioeconomy.

Conclusion: Cereal by-products, especially bran, are sustainable, cost-effective sources of bioactive extracts that are rich in polyphenols and have antioxidant potential. By using controlled fermentation, recovery is enhanced, and bran could be used in feeds or functional ingredients.

Keywords: cereal by-product; bran; polyphenols; valorization

Acknowledgements: This work was supported by the project entitled Enhancement of Agro Food Chain Byproducts through Innovative and Sustainable Methods (no 2024-1-RO01-KA220-HED-000246776) co-funded by the European Union.

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Cladodes flour from opuntia ficus-indica: a sustainable source of dietary fiber and a promising alternative for gluten-free formulations

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Supporting a growing global population requires significant environmental effort, making more sustainable food practices and appropriate dietary choices, such as low-fat and high fiber, mandatory. In Portugal, while prickly pear (*Opuntia ficus-indica*) is widely grown for its fruit and oil-bearing seeds, its cladodes are currently discarded [1]. Despite their potential value, they are yet to be integrated into the Portuguese diet [1]. This study proposes the valorization of these neglected cladodes for wider food applications, thereby enhancing the overall sustainability of the crop and providing a nutritionally valuable ingredient. Consequently, this work focused on producing flour from the cladodes, employing a methodology adapted from INIAV (2018) [2]. The resulting flour was chemically characterized using standard AOAC methods [3]. For the amino acid profile, RP-HPLC-DAD-FLD (Reverse-Phase High-Performance Liquid Chromatography with Diode Array and Fluorescence Detection) was employed. The sugar profile was subsequently determined using HPLC-ELSD (Evaporative Light Scattering Detector) [4]. All analytical results for the cladodes flour are expressed in dry weight. Cladodes flour is a low-fat ingredient (1.24%), possesses a high ash content (21.34%), and is a substantial source of dietary fiber (38.66%). The flour's protein profile (4.47%) is robustly supported by the prominent presence of glutamic acid, which is crucial for



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cognitive function and metabolism, and lysine, an essential amino acid. Since lysine is typically a limiting amino acid in cereal grains, the cladodes flour is established as an excellent agent for nutritional and protein complementation in baked products. Regarding simple sugars, the total content was 10.78%, with fructose, glucose, and sucrose being identified as the main components. As referred, it is a sustainable source of functional ingredients, enhancing the economic and environmental viability of the *Opuntia ficus-indica* crop. Given its promising nutritional profile and the inherent absence of gluten, this flour is validated as a viable ingredient for food formulations, representing a promising alternative for gluten-free products, particularly within the bakery sector.

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Acknowledgments: This work received financial support from the PT national funds (FCT/MECI, Fundação para a Ciência e Tecnologia and Ministério da Educação, Ciência e Inovação) through the project UID/50006 -Laboratório Associado para a Química Verde - Tecnologias e Processos Limpos. Liliana Espírito Santo is grateful for her research Grant (Ref. COMPETE2030-FEDER-02182500). Also, to Paulo Costa – Olaia Natura, due to the assignment of the samples.



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***From fields to pharmacies: repurposing of AHAS herbicides against
fungal targets through computational modeling***

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Drug-resistant fungal infections are rising, while current treatments are increasingly ineffective and often toxic. Discovering new antifungal agents is essential to combat resistance and protect vulnerable patients. Repurposing known compounds offers a fast and cost effective path to novel therapies. Innovative strategies, such as computational modeling, are promising tools for discovering safer and more effective treatments. In this context, recent studies have highlighted AHAS-inhibiting herbicides as highly promising candidates. AHAS, an enzyme found in plants and microorganisms but absent in animals, is of particular interest due to its potential for a lower toxicity profile in humans. AHAS-targeting herbicides from diverse chemical classes (e.g., sulfonylureas, triazolopyrimidines, imidazolines) have demonstrated antifungal activity against multiple pathogenic species (*Aspergillus* and *Candida*). This study explores the antifungal potential of AHAS-inhibiting herbicides by integrating known biological data with computational analysis. In silico techniques including molecular docking and pharmacophore modeling, were used to investigate key interactions between herbicides and active site residues of fungal AHAS. Critical residues (K247, R376, S254, A191) were identified and incorporated into pharmacophore models. These models capture essential molecular features responsible for antifungal activity and can be applied in virtual screening to identify novel antifungal candidates.

Keywords: AHAS , pesticide , toxic , computational analysis



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*Obtaining and characterizing a dessert for people with special nutritional
needs*

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This paper describes the development of an innovative product for people with special nutritional needs, namely a dessert without the following classic ingredients: gluten, lactose, sugar, and eggs. Gluten-free flours were identified and used as alternative ingredients that comply with dietary restrictions.

In this context, several technological recipe variants were developed and tested to obtain a food product with optimal organoleptic properties (taste, texture, appearance). The macronutrient content (proteins, lipids, carbohydrates) and energy value were analysed.

The resulting product has an improved nutritional profile, with cocoa replaced by carob, dairy products replaced by tofu and coconut milk, and the inclusion of chia, quinoa, and cranberries. This resulted in a dessert rich in fiber, antioxidants, omega-3 fatty acids, and vegetable protein, with a potentially lower glycaemic index compared to traditional desserts.

For this study, five food ingredients were analysed which were added to the final dessert, purchased from specialty stores in Romania. These were: quince juice, quinoa flakes, blue poppy seeds, and tofu. The analyses performed consisted in evaluating the radical scavenging activity (RSA) and quantifying the polyphenol content (TP). For this purpose, alcoholic extracts were obtained from all the above-mentioned products. A 70% ethyl alcohol



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solution was used and 1:20 dilutions were made.

Keywords: dessert, people with special nutritional needs, alternative components, antioxidant activity

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The importance of food safety in ice cream production

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Gelateria, a universe of flavors and textures, creates tasty, creamy, and refreshing products. From traditional Italian gelato to fruit-filled sorbets, gelateria products are appreciated globally. However, beyond the pleasure of taste, there is a crucial responsibility, namely food safety. Ensuring that these products are not only delicious but also safe for consumption is a challenge for the gelato industry, directly influencing the image, marketing, and reputation of manufacturers and, most importantly, the public health of consumers.

Gelato production, although seemingly simple at first glance, is a complex process involving multiple stages, from the selection of raw materials to the storage and serving of the finished product. Each stage presents potential risks of contamination, and neglecting hygiene standards can lead to serious consequences, including food poisoning. Ingredients such as milk, eggs, cream, and fresh fruit are conducive to the growth of pathogenic microorganisms if not handled and stored properly. Furthermore, production equipment, if not cleaned and sanitized regularly, can become sources of



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cross-contamination. With the growing importance of food safety worldwide, public health agencies and governments are seeking more effective solutions to monitor production chains. This is where the HACCP system comes in, recognized as a fundamental management tool in ensuring food safety.

In this study, an HACCP plan was developed for the production flow of an ice cream product (rice-based) in accordance with the HACCP of the United Nations Codex Alimentarius Commission and the guidelines for its application.

Keywords: ice cream, gelateria, food safety, HACCP plan

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Study on the mineral content of some berries

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The aim of this paper is to present a review on the mineral content of some berries (blueberries, raspberries and strawberries). In this study we used as information resources databases such as USDA and scientific papers. Berries, in addition to having an average low calorie content: 36 kcal/100g (strawberries); 51 kcal/100 g (raspberries) and 64 kcal/100 g (blueberries), are also rich in antioxidants, fiber, vitamins (B, C and K) and minerals that contribute to heart health, protection against certain diseases and improved digestion. There are numerous studies that have demonstrated the chemopreventive properties of raspberries and strawberries in cancer. Regarding minerals content, raspberries registered the maximum average values of following parameters: ash (0.35



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g/100g); iron (0.45 mg/100 g); magnesium (19.2 mg/100g); phosphorus (27 mg/100g); zinc (0.22 mg/100g); copper (0.053 mg/100g); manganese (0.494 mg/100g). Strawberries has the greatest average content of calcium (17 mg/100g) and potassium (161 mg/100g). Blueberries have registered the lowest content of minerals. In conclusion, among the three fruits taken in our study, the information resources reveals that raspberries have the greatest minerals content.

Keywords: databases, blueberries, raspberries, strawberries, health benefits

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*Stinging nettle: how fermentation unlocks the hidden potential of *Urtica dioica**

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Stinging nettle (*Urtica dioica*) is a robust, long-lived herb that people have eaten and used as medicine for centuries; its leaves and stems are surprisingly nutrient-dense, offering vitamins A, C and K, important minerals like iron, calcium and magnesium, plus a range of plant compounds: flavonoids, polyphenols and amino acids, that together explain its antioxidant, anti-inflammatory, diuretic and immune-supporting effects.

Fermentation is an environmentally friendly biotechnological process that can improve the nutritional quality and the bioavailability of the compounds of vegetal origin. Of different techniques, lactic acid fermentation has got major attention due to its effect of stimulating the development of beneficial microorganisms (e.g., *Lactobacillus* spp.) and leading the formation of organic acids that lower the pH, prevent spoilage, and stabilize the bioactive fractions. In



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the case of the application of fermentation to the leaves and stems of nettle, it is a sure method to transform phytochemical intake, increase antioxidizing potency, and mitigate anti-nutritional factors (such as oxalates and nitrates) in addition to possibly releasing new bioactive metabolites with their health-directed functions. The plant material was collected from wild-growing populations from Bazoș, Recaș area, Timiș County (Romania). After harvesting, the nettle leaves and stems were carefully separated, cleaned to remove impurities, and homogenized prior to the fermentation process.

The aim of the study is to evaluate the bioactive compounds and microbiological activity during fermentation of *Urtica dioica* leaves and stems as well as health-promoting potential of the resulting products. The anticipated outcomes include the development of a functional fermented nettle product with potential applications in nutraceuticals and functional foods, contributing to sustainable use of wild edible plants and natural sources of bioactive compounds.

Keywords: bioactive compounds, antioxidant capacity, microbiological activity, functional foods.

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***Redefining the PKU diet: novel functional foods with low
phenylalanine and high nutritional value***

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Phenylketonuria (PKU) is an inherited metabolic disorder characterized by the deficiency of phenylalanine hydroxylase; the enzyme responsible for converting phenylalanine into tyrosine. This deficiency causes accumulation of phenylalanine in the blood and brain, leading to neurotoxicity if not managed



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properly. Effective treatment relies on lifelong nutritional intervention to maintain metabolic control and prevent cognitive and physiological complications. The therapeutic diet for PKU is semi-synthetic and low in phenylalanine, emphasizing controlled consumption of natural low-protein foods such as fruits and vegetables, complemented by phenylalanine-free protein substitutes and specialized dietetic products.

Patients’ typical energy intake ranges between 1,160–2,700 kcal/day, with macronutrient distribution of 7–17% protein, 46–69% carbohydrates, and 17–39% fat, alongside 7–20 g dietary fiber. Low-protein medical substitutes provide about 75% of daily nitrogen needs and are fortified with essential vitamins, minerals, and long-chain fatty acids.

The aim of this study is to identify potential new food sources with low content of phenylalanine, but able to provide essential nutrients for an optimized and sustainable PKU diet.

Novel or underutilized plant sources—including dudhi, eddoes, ackee, banana blossom, breadfruit, callaloo, and lotus root—have shown promise as culturally adaptable, low-phenylalanine options. Expanding the range of low-Phe foods through reliable data on amino acid composition improves the accuracy of dietary calculations and supports more flexible and culturally sensitive dietary management. Moreover, persistent deficiencies in calcium, iron, zinc, and vitamin B12 highlight the need for tailored supplementation.

Current evidence confirms that combining natural low-phenylalanine foods with fortified protein substitutes enables both effective metabolic control and balanced nutrition in PKU. Developing diverse, culturally inclusive dietary models based on accurate amino acid profiling of plant foods can improve adherence, quality of life, and long-term health outcomes. Continuous nutritional education and research into novel low-protein sources are essential to advancing personalized dietary therapy for PKU.

Keywords: phenylketonuria (PKU); functional nutrition; nutrient optimization; food innovation; metabolic disorders

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Comparative study of the nutritional value of vegetable oils



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In the food industry a crucial role is played by vegetable oils, making significant contributions to the energy provided in the human diet but it is important to highlight the nutritional benefits of certain products. Vegetable oils are a source of fatty acids (such as omega-3 and omega-6), which are crucial for the human body. The Food and Agriculture Organization (FAO) recommends consuming an average of 55 grams of fat each day for a healthy, balanced meal. The average annual consumption of vegetable oil in Romania is 13 liters per consumer, more than the average annual oil consumption on any other EU country. The aim of the study was to compare nutritional values of some vegetable oils obtained by cold pressing, including sunflower, walnut, olive and pumpkin oils. Sunflower oil is high in omega-6 fatty acids. It also has a high calorific value. It has 884 kcal per 100 grams. Cold-pressed walnut oil has approximately 900 kcal per 100 grams. It is a rich source of unsaturated fats, including omega 3 and omega 6 fatty acids (linoleic acid). Consuming walnut oil increases your intake of essential fatty acids, essential for healthy skin. Extra virgin olive oil is part of the omega 9 oil category and has 824kcal/100 grams. It is a good gastric dressing. It also has an anticoagulant effect. Pumpkin oil is rich in linoleic acid, which is a type of omega-6 fatty acid that has been linked to improved heart health and blood sugar control. In conclusion, not all fats are harmful to human health, but it is important to consume them in moderate amounts.

Keywords: vegetable oils, nutritional value, fatty acids

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Development and characterization of a walnut-enriched pork salami

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The paper aims to develop an innovative homemade salami enriched with walnuts and to conduct a sensory and physicochemical analysis of the final product. Salami is one of the most popular and widely consumed foods, appreciated for its rich flavor, whether enjoyed on its own or paired with other ingredients. The core objective of this study was to create a natural product with nutritional benefits, leveraging the wholesome properties of its key ingredients – pork and walnuts. To ensure a high protein content, only one type of meat – pork – was used as the raw material. The final product was free from additives and preservatives, making it a healthier option without potential long-term adverse effects. The salami was prepared using a custom recipe, refined through multiple trials and taste tests. Sensory evaluation was conducted by a panel of 10 tasters, who completed sensory sheets based on an organoleptic examination of the product. Additionally, physicochemical analyses were performed to determine moisture and total dry weight content, salt content (using the Mohr method), titratable acidity and ash. The results showed that all values obtained comply with the current national standards.

Keywords: salami, walnut, proximate composition of salami, nutritional profile