ABSTRACT BOOK

SCIENTIFIC SUMMITS

WSFSN-2024

October 14-15, 2024 | Bern, Switzerland

WORLD SUMMIT ON

FOOD SCIENCE AND NUTRITION

FOREWORD

On behalf of the Organizing Committee, I warmly welcome you to the World Summit on Food Science and Nutrition (WSFSN-2024), a prestigious conference in the charming city of Bern, Switzerland, from October 14-16, 2024. Bern, the capital of Switzerland, is one of the most attractive and historically important places in Europe. The Suisse efficient railroad and highway system gives you the opportunity to explore both the wonderful nearby lakes as well as the highest alpine mountains of Europe.

WSFSN-2024 will be a 3 days event bringing together renowned researchers, scientists and scholars with Ph.D. candidates and post-docs from various communities including industry all over the world to exchange ideas, present latest research and discuss hot topics in these fields. Sharing their experiences, connecting all aspects of modern Food Science and Nutrition up to novel applications in devices based there upon.

We are looking forward to an excellent meeting with scientists from many different countries around the world, sharing their new and exciting results.
Hope you will share your results and ideas there.

Yours Sincerely,
Prof. Giancarlo Cravotto
University of Turin, Italy
Chair | WSFSN-2024

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PLENARY ABSTRACTS

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OCTOBER 14-15, 2024 | BERN, SWITZERLAND

Emerging Industrial Technologies in Food Extraction and Processing

Prof. Giancarlo Cravotto

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ABSTRACT

The increasing urge towards sustainable industrial protocols necessitates process innovation aimed at reducing energy consumption, enhancing efficiency, and improving product quality. This aligns with the principles of the circular economy, which focus on waste reduction, maximizing efficiency, and preventing pollution. Meeting these conditions can significantly benefit from so-called enabling technologies that drive disruptive process intensification. Consequently, these techniques have become prevalent in various processes over recent decades, improving heat/mass transfer while reducing plant size. However, the reproducibility of lab-scale processes using non-conventional technologies and the scalability claimed in numerous publications often prove challenging.Typical batch units for extraction and processing are becoming less competitive compared to flow-through plants. Technologies used in flow-through processes can significantly boost productivity, leading to faster and simplified downstream processes with easier purification and scaling-up. In the ongoing Industry 4.0 revolution, advancements based on cyber-physical systems and artificial intelligence have the potential to optimize and enhance processes by combining cascade units with continuous inline monitoring and even predicting solutions for unforeseen events.Alternative energy sources, such as dielectric, ohmic and infrared heating, ultrasound, hydrodynamic cavitation, extruders, pulsed electric fields, and cold plasma, have revolutionized standard processes. Additionally, hybrid or hyphenated techniques, which combine two different energy sources, often result in synergistic effects. This manuscript discusses relevant case studies of pilot and semi-industrial scale technologies for continuous or semi-continuous food processing, illustrating the potential and advancements in this field.

BIOGRAPHY

Giancarlo Cravotto is Full Professor of Organic Chemistry and Deputy Director of the Department of Drug Science and Technology (University of Turin). He started his academic career after one year of experience at the Technische Universität Berlin and few years in the industry. His research activity in the field of enabling technologies and industrial process intensification is documented by 550 scientific peer-reviewed papers

(H. Index 76, 25,850 citations - Google Scholar), 21 international patents and several book and book chapters. Non-conventional technologies applied from laboratory to semi-industrial scale include: ultrasound, hydrodynamic cavitation, high shear homogenizers, microwaves, radio frequencies, ohmic heating, pulsed electric fields, cold plasma, ball mills, extruders, subcritical water and supercritical fluid extraction reactors and hybrid combinations.He is Editor-in-Chief of Processes (MDPI, Basel) andassociate Editor or Editorial board member of several journals (by Springer Nature, Elsevier, De Gruyter, Frontiers etc.).

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Microencapsulation as Strategy to Reduce Salt Content: A Case Study in Meat Products

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ABSTRACT

This study is motivated by the food industry's need to reduce the salt (NaCl) content in processed products and is based on the hypothesis of the capability of salt microcapsules to prevent its solubilization in food matrices and to release in the oral cavity, thereby reducing the quantity of added salt while maintaining an acceptable salty perception. Additionally, it has been found that the addition of fish oil microcapsules, using maltodextrin and chitosan as wall materials, to enrich meat products in omega-3 fatty acids also increased saltiness scores [1]. This suggests that the addition of this type of microcapsules may also be used to enhance the salty taste perception and, consequently, reduce the quantity of added salt. These premises led to i) evaluating the effect of fish oil microcapsules on saltiness perception in meat derivatives to develop acceptable products labeled with nutrition claims related to sodium/salt, and ii) developing microcapsules of salt using different wall materials (maltodextrin, chitosan, alginate) and procedures (simple and double emulsions, liposomes) as NaCl replacers in meat products. For this purpose, on one hand, the addition of fish oil microcapsules in combination with salt reduction was evaluated in burger meats, and on the other hand, salt microcapsules with different wall materials were developed (Figure 1) and used as salt replacers in meat derivatives. The obtained results indicate that both strategies achieved acceptable meat products labeled with nutrition claims related to sodium/salt ("reduced salt" or "low salt content"), as well as the influence of the wall material of the salt microcapsules on sensory attributes of the meat products.

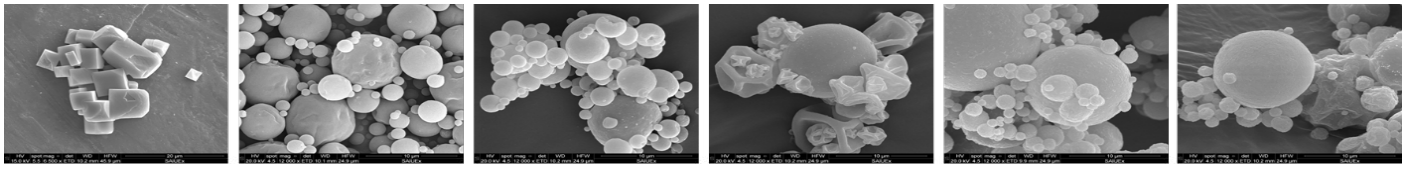

Figure 1. Scanning electron microscopy images from salt microcapsules with different wall material-preparations (a: control, b: maltodextrin, c: chitosan; d: doble; e: alginate; f: liposome).

KEYWORDS

salt reduction, saltiness, microcapsules

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BIOGRAPHY

Trinidad Perez-Palacios is a researcher in the Meat and Meat Products Research Institute at the University of Extremadura, in Spain. She also gives Food Technology lessons in the Veterinary degree and the Meat Science and Technology master. She has published around 80 papers in international journals, most of them in first quartile of the Journal Citation Report, and 50 international congress communications. Her main research line is about the microencapsulation of bioactive compounds to improve the nutritional quality of meat products, which is nowadays funded by two projects.

KEYNOTE ABSTRACTS

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Development of European Food Standard Agency-Approved Cardioprotective Functional Food Ingredients from Tomato

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ABSTRACT

Normal platelet activity is the key to maintaining hemostasis and normal blood flow. Hyperactive platelets interact with vessel walls by shedding macro-particles, secreting several adhesive growth factors, and inflammatory agents interrupt the blood flow and produce a pro-thrombotic state in people with obesity, diabetes, a sedentary lifestyle or hypertension, and in people who smoke. In general, the molecular events underpinning these processes are broadly similar. It has long been known that disturbances in blood flow, changes in platelet reactivity, and enhanced coagulation reactions facilitate pathological thrombus formation. Maintaining regular platelet activity is critical to overall hemostasis. It is, therefore, essential to find alternative safe antiplatelet inhibitors for the vulnerable population who has hyperactive platelets to reduce the risk of cardiovascular disease. Potent antiplatelet factors were identified in water-soluble tomato extract, significantly inhibiting platelet aggregation. Several human studies demonstrated the potency and bioavailability of active compounds in water-soluble tomato extract. The water-soluble tomato extract (now known as Fruitflow) became the first product in Europe to obtain an approved, proprietary health claim under Article 13(5) of the European Health Claims Regulation 1924/2006 on nutrition and health claims made on foods. In addition to reducing platelet reactivity, this tomato contains anti-angiotensin-converting enzyme and anti-inflammatory factors. Itlowers plasma TMAO in overweight and obese adults by modulatinggut microbiota,making it an effective and natural cardio-protective functional food.

BIOGRAPHY

Professor Asim K. Duttaroy currently serves as a Professor at the Faculty of Medicine, University of Oslo, Norway. His prolific career is marked by over 390 research papers, numerous book chapters, and several international patents (h-index 57, 10 index 156). He wrote or edited 15 books on basic nutrition and clinical sciences. Dr. Duttaroy's notable work includes discovering a tomato extract that prevents blood platelet aggregation, a breakthrough in cardiovascular health. His tenure at the Rowett Research Institute,

UK, was distinguished by his research on the fatty acid transport system in the human placenta, significantly advancing our understanding of nutrient transfer to fetuses. A respected Editor-In-Chief of the Food & Nutrition Research journal, Dr. Duttaroy also contributes to the editorial boards of Prostaglandins Leukotrienes and Essential Fatty Acids, Nutrients, and the European Journal of Lipid Science and Technology. His pioneering research extends to fetal brain development and the discovery of anti-platelet factors in tomatoes, leading to the development of Fruitflow®, the first European product with an approved health claim. This product is now available globally, testifying to Dr. Duttaroy's impact on health and nutrition. His expertise and extensive research experience make him an invaluable advisor for the Indian Extracellular Vesicle Society. His contributions to nutritional science, particularly in cardiovascular health and fetal development, align closely with the Society's focus on understanding and harnessing the potential of extracellular vesicles in medicine and biology.

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Exploring the Potential of Leaf Proteins: From Underutilized Biomass to Sustainable Food and Nutrition

Prof. Siew Young Ouek

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ABSTRACT

The utilization of leaf protein has advanced significantly, driven by the need for sustainable and alternative protein sources. Traditionally, leaves from various crops were used mainly as animal feed or compost. However, recent research has highlighted the potential of leaf protein concentrates (LPCs) as valuable nutritional resources for human consumption.

Initial studies focused on extracting protein from common green leaves like alfalfa and spinach, recognizing their high protein content. Technological improvements in extraction and purification have since enabled more efficient recovery of leaf proteins, preserving their nutritional integrity and functional properties.

Recent advancements have expanded the range of leaves used for protein extraction, including underutilized sources such as the Brassicaceae family (broccoli, cabbage, kale) and moringa. These developments are driven by a greater understanding of the chemical composition and properties of leaf proteins, which has opened new possibilities for their inclusion in food products. Research into the leaf proteins' functional properties has revealed additional benefits, including antioxidant and anti-inflammatory properties and emulsifying and gelling capabilities that enhance food texture and stability.

The shift towards plant-based diets and the demand for sustainable protein sources have further accelerated the exploration of leaf proteins. Startups and food companies are increasingly developing leaf protein-based products, ranging from protein powders to meat alternatives. The utilization of leaf protein has evolved from a niche research topic to a promising field with significant potential for global food security and sustainability.

BIOGRAPHY

Siew-Young Quek is a Professor and Director of the Food Science Programme and the founding Director of the Future Food Research Centre at the Faculty of Science, The University of Auckland, New Zealand. She is also a principal investigator at the Riddet Institute, the New Zealand Centre of Research Excellence in Food Research. She holds a BSc(1st class Hons.) in Biochemistry from the National University of Malaysia and a PhD (Chemical Engineering) from The University of Birmingham, UK. Combining

her experience in biochemistry, engineering, and food science, she has cultivated a profound research interest in food properties, functionalities, their interplay with processing aspects, and the creation of food products for health benefits and consumer enjoyment. Her current focus is on bioactive compounds, food flavour and alternative proteins. She is a Global Top 2% Researcher by Stanford ranking with an H-index of 52. Prof. Quek serves as the Co-Editor-in-Chief for Future Foods, an international food science journal dedicated to sustainability launched by Elsevier in May 2020 (impact factor 5.7) and an editor of LWT-Food Science and Technology (Impact factor 6.9).

INVITED ABSTRACTS

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Valorization of Pineapple Core Waste for Sequential Extraction of Antioxidant Compoundsand Carotenoids: Optimization through Ultrasound-Assisted Method and Box-Behnken Design

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ABSTRACT

The pineapple processing sector produces considerable waste, mainly pineapple peels (30-42%) and core waste (~10%), posing notable environmental concerns. Typically, these wastes are either disposed of in landfills, incinerated, or minimally used as animal feed, despite their rich content of bioactive components such as organic acids, phenolics, volatiles, sugars, insoluble fibers, pectins, vitamins, and minerals, which have substantial nutritional and technological value.

In this study, a pioneering cascade method involving ultrasound-assisted extraction (UAE) has been developed and optimized to valorise pineapple core waste by extracting antioxidant phenolic compounds and carotenoids. The process began with the extraction of antioxidant compounds, followed by a secondary extraction for carotenoids, crucial natural pigments. Using Box-Behnken Design (BBD) for optimization, the optimal extraction conditions were determined to maximize the yield of these bioactive substances from pineapple cores. The effectiveness of the extraction was evaluated based on total polyphenol content (TPC) and antioxidant capacity using ABTS and FRAP assays. Characterization of the carotenoids was performed using high-performance liquid chromatography with a diode array detector (HPLC-DAD). This research not only promotes sustainable use of pineapple waste but also demonstrates the potential to create valuable additives for the food, pharmaceutical, and cosmetic industries, encouraging a more circular and efficient use of resources in pineapple processing.

BIOGRAPHY

Ph.D. in Chemistry specializing in analytical methods and materials characterization. Associate Professor at the University of Alicante, leading research in food analysis and plastic material characterization. Published 47 articles with 2121 citations and an h-index of 25. Principal investigator in four projects securing over 400,000 euros. Experienced mentor, supervising 4 thesis and participating in 20 educational innovation projects.

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Significant Reno-Cardio-Metabolic Protection by the Food Additive Flexovital in a Murine Model Combining Unilateral Nephrectomy and Western Diet

Bengt Fellström
Lucas Carvalho , Maria Tyden , Bengt Fellström , Matheus Morais de Oliveira Monteiro , Daniel Andersson , Tomas Schiffer , Mattias Carlström
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ABSTRACT

Background and Aims: Cardiovascular complications are major threats in advanced renal failure and metabolic dysfunction with several unmet medical needs. This study aimed to investigate the therapeutic effects of a special food additive (FLEXOVITAL) in a newly developed mouse model of reno-cardio-metabolic disease, induced by moderate renal failure in combination with a special Western diet, rich in fat, carbs and salt.

Method: Male C57BL/6J mice (4 weeks old, n=18) were subject to unilateral nephrectomy (UNX), fed a Western diet rich in fat carbohydrates and salt (WD), and were followed for 12 weeks compared with SHAM-operated mice on standard chow (n=19). One group of UNX+WD mice (n=8) was fed a food additive (FLEXOVITAL; FLX) containing extracts of Rhodiola rosea, beetroot, and the amino acids arginine and citrulline. Body weight (BW), blood pressure (tail-cuff), endothelial-dependent vasorelaxation (myograph), glucose metabolism (IPGTT), body fat and lean mass composition (DEXA), adipocyte area, renal function (Glomerular Filtration Rate (GFR) by plasma clearance of FITC-inulin), and mitochondrial function (Oroboros, Highresolution respirometry) were measured together with biochemical analysis of heart injury (Troponin-I), inflammation (IL6) and histological analyses of the kidney and heart.

Results: BW gain was seen in the UNX+WD and SHAM group, and was 22% less in the FLX group ($p<0.05$). The fat/lean-mass ratio increased by 17% ($p<0.01$) and the adipocyte area by 31% ($p<0.001$) in the UNX+WD group but was virtually normalized in the FLX group ($p<0.01$). Fasting and non-fasting glucose levels became elevated in the UNX+WD group and were reduced in the FLX group ($p<0.05$). Impaired glucose clearance in the UNX+WD group, was partially preventedby FLX. BP significantly increased in the UNX+WD group (MAP = 78 □ 90 mmHg, $p<0.001$), and was largely prevented by FLX (MAP = 82 mmHg, $p<0.01$). Endothelial function was significantly impaired in the UNX+WD group ($p<0.01$) and partially preserved in the FLX group ($p<0.05$). GFR was reduced by almost 60% in the UNX+WD group but improved with

a 75% protective effect in the FLX group ($p<0.05$). Significant glomerular injuries with mesangial proliferation were observed in the UNX+WD group ($p<0.001$) but were less pronounced in the FLX group ($p<0.01$). Tubular injury score (1-10) increased from 1 in SHAM to 6.5 in the UNX+WD group and was partly protected (4.5) in the FLX group ($p<0.05$). TroponinI levels were 15 pg/ml in the SHAM group, markedly increased in the UNX+WD group ($p<0.001$), whereas completely reversed in the FLX group ($p<0.01$). No significant histological cardiac injuries or deviations could be demonstrated. Inflammatory activity (IL6) increased by 88% in the UNX+WD there was a trend of reduction in mice with FLX. Mitochondrial oxygen efficiency (P/O ratio) was improved in the kidneys of the FLX group compared to the UNX+WD group ($p<0.05$).

Conclusion: In the present multiorgan disease model, significant renal, cardiovascular, and metabolic dysfunction/injuries emerge in mice with a moderatereduction of renal function when fed a Western diet rich in fat, carbohydrates, and salt. Protective effects were noted by dietary FLX treatment in most functional assessments made in the model. This indicates FLX is a potential new treatment in patients with reno-cardio-metabolic disease. The next phase involves confirming these findings in the clinical setting.

BIOGRAPHY

Dr. Bengt Fellström is a distinguished nephrologist with an extensive academic and professional career. He earned his Bachelor of Medicine in 1970 and MD in 1976 from the University of Uppsala, followed by a PhD in 1981. He specialized in nephrology and internal medicine, eventually becoming a professor of nephrology in 2002. His research contributions include over 265 peer-reviewed articles, with a significant impact in nephrology, cardiovascular disease, and transplantation. Dr. BF has led numerous multicenter clinical trials, including the ALERT, AURORA, and NEFIGAN studies, which have shaped advancements in these fields. He has also secured significant research funding from prestigious bodies like the Swedish Medical Research Council and the pharmaceutical industry. Dr. BF actively participates in international conferences, serves on multiple scientific steering committees, and has supervised several PhD students. His collaborations with the pharmaceutical industry have been pivotal in the development of treatments for nephrology-related conditions.

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Food Science Challenges to Develop Alternative Protein Products with Similar, if not Improved Nutritional Value and Organoleptic Properties as the Meat and Fish Counterparts in a Sustainable Fashion and with Reduced Processing

Célia Ferreira

School of Food Science and Nutrition, Faculty of Environment, University of Leeds, United Kingdom

ABSTRACT

With the overgrowing population set to reach 11.2 billion people in the next 80 years the reliance conventional protein sources (meat, meat derivatives, fish) to meet the demand is becoming unattainable. Besides those sources create a huge environmental burden. It's imperative then to develop new sustainable alternative-protein rich foods to feed the ever-growing worldwide population, address the climate change issues and cope with societal challenges.

Unsurprisingly, the worldwide demand for alternative-proteins products has increased considerably, with the market projected to grow exponentially to approximately USD 290 billion by 2035, i.e. from 2% to 10–22 %. These products have not yet fully met the expectations of the consumer, although with relatively low-emission, some are much less nutritious than meat, highly processed and with many additives to achieve the desirable texture and flavor. These products also have the additional concern of presence of allergens and of developing mycotoxins harmful to the consumer. Equally, lab-meat still faces cultural constraints, safety concerns and a lack of a regulatory framework within European countries.

The main defy of meat analogues is how to obtain the meat like texture and flavor in a sustainable and cost-effective way. Several approaches will be discussed in this talk, with particular enphais to the use of bio-scaffolds and fermentation technologies.

BIOGRAPHY

Dr Célia Ferreira joined the University of Leeds, UK, in January 2015 as a Lecturer in the School of Food Sciences and Nutrition and the Director of the Master Program in Food Biotechnology. Dr Célia is the Principal Investigator of the Fermentation enabled novel proteins & Sustainability Group. She holds a foundation Engineering degree in Engineering Food Biotechnology from the Portuguese Catholic University, Porto,

Portugal and obtained a PhD in Sciences- Yeast cell and Molecular Biology in Carlsberg Research Centre, Copenhagen, Denmark and the University of Minho, Portugal. She has worked as a Postdoctoral fellow in School of Biology of the Minho University and after as a Lecturer in Glycomics (2009-2014). She was awarded several fellowships e.g. the Fulbright fellowship in 2007 spending 6 month in Technical Texas University, EUA, studying Lipidomics; the CNpQ visiting professor fellowship in 2010 spending 5 months in Universidade Federal do Rio de Janeiro, Brazil teaching Glycomics, being the most recent one the Michael Beverley Innovation Fellowship in 2023, UK, 1 year, developing a business project - STARProteins.

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Using a Continuous Glucose Baseline to Assess the Impact of Nutritional Interventions at Dinner

Célina Chkroun

Nestlé Research in Lausanne , Switzerland

ABSTRACT

Accurate and robust estimation of individuals' basal glucose level is a crucial measure in nutrition research but is typically estimated from one or more morning fasting samples. The use of Continuous Glucose Monitoring (CGM) devices presents an opportunity to define more robust basal glucose levels, which estimates can be generalized to any time of the day. Data drawn from four nutritional intervention studies performed on adults free from chronic diseases were used to define that basal glucose levels were optimally estimated using the 40th percentile of the previous 24 hours CGM data. This simple algorithm provides a Continuous Glucose Baseline over 24h (24h-CGB) that is an unbiased and highly correlated estimator ($r=0.86$, p-value<0.01) of standard fasting glucose. Moreover, the 2h-incremental Area Under the Curve (iAUC) and incremental glucose peaks (iCmax) of the Glucose Response (GR) to the controlled nutritional interventions from the four studies computed using the 24h-CGB or the standard fasting glucose as the glucose baseline are highly correlated (2h-iAUC: $r=0.93$, median residual=0.38 mmol/Lh; iCmax: $r=0.96$, median residual=0.2 mmol/L). In a clinical study with dinner interventions, the 24h-CGB basal glucose was evaluated against pre-intervention glucose in its use as glucose baseline to quantify the iAUC and iCmax of the GR to the intervention. We achieved a higher discrimination between the interventions when using the 24h-CGB (the effect size is increased, while the variability stays similar). We conclude that 24-CGB can provide reliable basal glucose estimates across the day while being more robust to interference than standard fasting glucose or pre-intervention glucose, adaptable to evolving daily routines and providing useful reference values for free-living nutritional intervention research in non-diabetic individuals.

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Non-Conventional Plant-Based Ingredients in Sourdough Breads Enhanced Nutritional Value and Impacted on Gut Microbiota

Federica Mastrolonardo

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ABSTRACT

STATEMENT OF THE PROBLEM:

Food digestibility and its impacton gutecosystem are increasingly recognized as essential for promoting healthier lifestyles. the synergiccombination of sourdough fermentation and the fortification with fermented plant-based substrates (including exploitable by-product)is strategy with potential for enhancing the health benefits of leavened baked goods that was no explored so far. This study aims to address this gap by designing and characterizing new sourdough breads fortified with apple by-products (AB), avocado, and walnut,and investigating their impact on gut microbiota and its metabolic answer.

METHODOLOGY:

Apple by-products, avocado, and walnut purees underwent fermentation with Lactobacillus plantarum, and non-conventional flours were obtained after freeze-drying of fermented matrices. Different percentages and combinations of such matrices were screened as new ingredients for making a baker's yeast wheat bread. A type II sourdough was also selected after a screening of different starters combinations. Two new sourdough breads were prepared combining sourdough fermentation and fortification with the selected combinations of non-conventional flours and characterized based on nutritional properties and digestibility. The impact of new fortified sourdough breads on the gut ecosystem was assessed in vitro using the SHIME® model.

RESULTS:
The fortified sourdough breadshad improved protein digestibility and starch hydrolysis, and enhanced content of dietary fiber, phenolic and unsaturated fatty acids. The in vitro administration promoted the synthesis of short-chain fatty acids in gut ecosystem, and expanded genera associated with potential positive health effects.

CONCLUSION:
The fortification of sourdough bread with fermented plant-based ingredients offers a promising approach for developing leavened baked goods with improved nutritional valuesand potential positive impact in gut ecosystem while also effectively utilizing food by-products.

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BIOGRAPHY

Federica Mastrolonardo is a third-year PhD student in Food Engineering and Biotechnology at the Faculty of Science and Technology, Free University of Bozen-Bolzano, Italy. Her research focuses on the digestibility of fermented food and formulation, specifically investigating the chemical and nutritional factors affecting digestibility and their impact on the human gut microbiome and metabolome. To replicate the functionality of the large intestine, she utilizes the Simulator of the Human Intestinal Microbial Ecosystem (SHIME®).

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Impact of Sugar Replacement in Biscuits Formulation: Technological and Nutritional Aspects

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ABSTRACT

Biscuits, representing classical snack consumed globally, are often produced with a high content of sugar, posing challenges for individuals with nutrition-related diseases. Since the overconsumption of sugars in diets is associated with many health problems, including diabetes, dental diseases, and obesity, this study explores the technological feasibility of producing low-sugar biscuits without compromising their sensory attributes. Various sugar substitutes, including isomalt, erythritol, and maltitol, were employed to formulate biscuits, with comprehensive assessments conducted on physical, nutritional, and sensory parameters. Results revealed distinct variations in sugar content and polyol composition, impacting biscuit coloration, texture, and nutritional profiles. Notably, isomalt exhibited unexpected colour characteristics, while formulations with erythritol demonstrated high moisture content. Texture analysis revealed differences in hardness and friability, with isomalt-based biscuits exhibiting a greater hardness. Furthermore, nutritional analysis highlighted variations in carbohydrate content and energy value across formulations, reflecting the differential utilization of sugar substitutes. Sensory evaluations provided valuable insights into consumer preferences, informing future product development projects .This research underscores the potential of polyolsas sugar substitutes in enhancing the nutritional quality of biscuits while addressing consumer demands for healthier options. These insights may contribute to the development of innovative, sustainable convenience foods aligned with evolving dietary trends and market dynamics. The study clarifies the technological complexities and sensory implications of the production of low-sugar biscuits, emphasising the imperative of reconciling nutritional goals with consumer preferences. Replacing sugar

with polyols offers a promising avenue to improve the nutritional quality of biscuits, although it requires judicious formulation and sensory optimisation.
The results of this research have profound implications for the development of healthier and more sustainable convenience foods in line with changing consumer trends and market dynamics.

KEYWORDS

Biscuits, sugar replacement, polyols.

BIOGRAPHY

Giulio Scappaticci, graduated with a Master's degree in Food Technology. He is currently a PhD researcher at University of Pisa and Barilla© Group (R&D Bakery), with a topic on industrial bread quality and shelf-life extension. His PhD project involves the study of innovative ways of reusing food by-products, in order to obtain alternative bakery products, containing a high quantity of functional ingredients, and therefore with better characteristics in terms of rheology and shelf-life. In particular, it collaborates on the development of innovative on-site and on-time sensors with experts from INFN and CERN, to monitor the thermal profile and water migration. These data are used as markers of the changes that occur during the various stages of preparation and storage of bakery products.

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Investigating Enhancement of Learning and Memory Following Supplementation with Juice PLUS+® OMEGA in an Adolescent Population

Jessica Eastwood

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ABSTRACT

Adolescence is a critical window for cognitive and emotional development. Omega-3 fatty acids are essential for cognitive development, and higher dietary intake of omega-3 is linked with higher cognitive attainment in childhood and reduced cognitive decline in ageing.However, the effect of omega-3 supplementation on cognitive function in adolescents is yet to be explored. In the present study, 64 adolescents aged 13-14 were randomised in a double-blind, placebo-controlled trial to consume an plant-based omega supplement (providing 375mg daily of omega-3; Juice PLUS+® OMEGA) or matched placebo (MCT oil) for 16 weeks. Cognitive function (verbal memory, executive functions, and sustained attention), emotional regulation, and mood were assessed at baseline and 16 weeks, alongside habitual diet and Omega-3 Index (O3I).O3I significantly increased following 16 weeks of omega supplementation but not placebo, indicating compliance with and absorption of the intervention. The primary outcome of delayed verbal recall, alongside delayed word recognition and immediate recall measures of total and final acquisition, were significantly improved following 16 weeks of omega supplementation. Additionally, omega supplementation was associated with significantly quicker reaction times during an executive function task, which was not evident following the placebo. Finally, the ability to reappraise emotions was significantly improved in individuals receiving the omega supplement, but no effect was found on emotional suppression or on mood. The results of the present study indicate that Juice PLUS+® OMEGA supplementationmay improve cognitive function, particularly word learning and memory, and support emotional regulation in adolescents aged 13-14.

BIOGRAPHY

Dr Jessica Eastwood is a postdoctoral researcher working in the Nutritional Psychology Laboratory at the University of Reading, UK. Jess' research interests include the gut-brain axis and diet induced benefits to cognition and gut health.

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Enhancing Lignin Recovery from Coconut Husk: Innovations with Deep Eutectic Solvents for Sustainable Biomass Processing

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ABSTRACT

Currently, 1.3 billion tons of food are wasted globally each year, with fruit being the most wasted category. From the coconut, this tropical fruit of the palm tree, only 17% is used while the remaining 83% is considered waste even though it is composed of lignocellulosic biomass rich in lignin, cellulose, and hemicellulose.

The proposed Master's Thesis focuses on optimizing a process of extracting lignin from coconut skin using ionic liquids called Deep Eutectic Solvents (DES), which are characterized by their low toxicity and their ability to dissolve a wide range of materials, including lignin. This eutectic solvent is complemented by the use of an ultrasonic homogenizer which, optimizing the conditions, will allow a higher extraction percentage than conventional methods currently used in which NaOH is added and stirred for 4 hours to obtain less than 20% extraction.

One of the main objectives of the study is to improve the efficiency and sustainability of the lignin extraction process. For this, novel equipment such as the ultrasonic homogenizer is used, reducing the time and improving the extraction percentage, achieving that the extraction percentage reaches 50% with respect to the total lignin in this tropical fruit. In addition, the work also addresses the analysis of the parameters of the extraction process such as temperature, amplitude, time, and solid- liquid ratio, in order to determine the optimal conditions that maximize the yield of lignin extraction through the realization of an experimental design, these being 0.1 grams of sample for an hour and a half at 80 amplitude. In addition, tests were also carried out where the antioxidant capacity of the extracted lignin was measured, giving a concentration of 677 mg/Kg.

This method is innovative and sustainable, it allows the extraction of lignin with the aim of significantly reducing the environmental impact associated with conventional

methods. These results that have been obtained could have important implications for the biomass industry and contribute to the transition towards a circular and sustainable economy.

BIOGRAPHY

I am a chemist, graduated from the University of Alicante and I am currently doing a master's degree in analytical chemistry. My Master's Thesis is about the revaluation of a very abundant waste, coconut skin. We are working to synthesize plastic for packaging from these wastes that people throw away in the future, thus helping the environment with the aid of the circular economy.

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Unravelling the Potential of Edible Insect Hydrolyzed On the Quality Of An Innovative Food Products

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ABSTRACT

Nutritional value of edible insects is now widely recognized. Their ability to convert agri-food waste into nutritious proteins and fats emerges in a context that is increasingly attentive to sustainability and the need for alternative protein sources. Traditionally, insects are subjected to different heat treatments (roasting, steaming, frying and others) to improve their sensorial and nutritional properties and to prolong their shelf life. Western culture, however, has made it necessary to implement traditional technologies (freeze-drying, drying) to obtain powders that can be included in the various preparations to increase their quality and overall acceptability. Many researchers have investigated the use of insect powders (Tenebrio.molitor, Alphitobius. diaperinus, Achetadomesticus, Locustamigratoria) in various preparations such as baked products (bread, pizza, biscuits). However, insect powder application has important limitations such as the percentage of use in terms of both rheological and sensorial characteristics and the propensity to hydrolytic, oxidative action and general microbiological and enzymatic deterioration. In this context, applications of new thermal and non-thermal technologies (Cold plasma, PEF, ultrasound, omics, microwave) were evaluated to minimize unwanted effects and guarantee food safety. The extraction of proteins, fats, or chitin has represented the most studied applications but new interest has been shown on the potential of protein hydrolysates of edible insects applied to the food sector. In fact, the study of the properties of protein hydrolysates has shown enormous potential and represents the basis for understanding and making the most of them in the use of new food formulations and innovative products. As shown by Purschke et al., 2018 the techno-functional properties of L.migratoriaand T. molitor proteins can be improved with hydrolysis even compared to hydrolysates of plant origin (Yu et al., 2021) as can the degree of hydrolysis to increase the quality of the hydrolyzed products (Leni et al., 2020; Leni et al., 2020a). Recent studies have shown the potential of using microorganisms such as YarrowiaLipolyticawhich can be exploited for the production of hydrolysates to be used in the formulation of innovative and functional foods based

on edible insect hydrolysates (Rossi et al., 2021; Rossi et al., 2022). The production of hydrolysates must first of all consider the choice of the enzyme that carries out the hydrolysis. Each enzyme is characterized by optimal operating conditions. Based on these characteristics and depending on the type of experimental design and research objective, the enzymes are selected and often combined with each other to enhance the hydrolytic effect which can influence the properties under evaluation of the protein hydrolysates. The nutritional (bioactive peptide), rheological, technological and functional properties will be evaluated to obtain and exploit the protein hydrolyzate in food preparations such as baked products. In particular, the use of protein hydrolysates in the formulation of biscuits was explored in depth.

KEYWORDS

protein hydrolysates; innovative food products; edible insects

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BIOGRAPHY

Dr. Roberta Foligni is a researcher of Food Science and Technologyat the Department of Agricultural, Food and Environmental Sciences-UniversitàPolitecnicadelle Marche. The scientific activity of Dr. R. Foligni has been mainly focused on the following topics: Novel foods, Applications of mass spectrometry coupled to instrumental chromatographic techniquesfor structural studying of complex lipids and volatile compounds in food matrices, Study of the relationships between processing technologies and quality aspects of foods, Evaluation of technological properties of different type of vegetable rennet, Application and quality evaluation of emerging food technologies. Results of her work have been published in over 45 scientific peer-reviewed papers.She is a member of the Topical Advisory Panel for the journals Foods, Applied Sciences and Frontiers and has been a guest editor for several special issues. She is currently involved in a PNRR research project studying innovative processes for the use of edible insects and derivatives in food technologies.

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Design of Biopolymeric Beads Entrapping Bioprotective Lactic Acid Bacteria to Control Listeria

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ABSTRACT

Lactic Acid Bacteria(LAB) can be considered as the main candidate for bio preservation due to their ability to produce anti microbial metabolitesaga in stun wanted microorganisms ,such as Listeria. In this work, 4% (w/w) alginate (Alg) and 10% (w/w) caseinate (Cas) were used to design biopolymeric matricesentrapping Lactococcuslactis LAB3cells. The volume fraction of the added cells and the composition of the medium were finely tuned. Polymeric matrices were initially loaded with LAB cellsat~104,~106or~108CFUmL-1, and LAB cells population in bead swas monitored for 12 days at 4°, 8°, 23°, and 30°. Results showed that LAB cells in Alg-Cas beads with the highest initial in oculum load had the highest viability and antagonistic activity. The cell density was maintained during storage period at 4° and 8° but decreased after 24h at 23° and 30°. LAB cells entrapped with MRS broth medium exhibited higher viability and antagonistic activity compared to those with M17 broth, with maxi malListeria growth inhibition zone diameters around bead sof8 mm and 4mm, respectively. To further study the mechanisms by which LAB3 inhibitthe growth of Listeria spp, the antimicrobial activities of cell-free supernatants (CFS) of LAB3 cells cultured aerobically or anaerobically in each medium were assayed. Results showed that CFS of LAB3 cell scultured aerobically had the highest antimicro bialactivity. This was ascribed to alower pH and to the presence of more antimicrobial metabolites. The production of lactic acid by LAB3 cells accounts for only a small part of the antimicrobial actions of this strain. The antibacterial activity of LAB3 cells is mainly due to the production of bacteriocin-like substances, which are thermostable but are inactivated following hydrolysis by proteases. The study emphasizes the importance of biopolymeric bead design for entrapping lactic acid bacteria in order to control Listeria growth and highlights the potential of this approach in biopreservation strategies.

KEYWORDS

Bioprotective lactic acid bacteria, Sodium alginate, Sodium caseinate, Anti-Listeria activity

BIOGRAPHY

I am a PhD researcher at the Université Claude Bernard Lyon 1 in France, Specializing in the Bioengineering and Microbial Dynamics at Food Interfaces Laboratory. I earned my master's degree in food processing and Safety from Hainan University, China, in 2022. My current research focuses on developing smart systems for preserving perishable foods, particularly through the use of bioprotective lactic acid bacteria.

POSTER PRESENTATION ABSTRACTS

Substitution of Sulfur Dioxide with Pomegranate Peel Polyphenols in Young Wine: Impact on Quality, Safety, and Aging Process

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ABSTRACT

Red wine production, a practice deeply rooted in Western civilization, has been extensively studied for its complexity and significant economic and cultural impacts. However, according to a report by the European Parliamentary Research Service (July 2023), wine consumption in the EU has declined by 24% from 2010 to 2020, driven by health concerns and changing consumption patterns. One major concern is the concentration of sulfur dioxide (SO2) in wine, used to inhibit unwanted microorganisms, control enzymatic browning, stabilize color, prevent secondary fermentation, and inhibit biogenic amine synthesis. Despite its benefits, the Federation of American Societies for Experimental Biology (1985) identified SO2 as a serious risk for individuals with hypersensitivity or asthma. Studies have linked SO2 ingestion to DNA damage and respiratory tract inflammation. This research explores substituting SO2 in young wine with polyphenols from pomegranate peel extract during the aging process in Balkan oak barrel. Free and total SO2 levels were measured weekly, and the total polyphenol content, expressed in gallic acid, was assessed spectrophotometrically. Additional parameters, including titratable acidity, color intensity, and microbiological safety, were also evaluated. Results showed a 34% decrease in total SO2 within the first two weeks, followed by a slower decline. The polyphenol content increased from 3.3 g/L to 6.44 g/L after two weeks of aging. Microbiological parameters remained stable within acceptable limits, although the wine's brilliance decreased significantly, down to 16%, during the first two weeks of aging.

BIOGRAPHY

Bahtir Hyseni is a Professor Assistant at the University "Isa Boletini" in Mitrovica, Kosovo. He earned both his bachelor's and master's degrees in Food Engineering and Technology from the University of Prishtina. In 2021, he completed his PhD in Biotechnology at Yeditepe University in Istanbul, Turkey. Following his PhD, he

participated in a six-month Fulbright Development Program at Ohio State University in the USA, where he contributed to curriculum development and engaged in scientific research on vibrational spectrophotometry within the Department of Food Science and Technology. Currently, Hyseni mentors three thesis projects and is actively involved in the COST Action project "Promoting Innovation of Fermented Foods: PIMENTO." Additionally, he has recently been appointed as Vice-Rector for Scientific Research at the University “Isa Boletini” in Mitrovica.

Moving Entrepreneurship to the Limits: Social Entrepreneurship, Food, Survival, and the Diaspora

Craig Watters
Director, Riata Institute for Global Social Entrepreneurship, USA

ABSTRACT

When teaching social entrepreneurship, I must point out the challenges it faces by the definitions of commercial entrepreneurship. Entrepreneurship is almost exclusively defined through the success or failure of business startups. What are lost are the non-monetary returns for innovations that enrich and support individuals, especially in developing regions or communities, through foods and recipes.

Innovations made in food and recipes during slavery among the African diasporic spread saw people developing strategies to help them and their cultures survive. We can also site pre-Hispanic food from the Spanish that came when indigenous Mexicans were conquered and lost their indigenous roots.

I will present research of this through my work in Jamaica and Afro-Ecuadorian communities and Dr. Luis Flores will present his research impact of industrial commercialization on Mexican identities and cuisine. My talk will address the use of the innovation theory used in social entrepreneurship and how it was used by the diasporas for survival and the attempts to re-establish an ecosystem destroyed by slavery and colonial oppression.

My workshop, entitled the same, will look at specific examples and cases of this in the diasporas of Africa to the US, Mexico, and Jamaica.

BIOGRAPHY

Craig Watters is an accomplished scholar, educator, entrepreneur, manager, and economic development specialist. He comes to OSU from the top-ranked entrepreneurship program at Syracuse University, where he led a portfolio of educational and community engagement initiatives. He has worked with faculty across an array of disciplines on curriculum development and outreach programs related to creativity, innovation, and entrepreneurship. At OSU, he was the Executive Director, Riata Center for Entrepreneurship, and the Norman C. Stevenson Chair in School of Entrepreneurship. He is now the Director of the Riata Institute for Global Social Entrepreneurship and International Entrepreneurship Chair. He teaches and is pioneering its Study Abroad initiatives to Nicaragua, Ecuador, Tel Aviv, Pakistan, India, Africa, South Africa, China,

and Mexico. He was the Senior Vice-President for Marketing, USASBE (US Association for Small Business and Entrepreneurship) from 2016-18. A former contracts specialist at General Electric and contracts officer the Syracuse Research Corporation, Craig has experience in project management and contracts administration. At General Electric, Craig administered may high priced and top-secret projects. He had clearance to work at the highest levels, including SCI.His one contract for a mobile radar unit was worth over $700k when he left. His clearances and high-priced contracts followed him to his contracts officer position at Syracuse Research Corporation where he oversaw contracts and grants. In addition to his corporate experience, Watters has launched two successful ventures. His dissertation examined the impact of infrastructure on economic development in rural areas. The Riata Institute for Global Social Entrepreneurship identifies, analyzes, and encourages student interest and involvement with international social entrepreneurship, particularly developing countries. The Institute brings a strong educational component of the students to introduce impactful innovations that support the different infrastructures necessary for socials entrepreneurship to start and thrive. One the most important things stressed by the Institute are the differences in what social entrepreneurship looks like under diverse cultures, political systems, and economic systems. While they learn the fundamentals of entrepreneurship and social entrepreneurship in my classes, the Institute provides real life applicability which helps the students understand situations and issues surrounding social entrepreneurship better. Collaborating with non-capitalist countries helps them better see that what they once feared was actually a lack of understanding. Better understanding helps them become better entre- and intra- preneurs.

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Use of Pectinase and Xylanase for the Enzymatic Processing of Hazelnut Skins

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ABSTRACT

Hazelnuts have a huge market in Italy, which is the second producer all over the world, after Türkiye. Due to this volume of production, there is a big quantity of residues and wastes that need to be disposed of, affecting both economic and ecological aspects. Among residues and wastes,one of the most abundant coming from hazelnuts is their skin which still may be utilized. For this reason, it has been required a solution to disassemble this matrix in order to obtain molecules of interest and put them in new formulation. Enzymatic biotechnologies are commonly recognized as a useful tool to pursue this aimsince it is one of the greenest and most innovative strategy to break down chemical bonds and hydrolyse molecules. Preliminary characterization of hazelnut skins evidenced that the carbohydrate fraction representsabout the70% of the material, thus carbo-hydrolases were used for enzyme processing. To this aim, micronized hazelnut skins were subjected to enzymatic treatment with pectinase and xylanase at different conditions of pH, time, temperature and solid:liquidratio. Theextent of hydrolysis was assessed both on liquid and solid fractions by evaluating released sugars (by DNS and Dubois analysis) and changes in the morphological structure of the remaining solid material (by SEM and ATR-FTIR).

The results of the chemical analyses show that both enzymes were able to allow the release of reducing and total sugars from the crude matrix, although xylanase more efficiently. These data were confirmed by SEM images which showed that after enzymatic treatment the matrices had a smoother appearance. ATR-FTIR investigations are ongoing but preliminary results reveal differences in the spectra of samples subjected to enzymatic digestion compared to controls.

Further analyses will be conducted on the liquid fractions to determine the presence of phenolic compounds and their antioxidant capacity using a DPPH assay. Furthermore, the hydration and water solubility indices before and after treatment with the enzymes

will also be studied.
The obtained productscould be used in the preparation of functional foods enriched in fibre and/or bioactive compounds.

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Analysis of Shelf Life, Vitamin C, Potassium, Flavonoid, and Antioxidant Activity on Mung Bean Yoghurt

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ABSTRACT

INTRODUCTION:
The incidence of 40 million deaths worldwide each year from non-communicable diseases is worrying and must be prevented.Mung beans are a local food with nutritional potential that makes it good for health. However, processing can affect its nutritional value. Yoghurt is a newly developed processed product from mung beans, so it is necessary to know its benefits and nutritional content. It is necessary to know its shelf life to ensure its quality.

OBJECTIVE:
The objective of the research was to analyse shelf life, vitamin c, potassium, flavonoid, and antioxidant activity in mung bean yoghurt.

METHOD:
The research method was cross-sectional, with the shelf life of yoghurt analyzed using the accelerated shelf life testing (ASLT) method with temperature variation. In addition, vitamin C was analyzed by titration, flavonoids by UV spectrophotometry, potassium by atomic absorption spectrophotometry, and antioxidant activity by DPPH (diphenyl-2-picrylhydrazyl).

RESULT:
The results of the analysis of 100 g of mung bean yoghurt showed that it contained 6.77 mg vitamin C, 310.3 mg potassium, 143.4 mg quercetin equivalent flavonoids, and 4124.27 ppm antioxidant activity.Mung bean yoghurt has a shelf life of 7 days, 5 days and 5 days respectively when stored at temperatures of 5^0C, 25^0C and 40^0C.

CONCLUSION:
Mung bean yoghurt has good nutrient analysis results with a shelf life that needs to be considered to obtain good benefits.

BIOGRAPHY

I am a lecturer at the Department of Health Nutrition, Faculty of Medicine, Public Health and Nursing, Gadjah Mada University, where I have been teaching since 2002. My educational background is in Food Science and Technology. In addition to teaching at Gadjah Mada University, i have been teaching at Yasalma Junior High School, Yogyakarta since 2000 and as a Halal Assessor Team of the Indonesian Ulema Council (MUI) Yogyakarta Special Region. My research also focuses on functional food and food safety. My publications in national and international journals have a total of about 22 articles with h-index in Scopus = 3.

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Protein Supplement and Baking Temperatures in Wheat Bread Production - Implications in Wheat Bread Texture Profile

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ABSTRACT

Wheat bread, a dietary staple for centuries, is rich in complex carbohydrates, fiber, and essential nutrients. As dietary preferences evolve and individuals seek ways to enhance their nutritional intake, the integration of proteins into wheat bread has become a notable trend. This fusion not only focuses to the demand for protein-rich diets but also introduces a myriad of potential health benefits. Moreover, the temperature at which wheat bread is baked plays a crucial role in its production, influencing its texture, taste, in vitro digestibility, and overall quality. Protein powder, trade name given to pure egg albumen, used as a substitute for fresh eggs in food industry is suitable for improving the nutritional characteristics of food products. This work studied the texture profile of wheat bread at two different baking temperatures (160, 180 °C) where wheat flour was partially substituted by egg albumen as protein at 0, 10, 15 and 20 g of egg albumen per 100 g of wheat flour. Briefly, Wheat flour Tres Estrellas® (protein 10.88g/100 g, carbohydrates.

74.29 g/100 g dietary fiber 0.28g/100g, lipids 2.1 g/100g,ashes 0.15 g/100g), sugar, salt, water and baking dry yeast Tradipan® [1].Ingredients were stirred and kneaded (5 min), rested (20 min) and were baked with steam in an Oster® convection oven previously heated (20 min) to the baking temperature (160, 180 °C).Texture profile analysis (TPA) was carried out with a T4/1000 cylinder (38.1 x 20 mm) in a Texture CT® and elasticity, adhesiveness, cohesiveness, hardness, resilience and chewiness parameters were analyzed with Texture Pro CT software®. Regardless baking temperature, control bread obtained similar values in texture profile. Texture profile is required to observe the acceptability among consumers of wheat-based products since hardness and elasticity are parameters that dominate the mouthfeel of consumers [2]. Deformation bread degree (cohesiveness) increases according to protein addition (0-15%) to its maximum (0.87 ± 0.03), and a major egg albumen content (20%), bread cohesiveness begins to decrease. Bread baked at 160° presents an elasticity profile with a logarithmic trend, unlike baking at 180°C, with a polynomial behavior. Major energy (mJ) is required to chew a bread baked with the same proportion of protein (20%) at both baking temperatures,

so chewiness depends on water loss within the starch-protein-water interactions. As the protein proportion increases, adhesiveness decreases, requiring less work to overcome the forces of attraction between the bread and the palate. Changes on textural profiles of breads added with different proportions of egg protein are linked to changes in the proportion of gluten present [3], changing bread microstructure and the starch-gluten- water interactions.

This research contributes to the ongoing discourse on improving the nutriotinal quality of wheat-based products, offering insights into the potential role of specific proteins, such as those from egg albumen, and the effect on wheat bread textural profile, enhancing the acceptance among consumers.

KEYWORDS

wheat bread, egg albumen, texture profile, hardness, chewiness

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BIOGRAPHY

Jessica Rosas is a Biotechnology PhD student at Universidad Autónoma Metropolitana, where she also earned her bachelor’s degree in food engineering and her master's degree in Biotechnology. Her master's research focused on a comparative study of bioplastic production between submerged and solid-state fermentation. Since 2022, she has been teaching various courses, including Bioremediation, Agri-Food Biotechnology, and Phytopathology, at Universidad Anáhuac. Currently, her PhD research investigates the effects of high exogenous protein content on the structuring, texture, and in vitro digestibility of starch in breads.

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Investigating EEG Activity Following Supplementation with Juice PLUS+® OMEGA in an Adolescent Population

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ABSTRACT

Omega-3 fatty acids have been linked with brain health, including higher cognitive attainment in early childhood, and reduced cognitive decline in ageing. An important stage of neural development occurs during adolescence, however omega-3 supplementation has yet to be explored in this age group. As a subset of a larger study investigating the behavioural effects of omega-3 supplementation, 38 adolescents aged 13-14 years were randomised in a double-blind, placebo-controlled trial to consume an omega supplement (providing 375mg daily of omega-3; Juice PLUS+® OMEGA) or matched placebo (MCT oil) for 16 weeks.Electroencephalography (EEG) was used to record brain activity at baseline and 16 weeks while subjects performed a simple computerised n-back task. Additional resting state measurements were recorded with eyes open, and eyes closed.Analysis of event-related potentials (ERPs) during the n-back task revealed higher P300 peak amplitudes following target trials versus non-targets as expected, however no effect of omega-3 treatment was observed. Spectral analysis showed most electrical activity to be concentrated in delta and theta wavebands, consistent with lower frequency ranges typically observed in children. Interestingly, theta activity was observed to be lower following omega-3 treatmentcompared to the placebo treatment, across central and temporal brain regions during eyes-open rest and duringthe n-back task. Reductions in theta activity have been associated with developmental brain maturation during adolescence and are also an indicator of efficient cognitive control. The findings suggest thatJuice PLUS+® OMEGA mayexpedite brain maturation and/orimprove cognitive control during adolescence.

BIOGRAPHY

Dr Lynne Bell is a postdoctoral researcher working in the Nutritional Psychology Laboratory at the University of Reading, UK. Lynne's research interests include diet induced benefits to mood and cognitive functioning, with a focus on plant-based phytonutrients.

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Lower Blood Vitamin D Levels are Associated with Depressive Symptoms in a Population of Older Adults in Kuwait: A Cross-Sectional Study

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ABSTRACT

Low serum vitamin D has been associated with an increased risk of neuropsychiatry disorders. This study aimed to examine the association between vitamin D deficiency and depression in adults aged 65 years and older. This cross-sectional study was conducted in seven primary healthcare centers across Kuwait (November 2020 to June 2021). The participants (n = 237) had their serum vitamin D 25-(OH)-D concentrations (analyzed by LC-MS) classified as sufficient, ≥75 nmol/L (30 ng/mL); insufficient, 50–75 nmol/L (20–30 ng/mL); or deficient, <50 nmol/L (20 ng/mL). Depressive symptoms were evaluated using the 15-Item Geriatric Depression Scale (15-item GDS). The mean serum 25-OH-D levels (nmol/L) in volunteers with normal, mild, moderate, and severe depression were 100.0 ± 31.7, 71.2 ± 38.6, 58.6 ± 30.1 and 49.0 ± 6.93, respectively ($p < 0.001$). The participants in the vitamin D sufficiency group were significantly less likely to exhibit depressive symptoms (88.2%) than patients with mild (36%) and moderate (21%) depression ($p < 0.001$). Ordinal logistic regression showed that vitamin D deficiency (OR = 19.7, 95% CI 5.60, 74.86, $p < 0.001$) and insufficiency (OR = 6.40, 95% CI 2.20, 19.91, $p < 0.001$) were associated with higher odds of having depressive symptoms. A low serum vitamin D level is a significant predictor of symptoms of depression among older individuals.

BIOGRAPHY

Dr Thurayya Sulaiman Albuloshi is the Head of Nutrition at the Palliative Care Center under the Ministry of Health in Kuwait. She has held this leadership position since 2013 and has significantly influenced the field of nutritional care within the country. She obtained her Master's and Doctor of Philosophy (PhD) degrees in Food and Nutritional Sciences at the University of Reading, UK, where she specialised in this field within

the School of Chemistry, Food, and Pharmacy. Dr Albuloshi's research contributions are substantial, with numerous published studies on medical nutrition therapy aimed at reducing disease risks. Her research interests include geriatric nutrition, vitamin D, vitamin D supplements, and depressive symptoms. She focuses on research that examines the prevention and management of vitamin D deficiency among older adults, exploring factors associated with low vitamin D status, and the relationship between depressive symptoms.

Her work has been instrumental in developing nutritional strategies that protect against vitamin D deficiency in older adults and depressive symptoms, improving overall health outcomes. With more than 20 years of experience, Dr Albuloshi is recognised as the first senior clinical geriatric dietitian in Kuwait. Her extensive background includes both inpatient and outpatient nutritional care, with specialised expertise in areas such as oncology and geriatrics. She has played a pivotal role in training healthcare professionals, including doctors and nurses, on essential techniques such as tube feeding and the assessment of depressive symptoms and cognitive function in older adults. Her work focuses on improving food management practices, increasing health and nutrition awareness, and combating malnutrition-related diseases, all aimed at enhancing lifestyles and reducing mortality rates.

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