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ABSTRACT BOOK

International Congress and Expo on

Food Science and Technology

March 18, 2024 | Virtual

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March 18, 2024 | Virtual

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Welcome To ICEFST2024

Dear Colleagues,

We are delighted to announce and honored to invite you to the International Congress and Expo on Food Science and Technology (ICEFST2024) on March 18-20, 2024 in Barcelona Spain.

The ICEFST2024 aim is to become the most prestigious forum for the exchange of new ideas, technologies, and novel findings in a broad spectrum of scales ranging from the as well as in basic research and applications.

The primary goal of the conference is to promote research and developmental activities in Food Science and Technology and provide opportunities for the delegates to exchange new ideas and application experience face to face, to establish business or research relations and to find global partners for future collaboration.

The leading researchers, scholars and experts of the fields will be brought together to attend the international conference.

We warmly welcome the prospective authors who are interested in the sessions to submit abstract to ICEFST2024 to join in the conference.

We are looking forward to seeing you in Barcelona, Spain!

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March 18, 2024 | Virtual

The potentials of probiotics on Caco-2 cells against gliadin-induced inflammatory responses

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Abstract

Background: Celiac disease (CD) occurs by gluten ingestion and is associated with poor quality of life (QOL). Food-processing researchers are looking to develop high-quality gluten-free products with affordable price and launch them to the market to improve CD patients QOL. This study aimed to determine the effectiveness of a probiotic mixture in hydrolyzing gliadin peptides and suppressing gliadin-induced inflammatory responses in Caco-2 cell line.

Methods: Wheat dough was fermented by a probiotic mixture containing B. longum, L. acidophilus, and L. plantarum with a cell concentration of ca. 108 cfu per g of dough for 0, 2, 4 and 6 hours. The effect of the probiotic mixture on gliadin degradation was monitored by SDS-PAGE. The expression levels of IL-6, IL-17A, INF-γ as pro-inflammatory, and IL-10 and TGF-β as anti- inflammatory mediators were evaluated using ELISA and qRT -PCR methods to study the capacity of probiotic mixture to counteract the gliadin-induced inflammation in Caco-2 cells.

Results: Fermentation of wheat dough with a mixture of B.longum, L. acidophilous, and L. plantarum for 6 hours was effective in gliadin degradation and accompanied by IL-6 (P=0.004), IL-17A (P=0.004) and IFN-γ (P=0.01) mRNA and IL-6 (0.006), and IFN-γ (0.0009) protein reduced levels. Four hours fermentation with this mixture strongly decreased IL-17A (P=0.001) and IFN-γ (P=0.003) mRNA, and IL-6 (P=0.002) and IFN-γ (P0.0001) protein secretion, and increased IL-10 (P<0.0001) and TGF-β (P<0.0001) mRNA levels.

Conclusion: According to our findings 4 hours fermentation of wheat flour with a probiotic mixture containing B. longum, L. acidophilus, and L. plantarum (ca. 108 cfu per g of dough) might be a good strategy to develop an affordable gluten free wheat dough for CD patients.

Keywords: Gliadin; Celiac Disease; Probiotics; Caco-2 Cells.

ICEFST2024

March 18, 2024 | Virtual

Effect of extrusion process parameters on the functional, cooking, morphological, rheological and sensory characteristics of millet based extruded lentil: Essential Amino Acid Balanced Nutri Lentil

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Abstract

Introduction

To address the problem of poor protein quality in pulses, an essential amino acid (EAA) balanced Nutri Lentil is developed which resembles natural lentil in physical and sensory characteristics; improved nutrient delivery, reduced antinutrients and cooking time. The extruded lentil is a value addition by utilizing broken lentil (by-product of pulse milling industry) along with foxtail millet and a protein isolate. The present investigation studies the effect of extrusion process parameters on functional, cooking, morphological rheological properties and sensory profile attributes of nutri lentil.

Method

The Nutri lentil are extruded at pilot scale level by varying the feed moisture (26-30%) and die head temperature (85- 105°C). The samples are analyzed for functional properties viz. water absorption index (WAI), water solubility index (WSI), Browning Index (BI) and Bulk density; cooking characteristics viz. cooking time, and hardness; morphology and crystallinity by SEM (scanning electron microscopy) and X-ray diffraction and viscoelastic properties of lentil flour mixture. Quantitative descriptive analysis (QDA) and consumer acceptance test (9□point hedonic scale) was conducted for sensory profile evaluation.

Results

Extrusion significantly changed the bulk density, WAI and WSI which varied from 50.9- 75.8, 0.67-1.15g/cc, 2.02 to 3.12 %. and 20.72-50.76 %, respectively. Cooking time and hardness significantly varied ($P < 0.05$) from 6-18 min, 22-40%, and 2.87 to 15.45 N. G□ and G□ of dough increased at different moisture. Formation of air cells and thinner cell walls resulting expansion at elevation of temperature was observed in SEM. It was observed that extrusion method considerably reduced trypsin inhibitors (98.28%), phytic acid (90.14%) and tannin (88.88%) without altering the protein content. Furthermore, associated thermal treatment was most effective in improving in-vitro protein digestion (IVPD) and in-vitro starch digestion (IVSD) is up to 91% and 93%, respectively. Sensory evaluation through QDA showed increased intensity of descriptors like adhesiveness, beanie aroma and after taste. Consumer acceptability testing indicated significant differences in overall acceptability.

Keywords

Extrusion, Lentil, Millets, Rheology, Essential Amino Acid, Protein Digestion, Physicochemical Properties

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March 18, 2024 | Virtual

Exploring the effect of local fibre as food additive on glucose homeostasis and carbohydrate structure in healthy humans: a pilot study

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Abstract
Abnormal postprandial blood glucose (PPG) is considered as a strong predictor for developing metabolic diseases worldwide. Nowadays, little understanding is available on how a carbohydrate-rich food matrix and the starch structures within interact with the gastrointestinal tract to help in controlling PPG. In this investigation, the use fibre enriched flour will be used to explore the effect of adding the fibre as food matrix on digestibility of starch in vitro, and on PPG in healthy humans.

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March 18, 2024 | Virtual

Biochemistry of the essential oils and polyphenols of commercial Avocado (Persea Americana Mill.) from Spain

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Abstract

Avocado (Persea americana Mill.) is a crop in strong international demand, with a production of more than 60 tons in Colombia alone in 2021 [1]. However, during the marketing and processing of avocado products, waste consisting mainly of leaves, peels and seeds is generated, which can represent up to 35% of the weight of the fruit. Therefore, a sustainable management of this bio-waste should be encouraged in order to minimize its economic and environmental impact. In this sense, the valorization of avocado bio waste as a source of value-added compounds, such as polyphenols and essential oils, has emerged. This strategy would make it possible to obtain extracts that can be used as bioactive natural ingredients in various industrial sectors, applying the circular economy [1,2].

As such, this work proposes the simultaneous extraction of essential oils and polyphenols from avocado leaves, peels and seeds, obtained as bio-residues from a Japanese food manufacturing industry, combined with the chromatographic and spectrophotometric characterization of both fractions.

Phenolic extracts from the different biowaste samples were obtained by ultrasound-assisted solid-liquid extraction in a probe, where the optimal conditions were obtained by a screening experimental design and multi-response surface analysis. Such conditions consisted of 0.4 g of sample, 4 mL of 40:60 ethanol-water extraction solution, 10 min, and US agitation at 60% amplitude and no pulses. In addition, the phenolic content of the decoction waters obtained during the hydro distillation of essential oils has been analyzed. Our results show that both total phenolic and total flavonoid contents, determined by the Folin-Ciocalteu and Aluminium complexation spectrophotometric methods respectively, were significantly higher in avocado seed bio-residues, followed by avocado peels and leaves, for which similar contents were found. Further, both TPC and TFC were lower in the decoction waters, which could indicate the effectiveness of the developed USE method.

Complementarily, the antioxidant activity of all phenolic extracts was examined by the DPPH free radical inhibition method. The results showed that leaf phenolic extracts were the most effective against DPPH radicals, followed by those of seeds, peels and the decoction waters.

The essential oils of the different fractions, leaves, peels and seed were extracted by hydro distillation with cohobation. All of them showed as low amount of oil that only the leaves' and seeds' oils were analyzed. The sesquiterpenes compounds were more abundant in both of them.

Neither the phenolic extracts nor essential oils obtained showed antibacterial activity against S. saprofiticus and E. coli at the concentrations tested.

The proposed approach is simple and efficient for the integrated valorization of avocado waste, promoting the sustainable recovery of bioactive compounds with potential applications in cosmetic or agri-food industries as aroma and antioxidant additives.

Acknowledgements to the Spanish Science Ministry [PID2020-114714RB-100].

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ICEFST2024

March 18, 2024 | Virtual

Diagnostic Significance of Neutrophil to Lymphocyte Ratio in Recurrent Aphthous Stomatitis: A Systematic Review and Meta-Analysis

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Abstract

Introduction Recurrent aphthous stomatitis (RAS) is a prevalent ulcerative condition affecting oral mucosa. Objectives A systematic review and meta-analysis was performed to compare the level of neutrophil to lymphocyte ratio (NLR) between individuals with RAS and those who are healthy. Methods A systematic search for relevant publications before June 21, 2022, was conducted using Web of Science, PubMed, and Scopus. The results were presented as the standardized mean difference (SMD) with a 95% confidence interval (CI), and a random-effects model was used to calculate pooled effects due to the presence of significant heterogeneity. Quality assessment was performed using the Newcastle-Ottawa scale. Results Overall, 13 article with were included in the analysis. NLR was higher among patients with RAS compared to healthy controls (SMD = 0.50, 95% CI = -0.20 to 0.79, P = 0.001, I^2 = 91.5%). In the subgroup analysis based on the study design, it was found that retrospective studies showed higher levels of NLR in patients with RAS compared to healthy controls (SMD = 0.62, 95% CI= 0.16 to 1.08, P < 0.01), but these results were not applied to prospective studies (SMD = 0.35, 95% CI = -0.03 to 0.74, P < 0.07). Conclusion Elevated neutrophil to lymphocyte ratio revealed crosstalk between systematic inflammation and RAS.

ICEFST2024

March 18, 2024 | Virtual

Recent Advances on Camel Milk Microbiota

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Abstract

Camel milk is gaining widespread attention on the international market due to its significant nutritional value and health benefits. It is a highly nutritive medium that supports the growth of diverse bacterial species. To foster industrial interest and deepen our knowledge of camel health and disease, a comprehensive understanding of all aspects of camel milk becomes essential. Recently, research has been focusing on the study of the composition of milk microbiota given its crucial role in animal well-being and its direct impact on the quality and safety of dairy production. Despite its importance, information about the microbiota in raw camel milk remains limited. Our research, therefore, aimed to shed light on the complex microbiota of raw camel milk. Utilizing advanced high-throughput sequencing that targets specific regions of the 16S rRNA gene (V3-V4), this study provided a large-scale detailed characterization of the core bacterial microbiota in raw camel milk. Within this microbial community, beneficial lactic acid bacteria exhibiting significant antibacterial effects against a broad spectrum of pathogens causing food spoilage were isolated and characterized. Moreover, resistant pathogenic bacteria harboring antimicrobial resistance genes were also identified among camel milk microbiome. Together, these findings emphasize the coexistence of beneficial and pathogenic bacteria within raw camel milk, highlighting potential technological benefits for food preservation while also raising awareness about antimicrobial resistance concerns.

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March 18, 2024 | Virtual

An Overview of the Potentialities of Antimicrobial Peptides Derived from Natural Sources in the Food Field

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Abstract

Over the past decades, epidemiological surveys have given robust evidence about the association between regular antioxidant-rich intakes and the reduced incidence of inflammation, cancer, cardiovascular disorders, neurodegenerative diseases, obesity, and diabetes. Therefore, consumer demand for functional foods, supplements, and nutraceuticals that provide antioxidants has increased in the last decade. Plants are rich in trace components with antioxidant properties. Agro-food industries produce massive amounts of non-edible waste rich in secondary metabolites with antioxidant potentiality. These raw materials could be low-cost supplies for up-cycling active antioxidant phytochemicals. Of particular interest could be the recovery of phenolic compounds, abundant in plant residues, with functional potential that can be used in nutraceutical, biomedical, and cosmetic formulations. The valorization of plant by-products can be strategic for the agro-food industry and sustainability policies since preventing the ecosystems' eutrophication preserves ecological standards. Many strategies have been proposed for the recovery of these compounds at a laboratory scale. The problem to be addressed is how to recover these compounds on a large scale without decreasing their functional characteristics. This work discusses advanced technologies proposed for extracting polyphenols from agri-food by-products recently, considering not only the ability to extract the phenolic compounds exhaustively and preserve their antioxidant properties but also the ability to be applied in advantageous conditions of time and energy.

Keywords

Circular Bioeconomy, Waste, Phenolic Compounds, Food Biowaste, Nutraceutical, Cosmeceutical, Functional Food, Extraction Techniques.

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March 18, 2024 | Virtual

Findings on the heart in food animals from the perspective of veterinary supervision of food safety

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Abstract

Veterinary inspection of slaughtered animals is an important part of the protection of public health. The aim of the study was to compare the incidence of heart damage in different categories and species of livestock. For the purposes of the analysis, data on the results of the veterinary examination of all bovine, porcine, ovine and caprine animals raised and slaughtered in the Czech Republic between 2010 and 2021 were obtained. The findings on the heart broken down into acute and chronic findings were recorded by official veterinarians during the veterinary inspection of animals after slaughter.

The results show that the highest incidence of acute heart damage was found in piglets (14.92%). Significantly (P□0.05) lower numbers of findings were found in calves (4.03%) and cows (2.72%). For other classes of animals, they were below 1%. There were zero findings on the heart in does and kids. The highest numbers of acute findings in piglets and calves correspond to the fact that they are culled from farms due to a deteriorated health, lower condition and lower gains, which are likely caused by disease processes. Frequently, they are respiratory diseases with subsequent manifestations of acute lung inflammation, which in many cases passes to the pleura and then to the heart pericardium.

The highest numbers of findings of chronic heart damage (14.13%) were also found in piglets culled from farms due to poor condition or health. In many cases, chronic inflammation of the lungs passes to the pleura, and with the development of inflammation of the pleura, the inflammation spreads to the pericardium and results in inflammation of the pericardium.

Among fattening animals, the incidence of chronic heart damage was significantly (P□0.05) highest in finisher pigs (8.19%) followed by fattening bulls (1.33%), while it was lower in lambs (0.20%) and kids (0.15%). In adult animals, the incidence of chronic heart damage was significantly (P□0.05) highest in cows (7.10%) followed by sows (5.21%), while it was lower in ewes (0.86%) and does (1.46%).

When comparing individual categories and species of animals, the incidence of heart damage had the same order from highest to lowest as the incidence of lung damage in slaughtered animals reported in our previous study. The results document the fact that a certain part of chronic and acute lung inflammation passes to the pleura and subsequently to pericardium and thereby damage the heart in animals.

The results of pathoanatomical findings on the heart determined at slaughterhouses are important from the perspective of the possibility of using heart muscle as human food.

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ICEFST2024

March 18, 2024 | Virtual

The occurrence of parasitic findings on the heart detected during the veterinary inspection of animals at slaughterhouses from the perspective of human health protection

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Abstract

Parasitic invasions of the heart are usually not of such a scale to affect the overall health and well-being of the animals. However, in cattle and pigs, parasitic invasions of the heart have a zoonotic potential in terms of the risk of parasites being transferred from the heart muscle to undercooked food and from there to the human digestive tract and causing human parasitosis.

The aim of the study was to analyze the occurrence of parasitic findings on the heart in order to express the zoonotic risk associated with parasitic invasion of the heart of slaughtered animals for humans. The data for the analysis were obtained in cooperation with the State Veterinary Administration of the Czech Republic and included the results of veterinary inspection of all animals raised and slaughtered in the Czech Republic between 2010 and 2021.

In general, findings of parasitic damage to the heart were very low. With the exception of ewes (0.18%), the incidence was below 0.03%. No parasitic findings were detected in goats during the monitored period. In ewes, developmental stages of Taenia ovis were detected with a frequency of approximately 1 finding per 500 ewes. A low occurrence was found in cows, heifers, fattening bulls and calves, approximately 1 finding per 12,500 to 20,000 slaughtered animals, however, even low numbers of findings are significant, as findings of developmental stages of Taenia saginata present potential danger to humans. In sows, finisher pigs and piglets, parasitic findings were detected in the range of 1 finding per 9,000 to 16,000 slaughtered animals. Similarly, even the low occurrence of developmental stages of Taenia solium presents risk for humans.

The obtained results suggest that some sheep were reared on pastures where a dog infected with an adult tapeworm could have been present. Sheep become infected by ingesting tapeworm eggs which have been passed in dog faeces. The developmental stages of the tapeworm invade and settle in the muscle tissue and also in the heart of the sheep. In cattle and pigs, tapeworm eggs are introduced into the farm through feed containing tapeworm eggs from a person with an adult tapeworm excreting tapeworm eggs in the faeces. After feeding on such infected feed, there is an invasion by the developmental stages of the tapeworm of cattle or pigs and their settlement in the muscle and also in the heart muscle, where they are found during the slaughterhouse veterinary examination.

The importance of Taenia is mainly of relevance to the meat industry as infestation with the intermediate stages of these cestodes leads to important financial losses, due to downgrading and condemnation of meat and hearts.

This study was supported by ITA VETUNI (Project No. 2023ITA21).

ICEFST2024

March 18, 2024 | Virtual

Role of IoT in Revolutionizing Food Science and Technology

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Abstract

Our food system is on the brink of a revolution driven by the Internet of Things (IoT). This transformative technology is creating a network of interconnected devices, sensors, and data that is poised to disrupt every facet of food science and technology. At the heart of this transformation lies the ability of IoT to optimize food production. Imagine farms equipped with smart sensors that monitor soil moisture, nutrient levels, and even weather patterns in real-time. This data empowers farmers to make data-driven decisions on irrigation, fertilization, and pest control, leading to significant increases in crop yields. These intelligent systems can also automate tasks like irrigation and greenhouse climate control, reducing reliance on manual labor and ensuring optimal growing conditions. The future of food is brimming with possibility, and IoT is at the forefront of this exciting transformation. This webinar will provide a comprehensive overview of how IoT is revolutionizing food science and technology, fostering a more sustainable, efficient, and delicious food system for generations to come.

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March 18, 2024 | Virtual

Food Self-Sufficiency under Limited Resources: Economic Analysis for the Case of Israel

Prof Iddo Kan
The Hebrew University of Jerusalem, Israel

Abstract

We develop a partial equilibrium model for assessing the agro-economic implications of policies to stimulate food self-sufficiency as a strategy to reduce the dependence of a developed country on food imports. Application to the case of Israel indicates that, based on its current population and agricultural practices, the country can technically self-supply the amounts of vegetative food products recommended for consumption by the EAT-Lancet Commission. The policy requires considerable changes in local agricultural production patters and inflicts large welfare loss, most of it falls on the agricultural sector. However, self-supply of the dietary needs of Israel's population forecasted for the coming decades will require expansions of the country's agricultural land resources and/or maintaining large stocks of storable-food products.

ICEFST2024

March 18, 2024 | Virtual

Recent Advances of Magnetic Gold Hybrids and Nanocomposites, and Their Potential Biological Applications

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Abstract
Magnetic gold nanoparticles (mGNP) have become a great interest of research for nanomaterial scientists because of their significant magnetic and plasmonic properties applicable in biomedical applications. Various synthetic approaches and surface modification techniques have been used for mGNP including the most common being the coprecipitation, thermal decomposition, and microemulsion methods in addition to the Brust Schiffrin technique, which involves the reduction of metal precursors in a two-phase system (water and toluene) in the presence of alkanethiol. The hybrid magnetic–plasmonic nanoparticles based on iron core and gold shell are being considered as potential theragnostic agents. Herein, in addition to future works, we will discuss recent developments for synthesis and surface modification of mGNP with their applications in modern biomedical science such as drug and gene delivery, bioimaging, biosensing, and neuro-regenerative disorders. I shall also discuss the techniques based on my research related to the biological applications of mGNP.

Keywords
Nanohybrids; Magnetic Gold Nanoparticles; Nanocomposites; Surface Functionalization; Core-Shell Nanocomposites; Magnetic-Plasmonic Nanoparticles; Biological Applications

ICEFST2024

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Crafting Innovating Sustainable Solutions for Food Preservation

Dr. Coelho Lorena

CeNTI, Portugal

Abstract

The demand for sustainable and circular products for packaging industry showed the potential of biopolymers and natural materials as alternatives to the current solutions. Therefore, the development and use of these materials, as well as the replacement of conventional packaging products with natural materials like rosin resin derivatives for these purposes, holds a very high investment potential. Moreover, this natural resin has other advantages such as availability and chemical properties, which will lead to more competitiveness against resin derivatives derived from fossil sources, and obvious gains at environmental, economic, and social levels. Within this context, the opportunity arises for this industry to create synergies with other sectors, such as the natural rosin resin industry, developing highly innovative products.

Protective packaging and films for packaging food products have undergone a massive evolution in terms of aesthetics and design, as well as in terms of their technical properties, to actively contribute to food preservation.

Biopolymers, due to their biodegradability properties and being a sustainable alternative, have been positioned to produce protective films and food packaging. However, this option still needs improvements to achieve the performance of current packaging and conventional films, about some technical properties that increase the quality and durability of the product, thus avoiding food waste.

Therefore, the RN21 project pretends to enhance and mobilize research and innovation on the natural resin extracted from pine trees and their derivatives, as a “bio” raw material. Through this project, it is expected to enhance a wider range of ready-to-market applications and broaden the entire value chain of the rosin exploitation sector.

The RN21 project has received funding from the Environmental Fund through Component 12 – Promotion of Sustainable Bioeconomy (Investment TC-C12-i01 – Sustainable Bioeconomy No. 02/C12-i01/2022), of European funds allocated to Portugal by the Recovery and Resilience Plan (PRR), within the scope of the European Union (EU) Recovery and Resilience Mechanism, framed within the Next Generation EU, for the period 2021 – 2026.

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