

JOINT EVENT ON

FOOD SCIENCE AND NUTRITION RESEARCH

11-13 SEPTEMBER, 2023 | VALENCIA SPAIN

Venue:

Olympia Hotel, Events & Spa,
Carrer Mestre Serrano, 5, 46120 Alborià,
Valencia, Spain

11-13 SEPT

BOOK OF
ABSTRACTS



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FOOD SCIENCE AND
NUTRITION RESEARCH

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*Thank You
All...*

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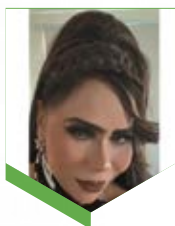


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Welcome Message

Dear congress visitors, it is a great honor and pleasure to write a few welcome notes. Nutrition is vital for our daily lives and activities and the need for a balanced diet is emphasized from our primary school education. The high rates of cardiovascular disease, diabetes and obesity often stems from marked deviations from such balanced diets. The area of nutrition has exploded recently with development of new technologies, including multi-omics platforms, and personal management plans with explosion of literature on areas such as health and disease in humans (e.g., obesity, weight management, metabolic syndrome and other metabolic disorders, biomarkers, aging) and animals together with associated changes at the cellular or whole-body level (e.g., metabolism, immunology, biochemistry), dietetics and education, nutraceuticals and functional foods, nutrigenomics and nutrigenomics, COVID-19 and nutrition and many others. This conference will provide an unparalleled platform to learn about new developments from cutting-edge research, increase network and foster new collaborations.



Prof. Dipak p. Ramji

Cardiff University, United Kingdom



Welcome Message

Dear Colleagues and Friends, on behalf of the **Scientific and Organizing Committees** of the **5th Edition of Euro-Global Conference on Food Science and Technology (FAT 2023)**, it is our huge delight to welcome all of you. We are honored to have the chance to bring together internationally relevant scientists, young researchers, students, and diverse professionals working into fields of food and beverage science and technology. This date will be a three-day hybrid event including oral and poster presentations, as well as debates and information exchanges on challenging topics such as **Food Nanotechnology, Food Colloids and Polymers, Advanced Research and Trends** among other emerging technological and scientific areas to achieve competitive and innovative solutions. Thus, our main interest is to develop a scientific event that strengthens and combines the experiences of experts from academia and industry with the aim to stimulate debates, foster collaborations, and expand our related knowledge to improve the food sector. We wish you a successful experience in the congress!



Dr. Maria Jesus Villaseñor Llerena

University Of Castilla-La Mancha, Spain



Welcome Message

It gives me great pleasure to welcome you all to this important euro-global conference of FAT- 2023. Soil influences human health in a variety of ways, with human health being linked to the health of the soil. As the world's population increases issues of food security become more pressing, as does the need to sustain soil fertility and minimize its degradation. Almost all the essential plant nutrients are critical to the quality of plant-based food, which serves as the main source of dietary intake for human. There are several adverse health affects that can arise from nutrient deficiencies in soils. Sulphur, Iron and Zinc deficiencies are probably the most common example Lack of adequate food and food of poor nutritional quality lead to differing degrees of under-nutrition, which in turn causes ill health. Nevertheless, recent scientific understanding of soil processes and factors that affect human health are enabling greater insight into the effects of soil on our health. Multidisciplinary research that includes soil science, agronomy, agricultural sustainability, toxicology, epidemiology and the medical sciences will facilitate for a greater understanding.



Prof. Surendra Singh

Banaras Hindu University, India

Welcome Message

Dear congress participants of the 5th Edition of International Nutrition Research Conference, in this current global vortex of changes with impact on our personal and professional life, four fundamental pillars remain as references: life security, food safety, good nutrition and balanced lifestyle.

In this context, I have the pleasure to invite in the audience of my Keynote Presentation entitled “*Harmonization Principles of Food Nutrition Labeling*”. I intend to conduct the presentation axed on one of my original proposal: the mandatory using of objective harmonization indicators to measure the similarities/differences between different nutritional standards used in food nutrition labelling from different international jurisdictions. This action will have an positive impact for the final consumer, as well as for the global food industry production and trading chains.

The Global Harmonization Initiative Nutrition WG (GHIWGN) could be considered as an impartial stakeholder regarding the food legislation harmonization process, at the EU and international level. The GHIWGN, one of the organization's 16 working groups, provide independently its expertise regarding global nutrition labelling and food health claims.

Iuliana VINTILA

University Dunarea de Jos Galati, Romania



Welcome Message

I take great pleasure in crafting these words of welcome. The field of food processing is currently experiencing an unprecedented surge, marked by significant advancements in recent years. The effects of foods produced with new technologies on nutrition have become more interesting.

While more environmentally friendly and more economical foods can be produced thanks to new food technologies, their effects on nutrition arouse curiosity. Reducing nutrient losses during processes and increasing the bioaccessibility of foods inspire new research. I sincerely express that this symposium will promote valuable knowledge sharing among the participants and serve for a deeper understanding of the complex interaction between contemporary food technologies and nutrition. I hope that this symposium, where presentations on new topics such as these will be shared, will be beneficial to all participants.



DR. Yasin OZDEMIR

Ataturk Horticultural Central Research Institute, Türkiye





ABOUT MAGNUS GROUP

Magnus Group (MG) is initiated to meet a need and to pursue collective goals of the scientific community specifically focusing in the field of Sciences, Engineering and technology to endorse exchanging of the ideas & knowledge which facilitate the collaboration between the scientists, academicians and researchers of same field or interdisciplinary research. Magnus Group is proficient in organizing conferences, meetings, seminars and workshops with the ingenious and peerless speakers throughout the world providing you and your organization with broad range of networking opportunities to globalize your research and create your own identity. Our conferences and workshops can be well titled as 'ocean of knowledge' where you can sail your boat and pick the pearls, leading the way for innovative research and strategies empowering the strength by overwhelming the complications associated with in the respective fields.

Participation from 120 different countries and 2000 different Universities have contributed to the success of our conferences. Our first International Conference was organized on Oncology and Radiology (ICOR) in Dubai, UAE. Our conferences usually run for 2-3 days completely covering Keynote & Oral sessions along with workshops and poster presentations. Our organization runs promptly with dedicated and proficient employees' managing different conferences throughout the world, without compromising service and quality.

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DAY 01

KEYNOTE FORUM



JOINT EVENT ON

**FOOD SCIENCE AND
NUTRITION RESEARCH**

Cardio-protective actions of nutraceuticals

Atherosclerosis, an inflammatory disorder of the vasculature and the underlying cause of cardiovascular diseases such as heart attacks and stroke, is responsible for a third of all global deaths. Although reduction in morbidity and mortality from atherosclerosis and its complications has been achieved recently by lifestyle changes and pharmaceutical intervention, this is expected to reverse in the future because of global increase in risk factors such as hypercholesterolemia, obesity, and diabetes. Current pharmaceutical therapies against atherosclerosis are associated with substantial residual risk for cardiovascular disease together with other issues such as side effects. In addition, pharmaceutical agents against many promising targets have proved disappointing at the clinical level. It is therefore essential that the molecular basis of atherosclerosis is fully understood, and new therapeutic/preventative agents or targets are identified and validated.

The major focus of recent research in my laboratory is to understand the molecular mechanisms underlying the cardio-protective and anti-atherogenic actions of natural products using a combination of in vitro and in vivo model systems together with biochemical, molecular biology and immunological approaches. Our research has provided novel insights into the mechanisms underlying the protective actions of several nutraceuticals, including fatty acids, polyphenols and probiotic bacteria. This presentation will discuss the molecular basis of atherosclerosis and opportunities for drug discovery, current therapies against the disease and their limitations, emerging therapies targeting lipid metabolism and the inflammatory response, new challenges, and the potential of nutraceuticals as preventative and therapeutic agents.

Audience Take Away Notes

- The audience will learn about how nutraceuticals can prevent and treat cardiovascular disease
- The research-led knowledge base will positively impact their jobs
- The research could be used other faculty to expand their research or teaching
- The research could impact therapeutic options available in cardiovascular disease
- The research could lead to development of new agents to prevent and treat heart disease



Dipak P Ramji

Cardiff School of Biosciences,
Cardiff University, Cardiff,
United Kingdom

Biography

Dipak Ramji is Professor of Cardiovascular Science and Deputy Head at the School of Biosciences in Cardiff University. He is also Fellow of the Learned Society of Wales. He received his BSc (Hons) degree (Biochemistry) and his PhD (Molecular Biology) from the University of Leeds. This was followed by post-doctoral research at EMBL (Heidelberg) and IRBM (Rome) with fellowships from the Royal Society and the EU. His current research is focused on understanding how nutraceuticals regulate cellular processes in heart disease with the goal of attaining deeper mechanistic insight and identifying preventative/therapeutic agents. He has published over 150 research articles (h index 41 and i10 index 76 with over 8350 citations), including 880-page book in 2022 on Methods in Atherosclerosis. He is an Editorial Board member of 16 international journals; regular organising committee member, speaker, and track/session chair at international conferences on heart disease; involved in grant evaluation for over 20 organisations; and supervised over 25 PhD students.

Innovative food safety training solution using behavioral sciences to increase knowledge retention and behavioral change

The importance of training food handlers is critical to effective food hygiene; however, there have been limited studies on the effectiveness of such training. Food safety training courses are administered worldwide in attempts to reduce outbreaks in food service, retail and temporary food service establishments. However, food handlers often exhibit a poor understanding of microbial or chemical contamination of food and the measures necessary to correct them. Studies suggest that the provision of a hands-on format of training embedded in behavioral sciences would be more beneficial than traditional classroom-based programs. The delivery of such a program will assist in changing ones' food safety behaviors and aid in the retention of knowledge that are necessary to reduce the incidence of foodborne illness. I will discuss a new innovative approach to food safety training that is hands-on, interactive and heavily rooted in the behavioral sciences. The talk will also cover innovative solutions to increase food safety retention and behavioral change for foodservice workers including proven scientific methods in learning and development such as the "spacing effect".

Robert Mancini

Roquette Canada, Canada

Biography

Robert Mancini has vast experience and knowledge in the field of food safety, with specific emphasis on alternate modes of food safety training and behavior science. Rob has more than 20 years' experience in Regulatory Compliance and as a Certified Public Health Inspector. In Canada, he provided expert advice on revisions made to the Canadian Food Retail and Food Services Code and Federal/Provincial/Territorial National Guidelines for Food Safety Training. Rob hosted and provided research for the television series "Kitchen Crimes" for Food Network Canada, H.G.T.V. (U.S.) and Discovery Asia. He has provided expert opinion on food safety for varying levels of Government in Canada. He currently holds a Master's Degree in Food Safety, is a FSSC and 9001 Lead Auditor. Currently working as the Internal Audit Manager for Roquette.

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DAY 01 ■

SPEAKERS

JOINT EVENT ON
**FOOD SCIENCE AND
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**Suparna Bhattacharya**

University of Nebraska Lincoln, Lincoln, NE, United States of America

Trade policies and organic food

Organic foods are produced using farming methods that may be less harmful to the environment while also leading to foods that are better for human health. Many environmental ethicists who believe that there is a moral obligation to protect the environment may view organic food as more sustainable and thus ethically superior to conventional food. Some scholars believe that access to safe and nutritious food is a human right seeing organic production as a viable means to achieve this right. Attributes such as healthiness and sustainability are invisible to consumers of organic products. Organic foods are differentiated from conventional alternatives because they are produced through different processes (characterized by crop rotation, the absence of synthetic fertilizers, and biological control of pests rather than chemical treatments) as opposed to having different physical attributes. In the absence of information that reliably communicates these desirable characteristics, organic foods can only compete on price and as they are usually more expensive to produce, there will be little incentive for markets to form. Setting up standards and a system to label or certify organic foods can help consumers in making an informed choice. Since countries may differ in how they define standards and certify organic foods, there is a potential for trade conflicts.

Audience Take Away Notes

- Organic food standards and ramifications of certifications across international markets
- Attributes of organic food products and environmental benefits
- The harmonization/equivalency agreements to resolve trade disputes from different organic standards
- Structuring alternative trade mechanisms beneficial for developed and developing countries

Biography

Dr. Suparna Bhattacharya earned her Ph.D. in applied economics from the University of Nebraska Lincoln, USA. She is a NextEra Resource Fellow, USA, awarded for her accomplishments in the field of energy markets, and published research articles in peer-reviewed economic journals. Her research interests include agricultural trade policies, regulatory policy impact on energy/water markets, food deserts and interdependence of bio-fuels and food supply. She has developed econometric models to analyze the effects of limited accessibility to healthy food on people's health outcomes. Dr. Bhattacharya has been an Economist for the Oregon Public Utility Commission and California Water Service Groups, USA.



Barbara Chilczuk^{1*}, Kamila RybczynskaTkaczyk², Justyna Bohacz², Małgorzata Materska¹, Marzena Pabich¹, Monika Staszowska Karkut¹

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Sea buckthorn extracts as potential food additives, assessment of their antibacterial and antioxidant properties

Growing demand for value-added products and functional foods is encouraging manufacturers to consider new additives that can enrich their products and help combat lifestyle diseases. The healthy properties of sea buckthorn have been recognized for centuries. This plant has a high content of bioactive compounds, including antioxidants, phytosterols, essential fatty acids, and amino acids, as well as vitamins C, K, and E. It also has a low content of sugar and a wide spectrum of volatiles, which contribute to its unique aroma. Sea buckthorn shows antimicrobial and antiviral properties, and is a potential nutraceutical or cosmeceutical. It was proven to help treat cardiovascular disease, tumors, and diabetes, as well as gastrointestinal and skin problems. The numerous health benefits of sea buckthorn make it a good candidate for incorporation into novel food products. However, its fruits may be unpleasant to eat raw due to its high acidity and astringency. An alternative to raw fruits may be extracts obtained from them, which contain the accumulation of active compounds in a relatively small mass. Therefore, it can be used in small amounts, so that the additive used will not affect the change of sensory properties.

The research material was sea buckthorn fruits. Ethanol and aqueous extract in a ratio of 1:10(m/v) was prepared. The extracts were lyophilized and analysed. Anti-radical activities against DPPH• and ABTS•+ were investigated. The antioxidant properties of the obtained extracts relative to Fe²⁺ ions were also analysed by the FRAP method. The obtained extracts were also tested for microbiological activity. The samples were tested against a set of microorganisms including bacteria: *Escherichia coli* ATCC 25922, *Staphylococcus aureus* ATCC 29737, *Listeria monocytogenes* ATCC BBA-2660, *Bacillus cereus* ATCC 14579, and *Salmonella enteritidis* ATCC 4931 and yeast *Candida albicans* ATCC 90028. In addition, the identification of analyses by LC-QTOF-MS was performed.

Based on the obtained results, it was found that dry aqueous extracts showed both higher anti-radical and antioxidant activities compared to dry ethanol extracts. However, ethanol extracts were more active in relation to the analysed bacteria and yeast. Sea buckthorn extracts are rich in phenolic compounds, exhibit both anti-radical and antioxidant and antimicrobial activities, therefore they can be potential food additives for its fortification and preservation.

Audience Take Away Notes

- Advantages of dry extracts as potential food additives
- Antibacterial properties of sea buckthorn extracts, which can be used in the creation of new natural preservatives
- In addition, audience can learn about the benefits of the sea buckthorn plant and the possibilities of its use

Biography

Barbara Chilczuk graduated from chemistry in 2007. She has been working at the University of Life Sciences in Lublin. She received her PhD degree in 2022 at the same University. She is interested in phytochemistry. Barbara specializes in natural compounds with potential health-promoting properties. Her research focuses on liquid chromatography methods combined with mass spectrometry.

Russell Rising

D & S Consulting Services Inc, New York, NY United States of America

Short duration metabolic measurements by whole room indirect calorimetry as an adjunct for obesity treatment and athletic training

Background: Previously, 24-hour Resting Metabolic Rate (RMR) or Exercise Energetics (EX) were determined utilizing metabolic carts, with typical measurement durations from 30 to 45-minutes, respectively (Balci et al, 2021; Guerrero et al, 2020). Major disadvantages of metabolic carts are the subject's physical connection to instrumentation using ventilated hoods or head- gear and the lack of calculation of carbohydrate and lipid oxidation. Moreover, metabolic carts themselves can produce highly inaccurate results (Rising et al, 2015; Rising et al, 2016). Finally, physical connection of the subject to instrumentation can cause anxiety (Malone, 2002), contributing to additional errors in metabolic results. Previously, specific Whole Room Indirect Calorimeters (WRIC's) have been validated for the determination of 24-hour RMR (Rising et al, 2015) and EX (Rising et al 2016) from 60-minute measurement durations. The purpose of this presentation is to show that accurate metabolic measurements of 24-hour RMR and 1-hour EX can be obtained in just a 30-minutes, similar that of metabolic carts.

Methods: For simulated 24-hour RMR, ten 30-minute propane (99.5 % purity) combustion tests were performed using a standard torch (Model UL2317, Bernzomatic Inc., Chilton, WI USA). Burn rates (BR; g/min) were determined by recording the propane weight prior to and after test completion using an analytical balance (Mettler Toledo Model MS1602S/03, Mettler Toledo LLC, Columbus, OH USA). For simulated EX, ten thirty-minute propane (99.5 % purity) combustion tests were performed using a larger burner (Coleman Model 5431B, The Colman Company, Wichita, KS USA) in order to simulate exercise. The BR's were determined as described previously. All respiratory exchange measurements were derived utilizing the Promethion (Model GA3m2/FG250) integrated system (Sable Systems International, North Las Vegas NV USA). Instrumentation was calibrated according to the manufacturer's instructions. The modified Weir equation was utilized to calculate energy expenditure (EE; kcal), assuming 66 mg/min protein oxidation. Ventilation rates (V;liters) of oxygen (VO₂), Carbon Dioxide (VCO₂) and the respiratory quotient (RQ; VCO₂/VO₂) were also calculated on a per minute basis. Finally, oxidation rates for glucose and lipids were also calculated (Kelly and Basset, 2017). Thirty-minute data were then extrapolated to 24-hours for RMR and one-hour for EX and compared to Propane Stoichiometry (PS). Statistical analysis was performed utilizing SPSS (Ver 27, Chicago, IL).

Results:

	24-hour RMR			one-hour EXEE		
	PS	RMR-WRIC	p<0.05	PS	EX-WRIC	p<0.05
BR	0.1623	-----	-----	0.6698	-----	-----
VO ₂	594.4 ± 39.3	597.0 ± 55.8	0.91	102.3 ± 16.0	103.4 ± 16.7	0.88
VCO ₂	356.9 ± 23.6	356.5 ± 25.4	0.97	61.4 ± 9.6	61.5 ± 9.7	0.98
RQ	0.60 ± 0.00	0.60 ± 0.02	0.87	0.60 ± 0.00	0.60 ± 0.01	0.15
EE	2785.4 ± 184.3	2746.1 ± 247.8	0.69	479.0 ± 75.0	475.6 ± 76.8	0.92

Conclusions: Accurate determinations of 24-hour RMR and one-hour EX can be obtained from just a 30-minute metabolic measurement in the respective WRIC. These results suggest that WRIC's may be suitable as an adjunct for obesity treatment and enhancement of athletic performance, with measurement durations similar to metabolic carts.

Audience Take Away Notes

- The audience will have an understating of the ease of using whole room indirect calorimetry as an adjunct for any kind of treatment program where accurate recording of metabolic rate and nutrient oxidation is necessary. They will also understand the advantages of whole room indirect calorimetry verses that of metabolic carts, both in terms of subject comfort and accuracy of metabolic measurements
- Anyone in the audience who is involved in the exercise sciences will understand how accurate measurements of exercise energetics can enhance athletic performance. This is a much underserved area of the metabolic sciences in terms of whole room indirect calorimetry. They will see the versatility of whole room indirect calorimetry in terms of metabolic measurements for just about any physical activity, unlike that of metabolic carts that are usually are restricted to just running or cycling, due to the subject's connection to the instrumentation
- The audience will also understand how accurate metabolic measurements could shorten treatment durations for obesity thus saving time and money for those professionals involved. Furthermore, this will allow greater patient thru put thus possibly increasing revenue. Finally, with greater accuracy and subject comfort, success rates in these various obesity treatment programs and athletic training will be greatly increased
- The information presented to the audience will improve the accuracy of metabolic measurements, increase patient comfort as well as provide data for many additional disease states, such as cancer or metabolic syndrome. Faculty in various departments such as Endocrinology, Physiology, or any other discipline, will benefit from accurate metabolic measurements by whole room indirect calorimetry

Biography

Dr. Russell Rising obtained his Ph.D. from the University of Arizona, Tucson. He started his career by inventing the world's first Whole Room Indirect Calorimeter (WRIC) for infants at Maimonides Medical Center, Brooklyn, NY. He then created several types of animal WRIC's, including one for non-human primates. Finally, he has created seven human adult WRIC laboratories worldwide comprising of 22 metabolic rooms. He has over 55 publications, been featured on television broadcasts, as well as holding a full adjunct professorship at China's largest medical school. Currently, he is President of Research and Development of D & S Consulting services Inc.



Matthew D Wilcox^{1,2}, Peter I Chater^{1,2}, Kyle J Stanforth^{1,2}, Rebecca Williams^{3*}, Iain A Brownlee⁴, Jeffrey P Pearson^{1,2}

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A pilot pre and post 4 week intervention evaluating the effect of a proprietary, powdered, plant based food on micronutrient status, dietary intake, and markers of health in a healthy adult population

How nutritionally complete food have emerged and their current typical usage followed by a summary of the published peer-reviewed paper “A Pilot Pre and Post 4 Week Intervention Evaluating the Effect of a Proprietary, Powdered, Plant Based Food on Micronutrient Status, Dietary Intake, and Markers of Health in a Healthy Adult Population”.

Audience Take Away Notes

- Nutritionally complete foods are still a poorly understood product category. This presentation will give audiences a greater understanding of this category and, if they work with patients, and understanding of why their patients use such products and their use cases
- Due to the way they are formulated, nutritionally complete foods can act as a reliable control in research studies

Biography

Rebecca Williams MSc, RNutr studied Sports and Exercise Sciences BSc at Birmingham University and Applied Sport and Exercise Nutrition MSc at Oxford Brookes University, graduating in the latter in 2013. She has worked at Lucozade Ribena Suntory and GSK before joining Huel in 2018. In her role as Senior Nutrition Manager, Rebecca is a pivotal member of Huel's Sustainable Nutrition team playing a crucial role in product development, nutrition regulation, public relations and research. She leads the scientific trials projects at Huel, an area that has grown significantly in the last 18 months.



Maryoris Elisa Soto Lopez*, Mendoza C Fernando, Vega A Felipe, Padilla F Cesar, Hernandez A Ana, Otero H Ana, Gonzalez P Víctor, Montalvo L Heyne, Perez SOmar, Velez H Gabriel

Food Engineer Department, Universidad de Cordoba, Monteria, Colombia

First report of bacteriophages for biocontrol of salmonella enteritidis at the north colombian coast in typical caribbean cheese (Queso Costeno)

Queso costeno is an autochthonous product of the Colombian Caribbean coast. It is made manually from raw milk and unfortunately, it has been associated with foodborne illnesses in the past, due to the presence of pathogenic microorganism such as Escherichia Coli and Salmonella Enteritidis, they belong to the family of Enterobacteriaceae and are found in the gastrointestinal tract of warm-blooded animals. To face this issue, it has been used bacteriophages as biocontrollers, which are semi-autonomous biological entities that by nature infect bacteria, have high host specificity, can be added to foods without affecting the quality or sensory of foods, and they do not cause harmful effects in humans and animals; they are also ubiquitous, so they can be isolated from multiple sources. Therefore, bacteriophages specific to Salmonella Enteritidis (ATCC 13076) were isolated from samples obtained from typical caribbean cheese-producing microenterprises in Cerete and Lorica (Cordoba, Colombia).

The isolation and quantification methods followed protocols outlined by Lopez et al. (2016), Nascimento et al. (2022) and Soto Lopez et al. (2015) utilizing Brain Heart Infusion (BHI) broth and agar, as well as magnesium sulfate to activate the host cell and isolate the bacteriophages. Samples (queso costeno) were diluted at the proportion of 1:2 in magnesium sulfate buffer. The suspensions were incubated in shaker at 150 rpm and 28 °C for 24h to allow phage migration to buffer. Subsequently, the samples were centrifuged at 4.000g/30min/28°C and the supernatants were collected. All of the bacteriophages isolate underwent to a minimum of three successive rounds of serial plaque purification and final lysates were stored in magnesium sulfate buffer at 4°C. For bacteriophages quantification, aliquots (100 µL) of diluted bacteriophages solution, 100 µL of a bacterial overnight culture (DO:0.5/600nm), and 5 mL of semisolid BHI agar were mixed and poured onto BHI agar plates. The plates were incubated overnight at 37 °C and the number of plaques was counted considering the appropriate dilution factors, providing between 10 and 100 plaques.

ELISA-QT, HM-QC y HM-QL bacteriophages were obtained from queso costeno and whey samples and were found to effectively lyse Salmonella Enteritidis (ATCC 13076). ELISA-QT y HM-QL bacteriophages had high lytic activity, completely inhibiting bacterial growth after 24 hours with titers of 6.831×10^8 and 4.677×10^{10} PFU/mL, respectively. Furthermore, HM-QC phage showed moderate lytic capacity on the host cell. In this study, it was observed that ELISA-QT y HM-QL bacteriophages show promising potential as a biocontrol agent for S. Enteritidis in queso costeno.

Audience Take Away Notes

- Use of bacteriophages as an alternative for biocontrol of pathogenic microorganisms that affect food conservation
- Isolation of bacteriophages from handmade products
- Use of bacteriophages as a sanitizing, antimicrobial and disease control agent in animals
- Application of bacteriophages in various foods

Biography

Dr. Maryoris Elisa Soto studied Food Engineer at the Universidad de Cordoba, Colombia and graduated in 2011. She has a Master and Doctoral degree in Food Science and Technology of Universidad Federal de Vicosa – Minas Gerais, Brazil. She belongs to the GIPPAL (Grupo de Investigaciones en Propiedades y Procesos Alimentarios) and GIF (Grupo de Investigacao de Fagos – LATAM) research groups. Today she is a Titular professor and Researcher at University of Cordoba working on biocontrolled food with bacteriophages, bacteriophages as alternative to bacterial resistance and several applications. She has published many research articles and book chapters in this field.



Nouf Alshehri

Nouf Alshehri*, Yee-Hung Chan and Dipak P. Ramji

Cardiff School of Biosciences, Cardiff University, Cardiff, United Kingdom

Molecular mechanisms underlying the anti-atherogenic actions of (+)-catechin

Atherosclerosis is an inflammatory disease of medium and large arteries that is associated with build up of lipids, cellular debris, and immune cells. Atherosclerosis and its complications are the underlying cause of cardiovascular diseases, such as myocardial infarction and cerebrovascular accidents, which account for most global deaths. It is expected that deaths from cardiovascular diseases will increase in the future because of rise in risk factors such as obesity and diabetes, particularly in developing countries. Current pharmaceutical therapies against atherosclerosis and cardiovascular disease are not fully effective and associated with various adverse side effects. Nutraceuticals represent promising alternative agents in the prevention of atherosclerotic cardiovascular diseases and potentially as add-ons with current pharmaceutical drugs. However, our understanding of the molecular mechanisms underlying the protective actions of nutraceuticals is relatively poor.

(+)-catechin is a flavonoid present at high levels in cocoa, black grapes, apricots, almonds, and other plant-based foods. A prospective study of 34,492 participants demonstrated an inverse association between (+)-catechin intake and coronary heart disease. We have therefore investigated the molecular mechanisms underlying the anti-atherogenic actions of (+)-catechin using in vitro and in vivo model systems. (+)-catechin inhibited several pro-atherogenic processes in vitro such as the production of reactive oxygen species by macrophages, endothelial cells and smooth muscle cells, chemokine driven monocytic migration and macrophage proliferation and pro-inflammatory gene expression. In LDL receptor deficient mice fed a high fat diet, (+)-catechin inhibited plaque inflammation and produced a stable plaque phenotype associated with increase levels of smooth muscle cells and collagen. RNA-sequencing have identified several key (+)-catechin regulated genes and pathways. The studies suggest that (+)-catechin is a promising nutraceutical that needs to be investigated further in animal model systems and in clinical trials.

Audience Take Away Notes

- The audience will learn about how nutraceuticals, and particularly (+)-catechin, can prevent and treat cardiovascular disease.
- The research-led knowledge from the presentation will positively impact their jobs.
- The research could be used by other faculty to expand their research or teaching, particularly in relation to functional foods, nutraceuticals, and cardiovascular disease.
- The research could impact therapeutic options available in cardiovascular disease.
- The research could lead to further studies aimed at (+)-catechin in the prevention and treatment of heart disease.

Biography

Nouf Alshehri is a PhD student at Cardiff University since 2020. Before starting her PhD studies on cardiovascular disease, she worked as a Demonstrator at the Department of Biochemistry in King Abdul Aziz University (KAU), KSA, where she also earned her master's degree in 2015. At 2019 she become a lecturer at Jeddah University, KSA from she has a scholarship to persuade her PhD in Cardiff University. During her carrier, she developed a capability of working with colleagues from different countries and has been trained how to perform major technical laboratory tests for large research projects.



Paolo Lucci*, Benedetta Fanesi, Anastasija Kuchalskaja, Deborah Pacetti

Department of Agricultural, Food and Environmental Sciences, Polytechnic University of Marche, 60131 Ancona, Italy

Effect of roasting conditions on the lipid composition of arabica and robusta coffee beans

Coffee is considered as the most popular beverage in the world for its unique sensory properties and physiological effects. From a chemical composition point of view, lipids are major coffee components and may contribute to loss of sensory quality. The roasting process is responsible for the flavour development and is a time-temperature-dependent highly complex process, whereby hundreds of chemical reactions and changes occur simultaneously. These modifications may involve not only triacylglycerols fraction, but also tocopherols, which are important lipophilic constituents present in the coffee oil with antioxidant properties. Furthermore, in addition to the important technological aspects, triacylglycerols and tocopherols profiles could also be useful in the discrimination of Arabica and Robusta coffees (either green or roasted). In this research, we have focused our attention on the modification of triacylglycerols and tocopherols from different Arabica and Robusta coffee beans subjected to different degrees of roasting.

In the present study, 5 pure coffee samples for each species have been analyzed. Coffee samples were obtained from several countries: India, Vietnam, Colombia, Guatemala, Brazil, Nicaragua and Uganda. Furthermore, the effect of the roasting temperature and time have been also assessed by using 5 different roasting levels (green, light, medium, dark, very dark). For triacylglycerols analysis, a novel LC method based on Charged Aerosol Detection (CAD) has been developed for improving the separation of TAGs. Regarding TAGs profiles, no significant changes were observed depending on the roasting degrees even if some differences have been observed between Arabica and Robusta. Tocopherols were monitored by NP-HPLC- FL analysis. In this case, tocopherols composition has been proven to be useful in the discrimination of Arabica and Robusta coffees. On the other hand, the Arabica and Robusta coffees behaviour at the 5 different roasting levels was similar without significant decreases in tocopherols content in both varieties. This study showed that the roasting level has no significant impact on TAGs and tocopherols composition on both Arabica and Robusta coffee, even if tocopherols profile has been confirmed as a valuable marker of coffee variety. Furthermore, a novel ultrahigh pressure liquid chromatography coupled with CAD detection has been developed and applied to the analysis of coffee oil triglycerides.

Audience Take Away Notes

- Roasting level has no significant impact on TAGs and tocopherols compositions
- Tocopherols profile has been confirmed as a valuable marker of coffee variety
- Charged Aerosol Detector represents a valuable analytical alternative to both Refractive Index (RI) and Evaporative Light Scattering (ELSD) for TAGs analysis in liquid chromatography

Biography

Prof. Paolo Lucci attained his PhD in 2008 at SAIFET department of the Polytechnic University of Marche (Italy). Starting from February 2009, he joined the NASCENT European Project as an experienced researcher (Marie Curie Postdoc) at POLYIntell SAS (France) and then in 2010 he spent one year as experienced researcher (Marie Curie Postdoc) at the Department of Analytical Chemistry of the University of Barcelona within the Carbosorb European Project. In April 2011, he joined the School of Sciences of the Pontificia Universidad Javeriana (Colombia) where he was named Head of the Research Group of "Foods, Nutrition and Health" in 2012 and then head of the Department of Nutrition and Biochemistry in 2014. Currently, he is Associate Professor at the Department of Agricultural, Food and Environmental Sciences, Polytechnic University of Marche (Italy).

**Carolin Edinger**

Anton Paar ProveTec GmbH, Blankenfelde-Mahlow, Brandenburg, Germany

Screening the influence of antioxidants on food product with the rapid small scale oxidation test

The quality of fats, oils, and food products in general strongly depends on their oxidation stability. In this contribution a new method for evaluating the oxidation stability of food products is introduced. Under accelerated conditions (elevated temperature and pure oxygen pressure) a sample of 5 mL/4 g is examined in a sealed stainless steel test chamber. Typical conditions of the method are temperatures between 80 °C-140 °C and an initial oxygen pressure of 700 kPa. These conditions initiate a rapid oxidation process, which is monitored by recording the pressure which drops according to oxygen consumption of a sample. Due to the defined oxygen volume in the closed test chamber, the oxygen consumption can be calculated. Furthermore, we observed Arrhenius behaviour with regard to the applied temperature, enabling the user to determine the activation energy of a specific oxidation process and to estimate a product's shelf life.

Beneficially, the oxidation stability of complex food products can be investigated since even solid samples can be measured without prior sample preparation. Application examples demonstrate the broad variety of samples and the effectiveness of the method when it comes to antioxidant screening.

The significantly reduced measurement time and a high repeatability of the method represent its major advantages, allowing for quick and direct measurement of the oxidation stability for research, process and test bench control.

Audience Take Away Notes

- The Rapid Small Scale Oxidation Test (RSSOT): Measuring principle and investigation possibilities
- Application examples will demonstrate how much oxidation stability and shelf life testing can be facilitated with the test method
- Almost unlimited sample variety due to the testing options and further evaluation of the measurement curve(s)

Biography

Carolin Edinger studied Chemistry at Johannes-Gutenberg University – Mainz and majored in organic chemistry. She earned her PhD for researching the electrochemical deoxygenation of amides and related compounds. Since beginning of 2016 she works as Product Manager at Anton Paar. Matching her chemical education she is responsible for oxidation stability testing devices. Exploring application is one of her core businesses.



**Marzena Pabich*, Małgorzata Materska, Barbara Chilczuk,
Monika Staszowska Karkut**

University of Life Sciences, Department of Chemistry Research Group of
Phytochemistry, Lublin, Poland

Stability tests of mixed extracts based on blackberry leaves during freezing and freeze-drying process and storage

Medicinal plants commonly consumed worldwide contain different chemical substances that display a broad spectrum of biological activities. One of such plants is the blackberry, a valuable fruit plants which leaves are also used in folk medicine. The Blackberry Leaves (BL) contain astringent, antibacterial and antifungal agents, recommended internally in diarrhoea and inflammation of the gastrointestinal tract. Leaf infusions are also used externally for skin lesions and ulcers, and as a rinse in infections of the oral cavity and throat. Among many possible effects on biological processes in the human body, the antioxidant properties of phenolic compounds are the most important.

The purpose of this study was to evaluate the *in vitro* antioxidant activity of mixed water extracts based on blackberries leaves and their stability during freezing, freeze dried and storage. The plant material were gathered and air dried at room temperature and grounded. The plant powder from base plant was combined with others (Elderberry (EF) and Viburnum (VF) flower, Cistus (CL) and Fireweed (FL) leaves) in calculated proportion and were subjected to extraction with hot distilled water assisted by ultrasounds. The extracts were stored in lyophilized and frozen form for 6 months. Fresh and stored extracts were tested for changes in antioxidant activity during storage.

Among the analysed medicinal plants, blackberry leaf extract showed the highest antioxidant activity. It was also noticed a higher antioxidant activity of three component (BL-EF-FL) extract with comparison to single BL extract. Mixed extracts based on BL contained together EF and VF showed better stability during storage compared to mixed extracts contained only one flower. It was also noticed that freeze-drying and freezing caused a decrease in antioxidant activity, which depended on the composition of the extract and was in the range of 1.1-37.6%. The highest decrease in antioxidant activity was found for the binary (BL-VF and BL-EF) and five-component extracts.

The study showed that blackberry leaves can be considered a good source of antioxidant compounds which can be enhanced by combining with other medicinal plants. There is clear potential for using blackberry leaves as a food additive, medicinal source or herbal tea. Project financed under the program of the Minister of Education and Science under the name „Regional Initiative of Excellence” in 2019-2023 project number 029/RID/2018/2019 funding amount 11 927 330.00 PLN.

Audience Take Away Notes

- The audience will gain information about the quality characteristics of blackberry leaves extract
- The information on the effect of freezing and lyophilization on the antioxidant activity of plant extracts and the stability of extracts during storage
- The information obtained may be an inspiration for broader research on the biological effects of mixed plant extracts

Biography

Dr. Marzena Pabich studied Chemistry at the Maria Curie-Skłodowska University (UMCS) in Lublin, Poland and graduated as MS in 2011. She then joined the phytochemistry research group of Prof. Materska at the University of Life Sciences in Lublin. She received his PhD degree on Food Technology and Nutrition in 2020 at the same institution. She is interested in natural products with potential health-promoting properties and dietetics. The subject of detailed research are dry plant extracts, especially from plant leaves and flowers, which are rich in biologically active compounds.



Pasquale Massimiliano Falcone*, Nartea Ankuta, Benedetta Fanesi, Paolo Lucci, Deborah Pacetti

Department of Agricultural, Food and Environmental Sciences (D3A)—Marche University Polytechnical, Monte Dago, Brece Bianche, 10 - 60131 Ancona, Italy

Artisanal gelato 4.0: Enhancing quality and efficiency with digitalization and artificial intelligence

AIM: The study aimed to assess whether digitalizing the batch plant to produce Italian-style artisanal gelato could help assess the technological quality of starting blends and control dynamic process conditions. At present, producers use a trial-and-error approach, which leads to varying quality of the finished product. Relationships between blend composition, technological performance, and physical mechanisms during the water crystallization and air emulsification process were understood using sensing, digitalization, and numerical analysis.

METHOD: IoT sensors were utilized to monitor bulk temperature variation, electrical conductivity, and shear stress acceleration throughout the freezing process. The final quality of the ice cream was evaluated based on texture profile and rheological properties under controlled flow conditions. Numerical analysis of cooling curves was conducted to identify the time-temperature domains of water crystallization and compare the effects of different sweeteners. The temperature profile in the cold zone was calibrated to ensure precise analysis.

RESULTS: The study revealed that ice cream blends exhibit a sigmoidal decrease in electrical conductivity during three cooling phases, indicating cooperative mechanisms involved in water crystallization and air incorporation. These mechanisms contribute to the exponential increase in the viscoelastic properties of the ice cream blend's microstructure. Shear stresses increase at a variable rate depending on the kinetics of internal structure formation. Mechanical vibration sensors provide more detailed information than electrical conductivity and temperature signals and can divide the freezing process into four distinct phases based on internal structure evolution. Emulsifiers and stabilizers interact during the third cooling phase to form a consistent viscoelastic network, reducing the size of air cells and retaining emulsified air. Shorter process times result in smaller ice crystals and lower sensory quality, as the quality of ice cream is closely related to its structural consistency.

CONCLUSION: Digitalizing freezing and whipping processes can effectively evaluate the technological quality of starting premix under real processing conditions. Machine and deep learning analysis can be used to create an artificial intelligence platform able to recognize significant freezing and whipping events, to trigger alarms, and to allow decision making on technological variable modulation and extrusion times to obtain tailor-made final quality of the Italian-style ice cream.

Audience Take Away Notes

- Digitalizing freezing and whipping processes can effectively enable standardization of method to determine the technological quality of starting premix under real processing conditions
- Machine and deep learning analysis can be used to support decision making activities about technological variable modulation and extrusion times to obtain tailor-made final quality of the ice cream

Biography

Pasquale Massimiliano Falcone is Aggregate Professor and senior Researcher at the Department of Agricultural, Food and Environmental Sciences of the Polytechnic University of Marche. He gained PhD in Food Product Biotechnology and extensive knowledge in the fields of food science and technology, food microstructure and food rheology. The scientific interest is towards the development of innovative paradigms to design and validate food processes and food properties for both the traditional and novel foods, under a sustainability perspective and based on the principles of circular economy. He co-authored more than 70 scientific publications, who have more than 1050 citation and H-index of 17 as cited by Scopus.



Jenni Pessi*, Marina Kostesic, Andre Duesterloh

Dsm-firmenich, 4303 Kaiseraugst, Switzerland

Lipid matrix-based formulations for sustained release of vitamin C

Vitamin C has several essential functions in the body, such as supporting the immune system, acting as an antioxidant, and maintaining healthy skin and bones. However, the uptake of vitamin C is limited due to saturation of the active transport system. Lipidbased encapsulation of vitamin C is an attractive option as it provides protection from the gastric conditions and enhances the uptake of the vitamin by enabling sustained release, and thus allowing more consistent absorption and achieving higher plasma levels. There are various liposomal vitamin C products on the market, mostly available in liquid form. An alternative to these aqueous formulations is a dry version, where vitamin C is embedded into alipid matrix. This formulation approach allows for the use of a lower quantity of excipients, resulting in a more sustainable product. The approach also provides good shelf life and is specifically beneficial for the release and absorption kinetics of vitamin C. The matrix is not digested by the gastric lipases and thus protect the vitamin in the stomach. The release process starts in the small intestine where bile salts form mixed micelles and vesicles with the lipids and expose them to be digested by the pancreatic lipases. This process slowly releases vitamin C from the matrix and enables uptake along the whole small intestine. We studied the release behaviour of vitamin C from a formulation prototype in a biologically relevant medium containing bile salts and pancreatic lipase over 4 hours and demonstrated sustained release performance of the formulation. The advantage compared to a traditional sustained-release vitamin product is that the release process first starts in the small intestine and the vitamin is fully protected in the stomach.

Audience Take Away Notes

- The audience will learn about in situ release from a vitamin C formulation intended for sustained release and enhanced uptake. The learnings from the presentation also enable the audience to consider relevant biological features of the GI tract and to conduct formulation design based on phenomena taking place in the GI tract
- Discussing the factor affecting release and uptake and the relevant physiology is very much a universal topic

Biography

Dr. Pessi is currently employed at DSM and works with biosciences and process innovation. She obtained her PhD in 2017 from the University of Helsinki, graduated as MSc from the same institution 2013 and conducted the MSc thesis research at Harvard University. Additionally, she has founded a start-up company and worked 5 years in the pharmaceutical industry. Over the course of her career, Dr. Pessi has focused on research topics such as controlled release, enhancing bioavailability, particle engineering, microfluidics, and solid-state analysis.



Shoichi Inaba

Toyo Institute of Food Technology, Japan

Packaging-material and surface-heat-transfer-coefficient-based tTrial calculations for the temperature distributions in container fed food products during thermal processing with packaging materials and surface heat transfer coefficient

Typically, cComputing the the internalside temperature distributions in container food products may will allows the the manufacturers of people who that is are developing new packaged food products s to identify acquire the indicators regarding of the heat degradation of food properties and optimise optimize atthe ambient temperature patterns of thermal processes, and as well as the figure of packages. Notably, most Although most related report reports have of this type of research were discusseding the temperature and Fo values of the slowest heating zones; in these studies,, the temperature distributions obtained fromof the computing results and measured measurements were compared with those for the containers completelyfully filled with a 6% starch liquid and were found to be almost similar alongin the a vertical direction and a horizontal directions. The computing models of the computing comprisedwere made of parts of starch and cylindrical plastic c ups ' cups materials that were provided containeding the surface- heat- transfer- coefficient-related informations. The parts of the models have heat properties of the model components were analyzed using some measured by some equipment. Computational fluid dynamics was used for computing the This type of computing were was solved by the commercial CFD application for the unsteady heat-conductivity equation. ConsequentlyAs a result, the differences inofFo values were 1 minute compared to the overall Fo values of which were 6 to 10 min.utes. And Moreover, the maximum of root mean square errors was approximately about 8 oC and they are about approximately less than 4 oC in the central parts of the containers.

Audience Take Away Notes

- For the the manufacturers of people who are developing the food packageses and for people considering the ambient temperature patterns during the of thermal processings of packaged foods
- The applications we used are being sold
- For the optimization for to ensure of minimal the least heat degradation of foods

Biography

Mr. Inaba graduated from the faculty of electrical engineering atof the Keio University in 1984. He then joined the corporate R&D sector of the Toyo Seikan Group, which manufactures various kinds of food packages such as metal cans and retort pouches. After working there for 20 years, he moved to the technology development division of Toyo Seikan Co., Ltd. as the manager of the Customer Solution department, wherein he was engaged in the development of technologies y for the filling, sealing, and sterilization of food and beverage packages. Since 2015, he has beenis joining Toyo Institute of Food Technology as working as a research manager at the Toyo Institute of Food Technology



Staszowska Karkut Monika*, Chilczuk Barbara, Materska Małgorzata, Pabich Marzena

Department of Chemistry, Faculty of Food Science and Biotechnology, University of Life Sciences in Lublin, 13 Akademicka Street, 20 950 Lublin, Poland

Evaluation of the isobologram method for the assessment of mixtures based on black currant leaves

The polyphenols are the substances commonly found in plants and occurs in plant derived food. They may exhibit synergistic properties, contributing to potential health benefits. Blackcurrant leaves contain unique quercetin derivatives whose contribute to anti-inflammatory, antiviral and antiseptic effects. Traditional medicine uses blackcurrant extracts to treat various diseases, including cancer. Currently, there are many clinical studies that confirm the positive effect of this plant on health and usefulness in the treatment of heart, brain and kidney diseases. The aim of the study was to evaluate the interaction of compounds contained in a mixture of blackcurrant leaf extract and four plants. Antioxidant activity was determined and IC₅₀ of individual extracts prepared from black currant leaves, willowherb, sweet pepper, chokeberry leaves and elderberry flower and mixtures of two, three, four and five-component plants were determined. Partial inhibitory concentrations (FIC) for individual components of the mixture and the impact factor (I) were also determined. On the basis of the value I, the power of interaction between individual herbs was determined. For the selected two-component mixture, the antioxidant activity for several concentrations was evaluated. A synergistic effect was noted for one of the concentrations. It was found that the antiradical activity of blackcurrant leaves in a mixture with elderberry or willowherb decreases/increases depending on the proportion of ingredients in the mixture. The isobologram method made it possible to determine the interaction of black currant leaves with elderberry and fireweed flowers as generally antagonistic or additive. Project financed under the program of the Minister of Education and Science under the name „Regional Initiative of Excellence” in 2019-2023 project number 029/RID/2018/2019 funding amount 11 927 330.00 PLN.

Audience Take Away Notes

- The method of evaluating interactions between extracts allows to shorten the analysis
- Health-promoting properties of blackcurrant leaf extract
- How to choose the best composition of herbal mixture

Biography

Monika Staszowska-Karkut studied Analytical Chemistry at the Maria Skłodowska- Curie University in Lublin and completed her master's degree in 2013. Then she received an internship at the Institute of Agrophysics, which is a scientific unit of the Polish Academy of Sciences. In 2015, she started working as an assistant at the University of Life Sciences in Lublin, Faculty of Food Sciences and Biotechnology. In his research work, he deals with compounds of plant origin.



Paolo Lucci^{1*}, Benedetta Fanesi¹, Erica Moret², Lanfranco Conte², Mauro Amelio³, Deborah Pacetti¹

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Effect of different storage conditions on quality parameters of “Mild” extra virgin olive oil

“Mild” Extra Virgin Olive Oil (EVOO) is highly appreciated by consumers as it is characterised by lower bitterness and spiciness, parameters which are positively correlated with the concentration of phenolic compounds. Phenols, together with tocopherols, are strong antioxidants present in olive oils, and they contribute to counteract lipid oxidation. The aim of this study was to evaluate whether the low level of phenolic compounds have an impact on the quality/stability of “mild” EVOO stored up to 6 months (t6) under different storage conditions (optimal, 25 °C, 40 °C, 50 °C, 60 °C in the dark and 25 °C at an intensity of 1000 lux, to simulate sales shelf conditions). EVOO samples were collected from different countries, and the number of peroxides, UV absorbances, fatty acids, tocopherols, hydrolysed phenols, and volatile profile, among others, were determined during the storage periods. Under optimal conditions, all the samples at t6 showed values of peroxides, UV absorbances and fatty acids within the legal limits reported in the Regulation (UE) 2019/1604. During storage, no statistically significant differences were highlighted in the content of tyrosol and hydroxytyrosol. By contrast, the concentration of α -, γ -, and δ - tocopherol drastically decreased, indicating their protective role against the oxidation of the lipidic and phenolic fractions. Around 70 volatile compounds were identified, with no significant variations between samples at t0 and t6. The green and floral aromatic notes were expressed by the predominant C6 alcohols and aldehydes (e.g., (E)-2- hexenal, 1-hexanol), with (E, E)-2,4-hexadienal being the most impactful in terms of sensorial perception thanks to its low odour threshold, while acetic acid (negative note) resulted high in some samples. The conducted study demonstrates that, although the low level of antioxidant compounds, the quality of “mild” EVOOs is guaranteed over the storage period considered through the study when stored under optimal storage conditions. On the other hand, significant change of the ratio between 1,2- and 1,3-diglycerides with an inversion between them occurred earlier in oil samples stored at higher temperatures while exposure to light caused the decay of tocopherols (55%), which are known to be highly photosensitive.

Audience Take Away Notes

- Impact of storage conditions on several quality parameters of olive oils
- Impact of high temperatures on 1,2- and 1,3-diglycerides ratio
- Exposure to light caused the decay of tocopherols

Biography

Prof. Paolo Lucci attained his PhD in 2008 at SAIFET department of the Polytechnic University of Marche (Italy). Starting from February 2009, he joined the NASCENT European Project as an experienced researcher (Marie Curie Postdoc) at POLYIntell SAS (France) and then in 2010 he spent one year as experienced researcher (Marie Curie Postdoc) at the Department of Analytical Chemistry of the University of Barcelona within the Carbosorb European Project. In April 2011, he joined the School of Sciences of the Pontificia Universidad Javeriana (Colombia) where he was named Head of the Research Group of “Foods, Nutrition and Health” in 2012 and then head of the Department of Nutrition and Biochemistry in 2014. From 2018 is Associate Professor in Food Chemistry, previously at the University of Udine, and then from 2022 at the Department of Agricultural, Food and Environmental Sciences, Polytechnic University of Marche (Italy).



Turgay Cetinkaya

Department of Food Processing, Armutlu Vocational School, Armutlu, Yalova, Türkiye

Characteristic changes in functionalized polyvinly alcohol based nanofibers after being stored with smoked salmon meat

It is important for consumers to predict the quality of processed fish products before they consume them. In this study, it is aimed to evaluate the characteristic changes in polyvinly alcohol-based nanofibers after being stored with smoked salmon. For this purpose, electrospun nanofibers were produced as control (PVA), extract incorporated (PVA+black carrot) and metal oxides incorporated (PVA+black carrot+tin dioxide) and then compared. Scanning Electron Microscopy (SEM) images showed the formation of ultrafine nanostructures and EDS mapping confirmed the attachment of metal oxides to the nanofibers. Differences between control (PVA), extract incorporated (PVA+black carrot) and metal oxides incorporated (PVA+black carrot+tin dioxide) nanofibers were evaluated by measuring fiber diameters. The main functional groups in these three nanofiber samples were determined and their stability compared by using Fourier Transform Infrared Spectroscopy (FTIR). To reveal the relationship between spoilage and absorption of volatiles from smoked salmon, nanomaterial samples and salmon meat were kept together in petri dish without contact at room temperature. Disappeared bands, shiftings, and new peaks, bonding interactions between nanofibers and volatile/nitrogenous compounds were deeply investigated in FTIR spectrums. Spectral changes of nanofibers before and after the spoilage of Salmon serves as an important indicator of seafood products to alert the consumer about its spoilage. Results showed that the absorption of volatiles on nanofibers that are produced by the deterioration of smoked salmon can be examined by spectroscopic approaches. Successful production and application of nanofibers with nanoparticles presented in this study proved that functionalized nanofibers with extracts and metal oxides can be applied for intelligent packaging layer which provide valuable data about the potential usage of electrospinning for the detection of volatile amines in fish meat.

Audience Take Away Notes

- Addition of extract and metals may affect nanomaterial diameter
- Chemical interactions between volatile gases and nanomaterial can be determined by infrared spectroscopy since there can be spectral changes of functional groups with the interactions with volatiles
- Nanomaterial stability be determined by calculating band and distances in spectrums
- Nanoform of metal oxides and plant extracts have the potential to be used as and intelligent food packaging ingredients for seafood product
- Determination the spoilage rate of food products in real-time applications in a rapid way will be more important in future.

Biography

Dr. Cetinkaya studied Food Engineering at Sakarya University, Türkiye and graduated as MS in 2014. He received his MSc and PhD degrees in 2016 and 2023 at Istanbul Technical University. He joined many research groups as visiting researcher from different Universities such as Ghent University, Denmark Technical University during his studies. He has published review and research articles related non-thermal applications on food products in various journals. His research area is production of nanocapsules, nanofibers, nanoparticles, and using of nanomaterials on seafood products for active and intelligent packaging functions.



Ngoni Mbella Rose^{1*}, Dr Bikai Eboa Josephine², Pr Ntsama Essomba Claudine²

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Physical, chemical and microbiological quality control of soft wheat circulating in Douala and Yaoundé (Cameroon)

Seventy percent estimated annual world production (600 million tons) of wheat is used for food production. Milling is very important in the processing of wheat and its transformation into flour, which is then processed into products such as bread, cakes, cereals, macaroni and noodles. African countries are the largest importers of wheat, with over 45 million tons in 2013. In Cameroon, there is a more or less organized wheat flour sector, and despite the development of the sector, quality management remains insufficient. The study Objective was to contribute in food safety. The Methodology used was a random-type analytical study from December 2020 to June 2021, in the cities of Yaoundé and Douala. Flours of soft wheat T45 to T65 locally grounded was include in the study. All the analysis (physico-chemical and microbiological) took place in the National Drug Quality Control and Valuation (LANACOME). Data were collected and analyzed using SPSS version 16.0, Excel 2013 and R software. Results: The study population collected was of 67% of samples from markets, 20% from supermarkets and 13% from millers. The wet level amongst the samples was between 11.2% and 12.9%. Regarding the pH measurements, all our samples have pH values between 5.8 and 6.2. Organoleptic characteristics were measured according to a scale from 1 to 10 ; then the score obtained was greater or equal to 8. We carried out counts of the different microbial colonies: 33.33% of samples from Douala were non-compliant, while Yaoundé one were 40% unsatisfactory.

Conclusion: Physicochemical parameters, as the wet rate and the pH, had an influence on the microbial quality of samples in the study. Enumeration of various microorganisms was carried out according to Codex Alimentarius standardized methods and showed the presence of aerobic mesophilic germs, total coliforms, *Escherichia coli*, *Staphylococcus aureus*, yeasts and molds in quantities greater than standard. Despite the absence of dangerous germs such as salmonella and fecal coliforms, our results showed in fine, that several samples of flours analyzed had an unsatisfactory microbiological quality.

Audience Take Away Notes:

- Physical and chemical parameters of wheat flour sampled in Yaoundé and Douala.
- The presence of bacteria and fungi by the Method of isolation and enumeration according to current standards.
- The correlation between physico-chemical factors and microbiological quality.
- The impact of the degree of microbial contamination on the nutritional and organoleptic quality of wheat flours.

Biography

Dr. Ngoni Mbella Rose, studied pharmacy at Marseille Mediterranean Faculty of Pharmacy, France and graduated as PharmD In 1988. She joined the Ministry of Research at IMPM from 1989 to 1993; and graduated as 3rd Cycle Dr. in Biochemistry at 1993, Yaoundé 1 University. After she become Director of Pharmaceutical Services, (1995 to 1998). Then she worked as Temporary Adviser in WHOAFRO (1999-2000); Technical Officer in WHO Geneva (2001); WHO National Officer in Cameroon Country office (2002-2011). She came back to academic as Lecturer (2012-2016), Senior Lecturer (2017-2022); she received her PhD degree in 2021 at UY1. Meanwhile, she is Chair of the department of Pharmacology and Traditional Medicine since 2017, and DG LANACOME from 2015 to now. Associate Professor by January 2023, she has published more than 30 research articles.

11-13 SEPT

DAY 01

POSTERS

JOINT EVENT ON

**FOOD SCIENCE AND
NUTRITION RESEARCH**



Ocampo Perez Maria Nathalia¹, Hernandez Aguirre Maria Antonia^{2*}, De Jesus Sanchez Antonia², Camacho Diaz Brenda Hildeliza², Osorio Diaz Perla²

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Effect of the addition of water on the physicochemical characteristics of a gluten-free bread based on non-conventional flour

Wheat is currently the cereal that most people consume in the world since it was a wild plant, it has been a staple food for humanity for thousands of years, it is used in the production of many products for daily consumption. On the other hand, the world market for gluten-free products has had an unprecedented increase in recent years. Reasons for this increase include the significant increase in gluten-related health problems, celiac disease, non-celiac gluten sensitivity, and wheat allergy, as well as a growing group of apparently healthy people who are opting for a diet gluten-free as it is considered healthier. Nutrition is one of the most important points in food technology research aimed at developing safe gluten-free foods since, according to the Codex Alimentarius, gluten-free products that replace important staple foods (flour, bread, pasta, etc.) must provide approximately the same amount of vitamins and minerals as the originals. Therefore, the objective of this work was to evaluate the effect of adding water on the physicochemical properties of a gluten-free bread made only with immature plantain flour added with agave fructans. Gluten-free breads were made using the formulation of a bun-type bread, using only immature plantain flour and agave fructans, 3 levels of water in the formulation were evaluated. The volume, specific volume was determined and the quantification of ethereal extract, proteins, ashes, humidity was carried out following official AACC methodology, as well as an image analysis of the crumb using an image of the central slice of the loaves. The results showed that both the volume and the specific volume increased with respect to the addition of water in the formulation, regarding the image analysis of the crumb, it was observed that the addition of water increased the size and number of alveoli at a concentration intermedia, however, by increasing the amount of water in the formulation, breads without crumbs (hollow breads) were generated. Regarding the texture profile analysis, hardness, chewiness and gumminess were higher compared to breads made with banana flour, but they were not added with inulin, presenting similar values in parameters such as cohesiveness and elasticity. The proximal chemical analysis showed that the breads presented an ethereal extract content of 11.37 g/100g, protein 9.54 g/100g, ash 2.64 g/100g, carbohydrates 26.27 g/100g, however, and humidity greater than 50 g/ 100g, the latter could be due to the addition of inulin, which could bind a greater amount of water. In conclusion, water plays an important role in the development and preparation of gluten-free baked goods, however, a high concentration affects the crumb structure and therefore the quality of the finished product.

Audience Take Away Notes

- The interactions generated between the different components of the flours, during the different stages of the elaboration process, will allow obtaining a gluten-free bread with desired physical characteristics
- The use of unconventional ingredients in bakery products will allow the general public to know alternatives for the production of gluten-free products
- The general public will be able to learn how unconventional ingredients can be used to develop new formulations and use them in their own products

Biography

Dr. Hernandez Aguirre studied Biochemistry at the Instituto Tecnológico de Zacatepec and graduated as engineer in 2009. She then joined the research group of Dr. Osorio Díaz at the Centro de Desarrollo de Productos Bióticos del Instituto Politécnico Nacional in 2011 and received her PhD degree in 2019 at the same institution. She currently works at the same institution and is Candidata in the Sistema Nacional de Investigadores del Consejo Nacional de Ciencia y Tecnología of Mexico.



Torres Marmolejo Karla¹, Hernandez Aguirre Maria Antonia^{2*}, Bravo Rivera Guadalupe², Jaime Fonseca Monica Rosalia³, Osorio Diaz Perla²

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Physicochemical characterization and sensory analysis of a gluten-free fettuccini pasta

Pasta has been a food consumed since ancient times. This product has been accepted throughout all these years due to the ease of its preparation since it mainly contains two ingredients, semolina and water. However, semolina contains gluten and there is currently a worldwide population that suffers from gluten intolerance or celiac disease, for which they are forced to consume a gluten-free diet for life. In the present work, a gluten-free fettuccine pasta based on unconventional flours was prepared, using amaranth, chickpea, and broad bean flour (problem sample). The pasta obtained together with a commercial gluten-free pasta based on rice flour (control sample), the ash content, moisture, protein, and ethereal extract were evaluated using official AACC methods, the texture of the pasta was determined. the cooked pasta through a texture profile analysis, where hardness, elasticity, adhesiveness, cohesiveness, chewiness, and gumminess were evaluated. The acceptance of the pasta was also evaluated through a sensory evaluation using a 5-point hedonic scale, with untrained judges. The results showed that the test paste presented better nutritional values than the control paste in humidity (4,197 g/100g and 7,863 g/100g respectively), proteins (18,531 g/100g and 7,026 g/100g respectively) and ashes (2,938 g/100g). and 0.130 g/100g respectively). While for lipids the problem paste had a higher value (11,021) than the control paste (10,790g/100g). In the texture profile, the control paste had a higher value in parameters of hardness (56,442 N), adhesiveness (6,772 N*s) and chewiness (31,778 N), while the test paste presented a lower value in all parameters, being the adhesiveness (2,360 N*s) an important parameter to highlight. As for the acceptance of the problem pastes, it was observed that it presented a lower acceptance in the areas of appearance in general, texture, flavor, and acceptance. While the color parameter obtained a higher rating compared to the control, this could be since the control pasta made with rice is white, while the test pasta presented a darker color. In conclusion, the problem pasta meets the quality criteria (physical properties) compared to a gluten-free commercial pasta, however, in the sensory evaluation the parameter with the best evaluation was color. The use of non-conventional native flours is a good alternative to develop pasta with physicochemical characteristics like gluten-free pasta present in the market, however, the characteristic flavor of the legumes wasn't liked by consumers.

Audience Take Away Notes

- The public will be able to learn how unconventional ingredients can be used to develop new formulations and use them in their own products.
- The knowledge generated in this research will allow the general public to learn about the use of unconventional native flours as an alternative for the preparation of gluten-free pasta and to generate new products from them.
- The use of unconventional flours and their potential use in the development of new products with physicochemical and sensory characteristics suitable for the consumer

Biography

Dr. Hernandez Aguirre studied Biochemistry at the Instituto Tecnológico de Zacatepec and graduated as engineer in 2009. She then joined the research group of Dr. Osorio Díaz at the Centro de Desarrollo de Productos Bioticos del Instituto Politécnico Nacional in 2011 and received her PhD degree in 2019 at the same institution. She currently works at the same institution and is Candidata in the Sistema Nacional de Investigadores del Consejo Nacional de Ciencia y Tecnología of Mexico.



Theodore Munyuli*, Bienfait Bashi Mushagalusha

Department of human nutrition and Dietetics, Institute of Higher Education in Medical Techniques, ISTM-Bukavu, Bukavu city, South-Kivu Province, Eastern DR Congo

Interacting effects of socio-economic drivers and climate change on children nutrition and health in South-Kivu province, Eastern DR Congo

A study survey was conducted for two consecutive years (2021-2022) in South-Kivu Province to assess the potential impact of drivers of the current status of health and nutrition of children. Primary and secondary data was collected with a questionnaire. Anthropometric parameters were measured and correlated with climatic factors. There was a variability (50-88%) in the prevalence of malnutrition status from a territory to another one. Bukavu urban health zones had the lowest status of malnutrition as compared to rural ones. Rainfall (GLM: $Z=-7.78$, $P<0.0001$), maximum temperature (GLM: $Z=-5.54$, $P<0.001$), altitude (GLM: $Z=9.76$, $P=0.0275$), wind speed (GLM: $Z=4.23$, $P=0.023$) were linked to rate of wasting and stunting of children and to burden of malaria and diarrhoeas. The geographic position (highlands, low lands, forest, savannah) and the degree of fertility of soil and crop productivity were also linked ($P<0.05$) to the current status of emaciation rate in children of under five years. The tribe, the level of education, the income level, the proximity to modern health services were also associated with the prevalence of general malnutrition of children and the household food security status. It was recommended to policy makers to take into consideration sociodemographic, geographic and climatic and anthropogenic drivers while planning nutrition sensitive interventions to improve and reduce the level of malnutrition in rural areas or while planning to ensure security in mountain zones of eastern DR Congo.

Keywords: Chronic Malnutrition, Climate Change, Fragile Health Status of Children, Eastern DR Congo.

Audience Take Away Notes

- By formulating proposals adapted to people of Africa with similar issues
- By knowing the reality of problems at the ground
- This research that other faculty could use to expand their research or teaching
- This provide a practical solution to a problem that could simplify or make a designer's job more efficient
- It improve the accuracy of a design, or provide new information to assist in a design problem
- Activists at the ground in Africa will be aware of the situation

Biography

Prof. Theodore Munyuli received his PhD in 2010 in UK and was employed as associated professor attached at the department of Nutrition and Dietetics (ISTM-Bukavu) since 2012 up to date. He is an author of more than 70 papers in peer reviewed journals.



Laribi Habchi Hassiba

Laboratory of Functional Analyzes of Chemical Processes, University of Blida 1, Algeria

Study of the acaricidal effect of a biomolecule of origin environmental protection against the parasite (Varroa) of the honey bee *Apis mellifera*

Bio-pesticides from biomolecular are characterized by their degradability in the environment, their low toxicity to humans and their mode of action on pests. One of the most damaging pests is probably the Varroa destructor, parasitic mite of the honey bee *Apis mellifera*, it causes significant economic losses and is one of the causes that devastates the bee population in Algeria and in the world. Several therapeutic trials have been conducted to combat this parasite. However some commercially available synthetic chemicals have proved ineffective over time due to the development of mite resistance and toxicity to the bee. The use of new non-toxic and biodegradable molecules in the treatment of varroasis is essential. It is in this context that an in vivo therapeutic trial was tested for a period of a few days as a means of biological control based on a bio-polymer (chitosan) extracted from a marine biomass (shrimp shell). Prepared in weak organic acid in gel form at a lethal dose of 1.5% (w / v). This gel was deposited in the hive in the same manner of another synthetic product (Amithraze) usually used by Algerian beekeepers. The results showed that the product administered in the hives has a mortality rate greater than 80% with a total safety towards the bee (0% mortality and no behavioral disturbance) in comparison with the treatment based on an acaricide synthesis (Amitraze) showing 85% mortality followed by a 1/3 loss of the bee colony. Our study showed that chitosan treatment is more effective than amithraze treatment in reducing the parasite population inside the apiary.

Keywords: Biological Treatment, Environment, Varroasis, Biopolymer

Audience Take Away Notes

- Beekeepers are witnessing an unusual phenomenon of colony death characterized by the rapid loss of large numbers of workers, leaving behind the queen and the brood
- One of the most damaging pests is probably the Varroa destructor, parasitic mite of the honey bee *Apis mellifera*, it causes significant economic losses and is one of the causes that devastates the bee population in Algeria and in the world
- Several therapeutic trials have been conducted to combat this parasite. However some commercially available synthetic chemicals have proved ineffective over time due to the development of mite resistance and toxicity to the bee
- Bio-pesticides from biomolecules are characterized by their degradability in the environment, their low toxicity to humans and their mode of action on pests

Biography

Laribi Habchi Hassiba is a Professor at SAAD Dahlab Blida 1 University, where she obtained an Habilitation to Direct Research (HDR). She holds a Doctorate and a Magister in Environmental and Pharmaceutical Biotechnology obtained respectively in 2013 and 2005 at the National Polytechnic School of Algiers and a state engineer diploma in Biological Engineering in 1990 at the University of Technological Sciences Of Algiers. Professor H. Laribi has supervised and supported several doctoral students and has produced numerous scientific works on biomolecules of microbial, animal and plant origin such as international patents of invention (WIPO) and renowned international publications and their application in the pharmaceutical, beekeeping, biochemical, enzymatic, molecular biology and environmental.

11-13 SEPT

DAY 02

KEYNOTE FORUM



JOINT EVENT ON
**FOOD SCIENCE AND
NUTRITION RESEARCH**

Soil available nutrients and their relationship with food security and human health

Essential soil elements that end up in the human diet are supplied through food from plants that took the elements up from the soil during growth depend on the soil for their nutritional needs. A major portion of the nutrients needed for human health originate with the soil. Soil affects human health directly through the ingestion, inhalation and absorption of soil or its constituents and indirectly through the quantity and quality of food that is derived from soil-based agriculture. Almost all the essential plant nutrients are critical to the quality of plant-based food, which serves as the main source of dietary intake for human. If the soil is supply adequate amount of nutrients for food, the human health also benefits. Hence, availability of important nutrients such as Potassium (K), Sulphur(S), Iron(Fe) and Zinc (Zn) in soil can play a vital role in ensuring food security. Deficiencies of these nutrients (K, S, Fe and Zn) in soils occur widely which in turn have adverse effects on human health. Potassium deficiency in soil results low dietary food intake of potassium by human, causing hypertension in human. Sulphur deficiency soils may result in food insecurity with resultant Protein Energy Malnutrition (PEM). Iron deficiency is probably the most common example and may affect as many as 5 billion people, with about 2 billion considered anemic. Zinc deficient soils are widespread and include about half the world's soils. Calcareous soils and leached, acidic soils are more likely to be Zn deficient. Food security is critical to human health. Food security is achieved when all people have constant access to adequate, safe, and nutritious food that is economically accessible, socially acceptable, and allows for an active and healthy life. The world's population continues to grow rapidly but large areas of cropland have to be abandoned every year due to soil degradation.

Audience Take Away Notes

- The availability of potassium and sulphur in soil affect human health
- Soil affects the amount of iron in food is indispensable to human health
- Zinc is the most important metabolic promoter among the nutrients known to be essential to humans
- Food security to ensure adequate and nutritious food is vital in human health in years to come



Surendra Singh

Department of Soil Science and Agricultural Chemistry, Institute of Agricultural Sciences, Banaras Hindu University, Varanasi (UP), India

Biography

Prof. Surendra Singh, Formerly Head, now professor, Department of Soil Science and Agricultural Chemistry obtained M.Sc. (Ag) and Ph.D. Degrees in Soil Science and Agricultural Chemistry, Banaras Hindu University. Altogether, he has experience more than 33 years (teaching, research, extension, consultancy, development, administration, etc.). Singh has more than 275 publications of national and International repute to his credit. He has guided/advised many M.Sc. and Ph.D. students in Soil Science and Agricultural Chemistry. Dr. Singh has successfully executed more than 17 externally funded research, extension and developmental projects as Principal investigator. He received prestigious several awards of national and International. Attended as speaker in the "Euro-Global Conference on Food Science, Agronomy and Technology" held, September 20-22, 2018 at Rome, Italy and 22nd World Congress of Soil Science held, 31 July-5 August 2022, Glasgow, Scotland, UK.

11-13^{SEPT}

DAY 02-VIRTUAL
KEYNOTE FORUM



JOINT EVENT ON
**FOOD SCIENCE AND
NUTRITION RESEARCH**

Synthesis and analytical control of nanodelivery lipid-based systems for encapsulation of nutraceuticals: Achievements and challenges

This conference aims to give an overview of an emerging challenge within the current research related to food science and technology, based on the nanoencapsulation of bioactive compounds essential for human health. Regarding this point, it is important to highlight the existence of many hydrophobic nutrients considered as nutraceutical compounds or functional foods with great relevance for human health, such as: fat-soluble vitamins (A, D, E and K), essential oils (terpenes and terpenoids such as cardamom and cinnamon oils), essential fatty acids (Omega-3), plant pigments (carotenoids, flavonoids, chlorophylls, xanthophylls and other phytosterols such as polyphenols), etc.

Despite their undeniable advantages, these bioactive principles present two serious problems with regard to their incorporation on a large scale in processed foods: their low stability during prolonged periods of storage due to physical and chemical processes of degradation against light, oxygen, high temperatures or humidity, etc., and its limited bioavailability. To overcome these two issues, a new alternative has been proposed based on the nanoencapsulation of said nutrients to protect them against inappropriate environmental circumstances, as well as to improve their bioavailability.

With this aim, different types of Nanostructured Organic Systems (NOMs), have been developed for the encapsulation and controlled release of nutrients, the most representative being: inclusion complexes, nanogels, nanoemulsions, nanofibers, nanosponges, nanoliposomes, nanomicelles, protein nanocapsules, Solids Lipid Nanoparticles (SLNs) and Nanostructured Lipid Carriers (NLCs).

The design and synthesis of these nanosystems require a detailed knowledge about their composition, structure, and properties. These three factors will exert a great influence on the final physical characteristics of the nanosystem, as well as on the stability and bioavailability of the bioactive principle. This knowledge requires the implementation of suitable analytical tools providing information on the characteristics of the nanoparticles (concentration, size, state of aggregation, surface charge, etc.) and about the physical-chemical properties of the whole system (appearance, rheology and stability) with regard to their incorporation as food ingredients.

In our specific case, two powerful bioactives, quercetin and vitamin D, have been selected attending to their beneficial properties as dietary nutraceuticals because of their antioxidant, anti-inflammatory and antidiabetic characteristics, but limited stability and bioavailability. Their encapsulation was accomplished as two different nanocarriersystems, that are nanoemulsions and nanomicelles, respectively.



Maria Jesus Villaseñor Llerena*, N Villamayor, A Ríos

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³A. Ríos, Analytical Chemistry and Food Technology, Castilla- La Mancha University/full professor, 13071 Ciudad Real, Ciudad Real, Spain

Biography

Dr. Maria Jesus Villaseñor completed her PhD in Analytical Chemistry at 28 years old, at Castilla-La Mancha University in spectrophotometry and electrochemistry fields. Later, she carried out two postdoctoral collaborations with the Institute of Organic Chemistry (CSIC) and the University of Amsterdam (Analytical Chemistry and Polymers Area) being specialized in gas chromatography-mass spectrometry and different modes of capillary electrophoresis, respectively. Nowadays her research interests are focused on new optical and electrochemical sensing nanomaterials-based strategies and on the design and analytical control of NOMs obtained by means of nanoencapsulation methodologies, within the research group SAMAN (Simplification Analytical Minutuarization and Nanotechnologies).

An initial stage was based on the selection (nature and percentage) of the appropriate components (organic and aqueous phases, surfactant, cosurfactant, etc.), as well as their specific synthesis methodology, considering that all of them must be food GRAS (generally recognized as safe) categorized, since our field of application would be focused within food science. In all these stages, the use of different characterization techniques will be necessary: SEM, DLS, TEM, Raman spectroscopy, UV-Vis spectrophotometry, etc. to control the physical-chemical characteristics required to obtain a food nanocarrier (droplet size, turbidity, rheology, etc.).

Furthermore, it must be highlighted the need to develop accurate methodologies able to analyze these new designed nanoencapsulated bioactives without altering their native nanostructure, such as fluorescence assisted-nanomaterials and SERS (Surface Enhanced Raman) spectroscopies.

Audience Take Away Notes

- Familiarization with different Nanostructured Organic Materials (NOMs), developed for the encapsulation and controlled release of bioactive compounds with nutraceutical activity
- Familiarization with the different synthesis methodologies to properly control size, polydispersity, stability and encapsulation efficiency
- Familiarization with specific analytical techniques as suitable tools to control nanostructural and physico-chemical properties

Harvesting biomolecules via the EVA technique

We describe here a modern and unique tool for exploring documents pertaining to the world cultural heritage while avoiding their contamination or damage. Known under the acronym EVA, it consists of a plastic foil of Ethylene Vinyl Acetate studded with strong cation and anion resins admixed with C8 and C18 hydrophobic beads. When applied to any surface such foils (cut into diskettes) can harvest any type of surface material, which is then eluted and analyzed via standard means, such as GS/MS (typically for metabolites), MS/MS (for peptide and protein analysis), X-ray (for elemental analysis). We briefly review here a number of past data, such as screening of original documents by Bulgakov, Chekov, Casanova, Kepler, while dealing in extenso with very recent data, pertaining to Orwell and Stalin and analysis of the skin of an Egyptian mummy. The technique was also successfully applied to paintings, such as the Donna Nuda at the Hermitage in St. Petersburg, attributed to Leonardo and his school. As a unique example, we quote here the analysis of a book Stalin was extensively reading during World War II (Ivan Grozny): on the pages of this book we found plenty of lithium salts, suggesting that he was bipolar just like Winston Churchill (except that this was a jealously kept secret and discovered by us for the first time as a world premiere). This novel methodology represents a formidable tool for exploring the past life of famous authors, scientist and literates in that it can detect traces of their pathologies and even drug consumption left by saliva and sweat traces on their original handwritten documents. Prior to our invention, the only technique proposed was scraping or grating the surface of the material under investigation, clearly a technique strictly forbidden in museums, private and public collections. In the worst cases, when dealing with pottery or other clay material, chipping away of a piece was proposed, a barbarian way to treat items belonging to the Cultural Heritage.

Audience Take Away Notes

- All they have to do is to use the technique to the benefit of their research.
- It will be helpful for the audience in their job, if they use it
- This research that other faculty could use to expand their research or teaching
- This provides a practical solution to a problem that could simplify or make a designer's job more efficient
- It will improve the accuracy of a design, or provide new information to assist in a design problem



**Pier Giorgio Righetti^{1*},
Gleb Zilberstein²**

¹Politecnico di Milano,
Department of Chemistry, Italy

²SpringStyle Tech Design Ltd,
Rehovot, Israel

Biography

On 560 articles reviewed by Mendeley Statistics, Righetti scores 26,680 citations, with an average of 47 citations/article and with a H-index of 81. During the years 2005-2013 he has received 1000 to 1200 citations per year. He has won the CaSSS and the Csaba Horvath Medal awards, on April 15, 2008 at Yale University. In 2011, he has been nominated honorary member of the Spanish proteomics society and in 2012 he has won the Beckman award and gold medal. In 2014 in Madrid, he has been given the HuPO award for proteomic research and, in Atlanta, the American Electrophoresis Society award.

11-13 SEPT

DAY 02

SPEAKERS

JOINT EVENT ON
**FOOD SCIENCE AND
NUTRITION RESEARCH**



Jonata M Ueda^{1,2,3*}, Macio Carrocho^{1,2}, Lillian Barros^{1,2}, Patricia M Gomez³, Virginia F Ruiz³, Sandrina A Heleno^{1,2}

¹Mountain Research Centre (CIMO), Polytechnic Institute of Braganca, Braganca, Portugal

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³Dept. of Nutrition and Bromatology, Faculty of Pharmacy, Complutense University of Madrid, Madrid, Spain

Development of powdered products as an approach to avoid food waste: Convenience and challenges

According to the Food and Agriculture Organization of the United Nations, about a third of all global food production is wasted annually, representing an inestimable economic and resource loss, in addition to the environmental impact it causes. Among the strategies to minimize food waste, powdered products are seen as an alternative, being able to attribute a longer shelf life and ease handling, transport, and storage. Therefore, this work aims to present a systematic review of the methodologies currently applied to avoid food waste, including the production of powdered foods. The advantages and disadvantages of powdered foods, their flow properties, drying methods, and pretreatments will be overviewed. Morphological properties, namely the microstructure, and the equipment needed to carry out the tests in order to obtain the desired properties, will also be presented. Rehydration or instant properties (wettability, sinkability, dispersability and solubility) and how to improve them will be discussed, in addition to the evaluation of the rehydration behavior, involving the rehydration kinetics of powdered foods, such as Fick's 1st and 2nd law, as well as Peleg's kinetics and Weibull's probabilistic models. In this work, powdered foods currently on the market will also be discussed, as well as the influence of each food matrix on powder production, regarding functional properties, sugar content, nutrients, and others. Finally, a case study with probiotics to produce yogurt powder will be presented, showing the viability of lactic acid bacteria and texture properties after the drying process. Overall, all challenges and possible solutions to the development of powdered foods will be covered.

Audience Take Away Notes

- The audience will learn how the production of food powders is able to avoid food waste compared to other methodologies. The benefits of powdered foods, desired parameters, and the applied technologies will also be covered
- Food microstructure, drying methods, rehydration properties, pretreatments used, and rehydration kinetics will be taught
- The biggest challenges in the production of powdered foods and possible solutions will be approached, and finally a case study with yogurt powder, carried out within my Ph.D. thesis, will be shown

Biography

Jonata M. Ueda has a bachelor degree in Food Engineering from the Federal University of Technology in Brazil, and a master's degree in Food Quality and Safety from the Polytechnic Institute of Braganca, Portugal. The author is currently a Ph.D. candidate in Pharmacy at the Complutense University of Madrid, Spain, and has experience in the extraction of bioactive compounds, evaluation of bioactivity, incorporation of natural extracts into food products, as well as production of powdered foods and experience in the injection of food matrices in the HPLC system. The author is deeply interested in any projects that involves the environment, innovation, and sustainability.



Dulce Maria Diaz Montano

Centro de formacion y Desarrollo, Maestria en Procesos del Tequila, Universidad Autonoma de Guadalajara UAG, Guadalajara, Jalisco, Mexico

Correlation between sensory attributes and volatile compounds produced during agave tequilana weber juice fermentation by native yeasts

Tequila is a Mexican alcoholic beverage distilled from the fermented juice of cooked Agave tequilana Weber (blue variety). Production is strictly regulated such that only beverages produced from A. tequilana Weber (blue variety) cultivated in a protected region of Mexico can be labeled with the guarantee of origin (Norma Oficial Mexicana, 2012). The tequila process involves multiple steps: cultivation and harvesting of the agave, hydrolysis of the agave carbohydrates into a mixture of fermentable sugars, especially fructose, and extraction of the agave juice to be fermented by yeast; the fermented juice is distilled twice to obtain silver tequila. The distillate can be optionally matured in white oak barrels for either 2 or 12 months to obtain rested or aged tequila, respectively. During alcoholic fermentation, the yeast cells produce primarily ethanol and CO₂ as well as many flavor compounds as secondary products. The tequila aroma is represented by several classes of volatile compounds; many of these compounds are produced by the yeast during fermentation together with other substances derived from both raw and cooked agave.

In some tequila distilleries, fermentation occurs spontaneously while in others, the agave juice is inoculated using commercial or indigenous yeast cultures, often *Saccharomyces cerevisiae*. The tequila industry, however, has very limited knowledge of the parameters that affect agave juice fermentation and yeast characterization. The purpose of this work was to analyze the fermentative and aromatic qualities of a group of selected yeast strains involved in the tequila process. The identification and quantification of volatile compounds in agave juice samples were performed by solid-phase microextraction coupled to GC-MS while the sensory profile was defined using a trained panel. The compounds analyzed included 47 volatile compounds classified into eight families. The agave juice fermented with *S. cerevisiae* strains had higher levels of alcohols, acids, and methionol compounds than non-*Saccharomyces* strains. On the other hand, the highest concentration of terpenes, furans, aldehydes, esters, and acetoin was observed in the non-*Saccharomyces* strains (95% LSD). The attributes such as “fruit”, “solvent” and “vinegar” were associated with *S. cerevisiae* strains while “caramel”, “pumpkin candy” and “lemon blossom” were related to the non-*Saccharomyces* strains. Partial least-squares regression analysis of volatile compounds and sensory data indicated that mainly Maillard compounds were associated with “caramel” and “pumpkin candy” attributes.

Audience Take Away Notes

- The audience will learn about the native yeasts of the tequila industry and their fermentative and aromatic characteristics, as well as the odors and aromas they impart to the final beverage
- In selecting the right yeast or yeasts for an adequate sensory profile as well as achieving a complete fermentation

- The present work contributes to the knowledge of the fermentation stage, which will allow us to compare these results with other work done with other beverages, which will allow us all to continue advancing in worldwide research in this area
- Knowing the limitations and qualities of the different genera of native yeasts in tequila will allow the selection of yeasts that will generate desired bouquets in the final beverages, as well as complete fermentations
- Based on the knowledge presented in this work, tools will be available for the design of sensory profiles of beverages
- List all other benefits
 - o Move forward with state of art on agave distilled beverages
 - o Increase knowledge in the area, to make the fermentation stage more efficient. Expand the market of agave distilled beverages

Biography

Dr. Diaz Montano studied Chemical Engineering at UAG. She has a double doctorate: PhD in Process and Environmental Engineering from the INP in Toulous France and PhD in Biotechnological Processes, UdG Mexico. She has received several awards, such as Jalisco State Award for Science, Technology and Innovation 2009; Jalisco Recognition for Women in Technology and Innovation, 2010, and Recognition by the TequilaRegulatory Council in 2019. She is currently the director of the Graduate Program in Engineering and Construction at the UAG, which includes 6 graduate programs, one of which is the Master's Degree in Tequila Processes, which is a graduate program recognized by CONHACYT.



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Effect of seriphium plumosum meal inclusion in diet on meat sensory attribute of Nguni steers

Seriphium plumosum, an indigenous shrub to South Africa, has slowly colonized huge portions of the grasslands biome, which is critical for livestock production. While mechanical chopping, fire, and chemical control can temporarily help control encroaching shrubby plants, the problem is still escalating. An alternative sustainable approach may be to incorporate *S. plumosum* as part of animal feed. The study determined the effect of *S. plumosum* inclusion levels of 0, 10, 20, or 30% in diets on sensory attributes of Nguni steer meat aged at 3 or 14 days. A trained panel evaluated the sensory attributes (taste, aroma, flavor, and texture properties) while the shear force was determined using a Warner Bratzler blade. Results indicated that *S. plumosum* inclusion levels at 0, 10, 20, or 30% in diets and aging at 3 or 14 days did not affect ($p > 0.05$) Nguni meat sensory attributes, cooking loss, shear force values, tenderness, stringiness, and chewiness. Similarly, *S. plumosum* meal inclusion levels in the diets did not affect ($p > 0.05$) Nguni steers meat salty, beef aftertaste, or bitter tastes and bloody aftertaste at 3 or 14 days of aging. It is concluded that *S. plumosum* meal can be included in Nguni steer diets at 0, 10, 20, or 30% without adverse effects on meat sensory attributes at up to 14 days of aging. This would be a plausible way of controlling woody plant encroachment, specifically *S. plumosum* as fodder for livestock. However, it is suggested that longer studies on using *S. plumosum* meal as livestock feed be conducted to ascertain the present findings.

Audience Take Away Notes

- The outcome of the presentation will enhance the audience knowledge in implementing technology transfer of the shared research output. Bush encroachment is a global concern, and as such using an encroacher specie “*Seriphium plumosum*” also known as Bankrupt bush as animal feed will contribute to management strategies to control Bush encroachment
- Utilization of *Seriphium plumosum* will form part of the strategic planning or policymaking in controlling Bush encroachment, while improving meat sensory of ruminants
- Woody species have been used as livestock feed, however, information on the use of *Seriphium plumosum* as feed is new. This will help explore *Seriphium plumosum* use as feed in various manners
- Many techniques and methods have been employed to control Bush encroachment with no permanent solution. These methods are in many instance expensive to smallholder farmers whose livestock rely on rangeland species for feeding. Harvesting and feeding *Seriphium plumosum* to livestock could be a practical way of improving meat sensory of livestock at minimal costs
- Utilization of *Seriphium plumosum* as feed ingredient in diet is new. It was evident from the current findings will contribute to management of Bush encroachment
- List all other benefits
 - o Meat sensory improvement of cattle
 - o Bush encroachment management
 - o Cost – effective with natural feed resource

Biography

Dr. Motswapo Phoko obtained her PhD degree at the University of Limpopo, South Africa in 2023. She also holds Master of Science in Animal Science from the University of New England, Australia. She is employed at the Agricultural Research Council, Animal Production Institute – South Africa as a Junior Research from 2018 to date. Her duties include amongst others, writing of proposals for funding, postgraduate student supervision, project design and implementation, scientific paper publication, participation at the local and international conferences. Dr. Phoko has recently submitted three-research articles with three international journals, and have three papers under review for publications with international journals. She is supervising one Master of Science candidate.



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A engineering approach to preserve long-term texture quality and authenticity of certified hard cheeses: The parmigiano reggiano cheese perspective

The Parmigiano Reggiano Cheese (PR) is an Italian artisanal cheese famous worldwide. Its commercial quality and designation of origin are regulated and protected by a law disciplinary, which imposes requirements about making technology, time of ripening and product properties including the “struttura finemente granulosa” and “frattura a scaglie” among the main typical structure-related properties which can be considered a fingerprinting of cheese quality and authenticity. The latter two requirements are specified without a clear definition and analytical method for their quantitative measurement.

The aim of this work was performing a multi-scale and non-destructive investigation of this precious cheese to individuate the fundamental material properties underpinning cheese quality law requirements. Cheeses samples provided by PR's Consortium with different ripening ages were firstly investigated by Electron Scanning Environmental Microscopy and X-Ray Microtomography with the aim to virtualize non-destructively the bulk and crack interface structure. Temperature and frequency sweep, and isothermal creep tests were performed to evaluate the effect of temperature and shear stress on cheese deformation and fracture. Differential scanning calorimetry was carried out to evaluate the temperature effect alone. Crack extent, load and load line displacement were video recorded under three-point bending conditions and then analyzed using the J-Integral theory to determine the fracture toughness, the mechanical property related to the crack-initiation, crack-growth propagation, and kinetics. A computer implementation in visual basic language was performed to decouple the elastic and inelastic strain energy in single-edge bending test specimens under strain-controlled fracture according to the elasto-plastic fracture mechanics theory.

Results suggested that the crack initiation and propagation in PR cheese are strictly related to the structural heterogeneity over a large range of scale as well as to the elastic and inelastic energy release under strain. The applied stresses concentrated around the tips of sub-micron discontinuities, this latter arises from partially fused curd junctions originated during milk clotting and cutting. Fat escapes from casein network and crack propagates along with interfaces between fat and casein matrices due to their different relaxation times, while new surfaces originate with an intergranular pattern. The extent of crack propagation within the cheese bulk follows different kinetic regimes ranging from unstable and spontaneous to stable and strain-rate driving one. The spontaneous fracture was attributed to the ability of casein network to release the minimum elastic strain energy. Whereas the stable and strain-rate driving fracture was attributed to the plastic and viscous structural elements, mainly represented by the micro-discontinuities, free fat, globular fats and aqueous solution physically linked to the casein network.

Two apparent creep activation energies from 10 to 80J/Kmol were found suggesting at least two main mechanisms for steady-state structure relaxation. The first relaxation mechanism has been mainly attributed to the dislocation/coalescence of macro-discontinuities and micro-porosity up a softening

transition temperature, with minor temperature dependence of relaxation time. These results have been attributed to the counterbalancing plasticizing effect of water and free fatty acids, both acting as plasticizers. The longer the time of ripening, the more extent of water evaporation and the naturally occurring lipolysis, i.e. triglycerides hydrolysis degradation to a low molecular weight compounds. The second relaxation mechanism observed beyond the transition temperatures has been attributed to the sliding of the interfaces between caseins (harder regions) and free fat (soft regions) without significant differences with respect to the time of ripening.

Audience Take Away Notes

- Engineering codification of the actual texture evaluation system will pave the way for cheese making process innovation and optimization using microstructure and fracture properties as keystone to trace cheese quality and authenticity. Structure and fracture properties are law requirements closely related to the authenticity and commercial quality for these cheeses
- The possibility to standardize both the texture evaluation system and cheese making process will provide a recovery of more than 8% of total annual revenue, i.e. more than 220 million euros per year in the sector of Parmigiano Reggiano cheese, due to the actual loss of quality category assignment
- The proposed engineering approach will pay the way to solve socio-economical and industrial issues related to long-term sustainability, authenticity, texture and, sensory assessment for other worldwide famous Italian's hard cheeses with PDO and PGI certified quality, such as Grana Padano, and Trentingrana and other minor hard cheeses

Biography

Pasquale Massimiliano Falcone is Aggregate Professor and senior Researcher at the Department of Agricultural, Food and Environmental Sciences of the Polytechnic University of Marche. He gained PhD in Food Product Biotechnology and extensive knowledge in the fields of food science and technology, food microstructure and food rheology. The scientific interest is towards the development of innovative paradigms to design and validate food processes and food properties for both the traditional and novel foods, under a sustainability perspective and based on the principles of circular economy. He co-authored more than 70 scientific publications, who have more than 1050 citation and H-index of 17 as cited by Scopus.



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NSGA-II-based optimization on the recovery of antioxidant compounds from tangerine peels

The food processing industry, including the processing of fruits and vegetables, generates a large amount of waste, such as peels, seeds, and unused pulps, which can contain many substances of high value and with great economic potential. They are new natural and economical sources of flavorings, dyes, proteins, dietary fibers, antimicrobials, and antioxidants, applied in the food industry as a source of natural food additives.

This study aims to evaluate the bioactive capacity of tangerine (*Citrus reticulata*) peel extracts and explore its potential as a natural food preservative. Optimized extracts of tangerine peel were obtained by heat-assisted extraction and evaluated in terms of total phenolic content, total flavonoid content, and maximum antioxidant activity. Time, temperature, and solvent (ethanol/water ratio) were the independent variables. Response surface methodology with Genetic Algorithm (RSM-GA) was used to obtain optimized parameters for single-objective extraction, while Non-Dominated Sorting Genetic Algorithm II (NSGA-II) was used for multi-objective optimization. The optimal extract obtained through NSGA-II was evaluated in terms of bioactive capacity. The results show that the antioxidant activity (EC₅₀ = 1.19 mg/mL) and the levels of total phenolic compounds (3.02 mg/mL) and flavonoids (1.949 mg/mL) were maximized simultaneously when extracted in 30.2 minutes, 54.0 °C, and with 38.4% of ethanol content in the solvent. Future studies involve the incorporation of the extract in food products to evaluate its potential as a food preservative.

Audience Take Away Notes

- The presentation approaches experimental methodologies for evaluating the antioxidant capacity and quantification of phenolic compounds and total flavonoids
- Single and multi-objective optimization techniques will be covered, namely Response Surface Methodology, Genetic Algorithm and Non-Dominated Sorting Genetic Algorithm II
- The audience will learn how computational methods can be applied to experimental analysis in food science to improve accuracy, reduce time and costs
- Techniques applied in this work can be adapted and extended to studies that are being developed by researchers present at the event

Biography

Laires Lima has bachelor and master's degree in Chemical Engineering from the Polytechnic Institute in Braganca, Portugal. She is a PhD candidate in Biotechnology at Universidade Catolica Portuguesa and a research fellow at the Research Centre in Digitalisation and Robotics (CeDRI-IPB) and Centro de Investigacao da Montanha (CIMO-IPB). She has participated in some research projects associated to the development of prediction models using machine learning, computational platforms, and software development. Laires has published some ISI indexed research articles and participated in national and international conferences with oral communications concerning data analysis, predictive models, optimization methods, and extraction and analysis of bioactive compounds.



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Enzymatic hygiene in the storage of uht milk-case study

The use of enzyme-based products for the cleaning of UHT (ultra high temperature) milk storage silos is an effective practice for the removal of organic residues, which serve as a foundation for the development of undesirable bacteria, including biofilm-forming ones. In addition to being a more sustainable and environmentally friendly approach due to the biodegradability of the enzymes, we evaluated the use of a new line of enzymatic products: CIP MAX ABC Line (CMAL) from ABC de Itaperuna Ind. de Detergente Ltda for efficiency testing in microbial control in a pre-packaging UHT milk storage silo at a dairy plant in Brazil. The CMAL consists of three products: i) ENZYMAX ABC, a Lipase and Protease-based product; ii) ALCALIMAX ABC, an alkaline descaler and enzymatic activator; and iii) ADITIVIMAX, a microfoam generator and for breaking the water's surface tension. Following the manufacturer's guidelines, the cleaning was performed using a CIP (cleaning in place) system with traditional products, ABC 54 alkaline descaler based on sodium hydroxide, ABC 36 acid descaler based on nitric acid, and Sanity 100 ABC, a sanitizer based on peracetic acid, followed by CIP with CMAL. Microbiological samples using QuickSwab 3M/Neogen swabs (QS) for surface and ATP detection were collected before and after CMAL+CIP. The results from the LM1 system by 3M/Neogen indicated an increase from 10 to 12 RLU (Relative Light Units) within the silo and a reduction from 63 to 12 RLU at the outlet nozzle. Our results from commercially sterile samples of UHT milk showed positive progression, with improvements in product compliance percentages during the two months of testing and the subsequent two months (33.0%, 53.0%, 76.0%, and 96.0%). Based on the observed results, we can conclude that the use of CMAL offered significant removal of microbial biofilm, improving the cleaning system of the UHT milk storage silo. There was an improvement in the CFU count on the surface, with a reduction in total bacteria and total coliforms after the fourth enzymatic cleaning, promoting greater safety and quality of UHT milk.

Audience Take Away Notes

- New approaches for hygiene in the food industry using enzymatic products
- Microbial biofilm control and
- Enhanced safety of UHT milk - microbial control

Biography

Dr. Conrado Augusto Vieira works as a Food Safety Specialist, promoting the safe production of food through training and support. He obtained the title of microbiologist from the Federal University of Viçosa (UFV), Viçosa, Brazil - 2018, and a bachelor's degree in Biological Sciences from the State University of Minas Gerais (UEMG), Divinópolis, Brazil - 2008. He worked as a researcher for the United Nations Educational, Scientific and Cultural Organization (UNESCO) in 2022 at the National Museum of Natural History (MNHN), Paris, France, between 2016 and 2017. He has published 11 scientific articles, presented 23 abstracts at conferences, and authored two books and a book chapter.



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Production of bio-yoghurt using soy-bean protein hydrolysate

Preliminary experiments were conducted using pepsin and trypsin to obtain soybean protein hydrolysate. Pepsin was chosen to obtain bio-peptides from soybean isolate without bitterness. However trypsin showed formation of bitter peptides when used as a proteinase to get bio-peptides from soybean isolate. Addition of soybean protein hydrolysate led to a decrease in the water holding capacity.

Soybean protein hydrolysate (5%-10%) were added to skim milk to manufacture non-fat bio-yoghurt. Chemical composition, microbial load, anti-oxidant activity and sensory evaluation were studied. Addition of soybean hydrolysate to yoghurt samples led to an increment of total solids to 11.9% and 12.4% when 5% and 10% soybean protein hydrolysate was added. Addition of soybean protein hydrolysate to yoghurt led to a decrease in water holding capacity during cold storage at 4°C for 7 days. Acetaldehyde content was increased in yoghurt samples with or without probiotic bacteria due to the presence of soybean protein hydrolysate.

Yoghurt samples supplemented with 10% soybean protein hydrolysate had 81.02 mg of total phenolic content in comparison with 23.88 mg/100g in the control sample. Non-fat yoghurt samples supplemented with 10% soybean protein hydrolysate resulted in higher total flavonoids content (72.31 mg/100g) compared to control yoghurt (13.1mg/100g). Soybean protein hydrolysate increased the viability of both lactic acid and probiotic bacteria. So soybean protein hydrolysate with probiotic bacteria in association with common yoghurt culture could be used to produce non-fat bio-yoghurt.

Biography

Ahmed S. Zahran is a Professor of food microbiology, Minia University, Egypt. Graduated from the University of Edinburgh (UK), department of Microbiology. His main area of interest is probiotic foods and functional foods. Published more than 80 research papers in the field of bacterial enzymes, probiotic foods, functional foods and antibacterial substances isolated from lactic acid bacteria. He has his expertise in evaluation and passion in improving the quality of probiotic foods. He supervised 30 graduate students in the field of food microbiology, microbial biochemistry and synbiotic foods. He teaches to both undergraduate and postgraduate students courses in fermentation technology and biochemistry, microbial enzymes, food poisoning and probiotic foods.



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Molecular mechanism of quinoxaline-type heterocyclic amines formation in meat and fish

This study aims to investigate the underlying molecular mechanism responsible for the development of quinoxaline-type Heterocyclic Amines (HAs) in roasted beef, chicken, and fish. The study explores the influence of both low temperature (160°C) and high temperature (220°C) roasting on the formation of HAs. The results indicate that chicken, among the three types of meat, exhibits the highest levels of MeIQx (2.34 ± 0.03 ng/g), 4,8-DiMeIQx (3.96 ± 0.05 ng/g), and 7,8-DiMeIQx (2.78 ± 0.03 ng/g), followed by beef (1.63 ± 0.02 ng/g), (2.77 ± 0.04 ng/g), (2.13 ± 0.04 ng/g) and fish (1.25 ± 0.02 ng/g), (2.29 ± 0.02 ng/g), (0.94 ± 0.01 ng/g), respectively. Moreover, the roasting temperature significantly affect the formation of HAs. Analysis of HAs precursors reveals that chicken has significantly higher levels of creatine, creatinine, and reducing sugars compared to beef and fish. Amino acid analysis demonstrates that chicken contains higher amounts of Serine, Glutamic acid, cysteine, tyrosine, and leucine when compared to beef and fish. Additionally, beef has the highest overall content of fatty acids, including Methyl palmitate, Methyl oleate, Methyl stearate, Methyl elaidate, and Methyl heptadecanoate, followed by chicken, while fish has the lowest content. Correlation analysis shows strong associations between creatine, creatinine, reducing sugars, and MeIQx, 4,8-DiMeIQx, and 7,8-DiMeIQx. Furthermore, certain amino acids such as cysteine, tyrosine, serine, histidine, and specific fatty acids, including Methyl elaidate, Methyl 4,7,10,13,16-docosapentaenoate, and cis-11-eicosenoic acid methyl ester, exhibit significant correlations with MeIQx, 4,8-DiMeIQx. In conclusion, the formation of HAs is strongly influenced by the presence of specific precursors, particular amino acids, and fatty acids.

Audience Take Away Notes

- **Formation of Heterocyclic Amines (HAs):** The audience will gain insights into the molecular mechanism behind the formation of quinoxaline-type HAs in roasted beef, chicken, and fish. They will understand the factors that contribute to the generation of these compounds during the cooking process
- **Impact of Roasting Temperature:** The presentation will highlight the significant impact of roasting temperature on the formation of HAs. The audience will learn about the variations in HAs content at different temperatures and how temperature influences the chemical reactions involved in their formation
- **Variation in HAs Content Among Different Meats:** The audience will understand the differences in HAs content between beef, chicken, and fish. Specifically, they will learn that chicken exhibits the highest levels of MeIQx, 4,8-DiMeIQx, and 7,8-DiMeIQx among the three meat types
- **Role of Precursors:** The presentation will discuss the analysis of precursors such as creatine, creatinine, and reducing sugars, and their relationship with HAs formation. The audience will gain insights into the role of these precursors in the generation of HAs and their correlation with specific HAs compounds
- **Influence of Amino Acids and Fatty Acids:** The audience will learn about the impact of amino acids and fatty acids on the formation of HAs. The presentation will highlight the specific amino acids and fatty acids that show a significant correlation with the respective HAs compounds, providing a deeper understanding of the chemical processes involved.

- These specific items will provide the audience with valuable knowledge about the formation of HAs in roasted meats, the factors influencing their levels, and the role of precursors, amino acids, and fatty acids in this process
- The knowledge gained from the presentation will empower the audience to apply what they have learned in various practical ways. Understanding the formation of HAs and the impact of roasting temperature can help the audience make informed decisions about their cooking practices. They can modify their cooking techniques and temperatures to minimize the formation of HAs in their own kitchens, thereby promoting food safety
- For professionals in the food industry, the insights gained from the presentation can guide research and development efforts. They can explore strategies to reduce HAs formation during food processing, develop new cooking techniques that minimize HAs content, and improve product formulations to ensure food safety and quality
- Regulatory bodies and public health authorities can utilize the information presented to establish guidelines and regulations regarding safe cooking practices and HAs content in food products. The knowledge gained can contribute to evidence-based policies and recommendations for public health and food safety
- Food Safety and Quality Assurance Professionals: Individuals responsible for ensuring food safety and quality in various industries, such as food manufacturing, food service, and regulatory agencies, can apply the knowledge gained to develop and implement robust control measures. This includes establishing guidelines, protocols, and standard operating procedures to minimize HAs formation during food processing and cooking. It can help them make informed decisions regarding product formulation, cooking techniques, and quality control measures to reduce HAs content in the final food products
- Chefs, culinary educators, and professionals in the foodservice industry can benefit from understanding the factors that influence HAs formation during cooking. This knowledge can help them develop cooking techniques that balance flavor and food safety, allowing them to create delicious and safe meals. By incorporating this understanding into their culinary practices, they can enhance the quality of their offerings and prioritize the health and safety of their customers.
- Overall, the knowledge gained from the presentation can empower professionals in various roles to make informed decisions, develop innovative strategies, and implement best practices in their respective fields, leading to improved food safety, quality, and customer satisfaction
- Other faculty members, particularly those working in the fields of food science, chemistry, toxicology, or nutrition, can build upon this research by conducting further investigations. They can explore related aspects such as the formation of other types of HAs, the influence of different cooking methods on HAs content, or the development of novel strategies to reduce HAs formation. The findings from this research can serve as a foundation for future studies, providing insights and directions for further exploration
- The research findings can be integrated into teaching materials, such as lectures, lab exercises, or case studies, in relevant courses. Faculty members can use this research as a real-world example to illustrate concepts related to food chemistry, food safety, toxicology, or nutritional science. It can enhance the educational experience by providing students with practical applications and showcasing the importance of research in addressing food-related challenges
- Faculty members can utilize the findings from this research to stay updated on the latest advancements in the field of food chemistry and toxicology. They can attend conferences or workshops, participate in discussions, and collaborate with other researchers to exchange ideas and knowledge. This research can facilitate networking opportunities and contribute to professional development in the academic community

- Designers involved in developing food products or recipes can utilize the knowledge gained from the research to create formulations that minimize HAs formation. They can consider alternative cooking methods, ingredient combinations, or processing techniques that reduce HAs content, thereby prioritizing the safety and health aspects of their designs
- Designers focused on packaging, labeling, or product presentation can consider incorporating HAs-related information into their designs. By including clear and informative labeling about HAs content, cooking recommendations, or potential health implications, designers can contribute to consumer awareness and empower individuals to make informed choices about the food products they purchase
- While the research may not directly simplify or enhance a designer's job efficiency, it offers valuable insights that designers can consider in their work to contribute to safer food products, support evidence-based design decisions, foster collaboration with experts, and promote consumer awareness. These aspects can ultimately contribute to the overall quality and impact of the designs they create in the food industry
- The research findings presented in the abstract may not directly improve the accuracy of a design or provide specific information to assist in a design problem. The focus of the research is on the molecular mechanism of HAs formation in roasted meats and the factors influencing their levels
- However, designers can still benefit from the information provided in several ways:
- Designers can gain a deeper understanding of the formation of HAs in roasted meats, including the impact of cooking temperature and the variation in HAs content among different meat types. This awareness can help designers make informed decisions regarding food-related design projects or products that involve roasted meats, such as packaging, labeling, or kitchenware
- The research findings can raise awareness about the potential health risks associated with high levels of HAs in certain meats. Designers can take this information into account when designing food products, packaging, or culinary tools, considering strategies to minimize HAs formation and prioritize consumer health and safety
- Designers can collaborate with experts in food science, nutrition, or culinary arts to further explore the implications of HAs formation in their design projects. By working closely with these experts, designers can gain access to their knowledge and insights, ensuring that their designs align with the latest research and best practices in food safety
- Designers can utilize the research findings to develop educational materials or communication strategies aimed at informing consumers about HAs formation and its impact on food safety. By integrating this knowledge into design projects, designers can contribute to consumer awareness, helping individuals make more informed choices and promoting healthier cooking practices
- List all other benefits
 - o Scientific Advancement: The research contributes to the scientific understanding of HAs formation in roasted meats, expanding knowledge in the fields of food chemistry, toxicology, and culinary science. It adds to the body of scientific literature, providing a foundation for future studies and investigations in this area.
 - o Risk Assessment and Regulation: The research findings can inform risk assessment processes and contribute to the development of regulations and guidelines related to HAs in food products. Regulatory bodies and policymakers can utilize this information to establish safety standards, set maximum allowable levels of HAs, and develop appropriate cooking recommendations to protect public health
 - o Public Health Awareness: The research enhances public health awareness by shedding light on the potential health risks associated with HAs in roasted meats. Disseminating the findings through

public health campaigns, educational materials, or media can educate the general public about the importance of safe cooking practices and encourage healthier dietary choices

- o **Industry Guidelines and Best Practices:** The research findings can guide industry professionals, such as chefs, food manufacturers, and culinary educators, in implementing best practices to minimize HAs formation. It can lead to the development of industry guidelines, standard operating procedures, or training programs focused on safe cooking methods and reducing HAs content in food products
- o **Culinary Innovation:** The research findings may inspire chefs, culinary professionals, and food entrepreneurs to explore innovative cooking techniques or ingredient combinations that minimize HAs formation while maintaining flavor and quality. This can foster culinary creativity and the development of new, healthier recipes and food products
- o **Consumer Empowerment:** Knowledge about HAs formation and its influencing factors empowers consumers to make informed choices about their food consumption. Consumers can apply this information to select cooking methods, ingredients, and food products that align with their health preferences and minimize exposure to HAs
- o **Collaborative Research Opportunities:** The research findings can open doors for collaboration between researchers, industry professionals, and regulatory agencies. Collaborative research projects can further investigate HAs formation, develop mitigation strategies, and assess the effectiveness of intervention methods, fostering interdisciplinary collaboration and knowledge exchange
- o These benefits encompass various aspects, including scientific advancement, public health awareness, industry practices, culinary innovation, consumer empowerment, collaborative opportunities, and regulatory measures. The research findings have the potential to impact multiple sectors and stakeholders involved in food safety, health, and culinary practices

Biography

Dr. Khan pursued Animal Products Technology at Sindh Agriculture University, Pakistan, completing his M.Phil in 2013. He later joined Prof. Huang's research group at the National Center of Meat Safety and Quality Control, Nanjing Agricultural University, China. In 2019, he earned his PhD and subsequently undertook a two-year postdoctoral fellowship in Prof. Doing Wang's Lab at the Institute for Agro-products Processing, Jiangsu Academy of Agricultural Sciences, China. In 2021, he secured another postdoctoral research fellow position at the Institute for Advanced Study, Shenzhen University, working in Prof. Cheng's lab. Dr. Khan has published over 35 research articles in SCI(E) journals.



Dra Lesvia Sofia Meraz Torres

Latin American Institute of Science in Habits and Ketogenic Food/Director,
CDMX, Mexico

Ketogenic diet for human diseases

The Ketogenic Diet (KD) is a dietary approach characterized by high fat, low carbohydrate, and adequate protein intake. Its ultimate goal is to achieve a state of nutritional ketosis in the patient by producing compounds such as acetoacetate, beta-hydroxybutyric acid, and acetone, similar to those found in the fasting state. This affects the metabolism of blood lipids, promoting the utilization of fatty acids as an energy source in the absence of glucose. Since the 1920s, it has been used as a treatment for controlling seizures in epilepsy patients, especially those who do not respond well to antiepileptic drugs. Several variants of the KD have been developed to date, showing similar efficacy to the original form and offering flexibility to enhance compliance with the regimens. There are four main types of KD with proven efficacy: the classic Long-Chain Triglyceride (LCT) KD, the Medium-Chain Triglyceride (MCT) KD, the Modified Atkins Diet (MAD), and the low glycemic index treatment.

The 21st century has witnessed the emergence of various diet programs with the increasing prevalence of obesity, and the KD has been at the forefront for promoting weight loss and improving physical performance. Additionally, it has been used in the treatment of type 2 diabetes, non-alcoholic fatty liver disease, polycystic ovary syndrome, heart disease, inflammatory bowel disease, and irritable bowel syndrome, where it has been found to have effects on the gut microbiota, with changes in bacterial composition that may have anticonvulsant effects. Therefore, it has been studied in several neurodegenerative diseases such as Alzheimer's disease, Parkinson's disease, and amyotrophic lateral sclerosis, where mitochondrial dysfunction and oxidative stress play an important role, both of which generate high levels of Reactive Oxygen Species (ROS) that are detrimental to all cellular macromolecules. Its impact on depression, bipolar disorder, and anxiety has also been investigated. It is worth noting that the KD could improve mitochondrial number and function by inhibiting glycolysis and increasing the formation of Ketone Bodies (KB), providing neuroprotective benefits in neuronal cell lines.

Cancer is one of the major global public health challenges and a leading cause of mortality worldwide. Complementary approaches to significantly enhance the efficacy of standard cancer therapies are scarce. The KD appears to sensitize most cancers to standard treatment by exploiting the reprogrammed metabolism of cancer cells, making it a promising candidate in adjuvant cancer therapy.

The KD is a biochemical model of fasting or starvation that promotes the utilization of KB as the dominant fuel source to replace glucose in the central nervous system. This can modulate the neuropathological and biochemical changes observed in neurological diseases.

Audience Take Away Notes

- In recent years, the ketogenic diet has become a nutritional strategy for metabolic diseases with over 100 years of scientific support. However, in the 21st century, with the obesity pandemic, nutritional strategies have been sought to promote weight loss with a greater emphasis on habit changes and nutritional education. Unfortunately, there are very few professionals trained in recommending and applying this diet in chronic degenerative conditions. Therefore, it is important to disseminate science and clinical practice

- Healthcare professionals who wish to support their patients with these metabolic nutritional strategies
- Undoubtedly, by working at the metabolic level in chronic degenerative diseases such as obesity, diabetes mellitus, dyslipidemia (elevated cholesterol and/or triglyceride levels), and hypertension, healthcare professionals can achieve favorable results and promote adherence to a healthy lifestyle
- It improve the accuracy of a design, or provide new information to assist in a design problem
- List all other benefits
 - o The KD diet could potentially increase the genetic diversity of the microbiome and increase the ratio of Bacteroidetes to Firmicutes
 - o The epigenome could be positively affected by the KD as it creates a signaling molecule known as β -Hydroxybutyrate (BHB). KD has helped patients with diabetes reduce their HbA1c levels and decrease the need for insulin. There is evidence suggesting that a KD can assist with weight loss, visceral adiposity, and appetite control
 - o The evidence also suggests that consuming a high-fat diet improves lipid profiles by reducing Low-Density Lipoproteins (LDL), increasing High-Density Lipoproteins (HDL), and lowering Triglycerides (TG)
 - o Due to the Warburg effect, the KD is used as an adjunctive treatment to starve cancer cells, making them more vulnerable to chemotherapy and radiation.
 - o Therefore, it is important to disseminate the science and clinical practice that supports it with well-calculated and formulated ketogenic diets. Healthcare professionals should update and educate themselves accordingly

Biography

Dr. Meraz studied nutrition at the Veracruzana University of Mexico and graduated in 2001. She received her PhD degree in Food Sciences in 2011 at the National Polytechnic Institute of Mexico, she has diplomas in enteral nutrition, sports nutrition, kidney disease and oncology, she has certifications in ketogenic diet, currently works as director of the ILCHAC and Ketogenic Food and director of the scientific area of Ketolife company, development and imparts the Diploma in ketogenic diet and intermittent fasting, she is an honorable member of the Ibero-American Association for Oncology Nutrition and is author of research articles in journals.



Kateryna Fedosova

Hotel and Restaurant Business Department, Odesa National University of Technology, Odesa, Ukraine

Analyzing the impact of restaurant dish design on customer perceptions

This study examines the impact of restaurant dish design on customer perceptions. As neurogastronomy and gastrophysics gain global interest, the importance of dish aesthetics in shaping consumer experiences becomes evident. Understanding how food presentation affects taste and customer perception is crucial for culinary establishments seeking to enhance satisfaction and loyalty.

Through a comprehensive review of relevant scientific literature and an anonymous Google Forms survey among restaurant-goers, data was gathered to assess customer preferences. Respondents evaluated ten dishes in "basic" and "refined" styles. Findings reveal a strong correlation between dish appearance and perceived value. Customers consistently valued dishes presented in refined and aesthetically pleasing ways, regardless of size or content, highlighting the influence of visual appeal on perceived worth. Moreover, guests favoured modern and innovative culinary presentations over traditional styles. Dishes presented with heightened sophistication garnered higher acceptance and customer interest, indicating a willingness to pay a premium for superior visual presentation.

In conclusion, this research underscores the important role of dish design and presentation in shaping customer perceptions. Culinary establishments should recognize the visual aspect as an instrumental factor in influencing customer choices. Emphasizing both taste and presentation can elevate the dining experience and foster stronger relationships with customer. The study's implications extend beyond gastronomy, offering valuable insights for businesses seeking to comprehend aesthetics' impact on consumer behaviour. The findings hold significance for culinary businesses aiming to thrive in a competitive market, urging innovative approaches to dish design and presentation to meet evolving consumer expectations.

Audience Take Away Notes

- The audience will learn about the significant influence of dish design and presentation on customer perceptions
- They will be able to use this knowledge to improve dining experiences and customer satisfaction
- This research could benefit other faculty members by expanding research in neurogastronomy and gastrophysics
- The presentation offers practical solutions by Increasing customer satisfaction through aesthetic improvements in food design
- In summary, this research provides valuable insights into the impact of dish design on customer perceptions, but also provides practical applications for the culinary industry and food production

Biography

Dr. Kateryna Fedosova, PhD, is an Associate Professor at Odesa National University of Technology, specializing in Restaurant Business. She is the Head of restaurant consulting group with over 10 years of experience in developing and promoting restaurants. She lectures on various courses and supervises students' projects (Culinary Arts, Technology of Catering Products, F&B Operations, etc). Dr. Fedosova actively participates in international conferences, conducts seminars, is a member of the Southern Association of UA Chefs, EuroCHRIE, La Fondation pour la Formation Hoteliere and others. Currently residing in Valencia due to the war in Ukraine and also is a guest lecturer at SRH Dresden School of Management.



Motswapo Phoko^{1*}, Tlou Tjelele¹, Jones Ngambi²

¹Range and Forage Science, Agricultural Research Council, Animal Production Irene, Gauteng Province, South Africa

²Department of Agricultural Economics and Animal Production, University of Limpopo, Sovenga, Limpopo Province, South Africa

Carcass and meat quality characteristics of Nguni steers fed *Seriphium plumosum* meal

The use of encroaching woody plants such as *Seriphium plumosum* for livestock feeding is gaining importance. The study aimed at evaluating effects of *S. plumosum* meal inclusion level in a diet on meat characteristics and quality of Nguni steers fed a diet based on lucerne hay and maize meal. Twenty-eight Nguni steers aged 22 months with an initial mean body weight of 300 ± 10 kg were randomly assigned to isocaloric and isonitrogenous diets containing 0, 10, 20 or 30 % of *S. plumosum* meal in a complete randomized design, each treatment having seven replications and one steer per replicate. The experiment lasted for 111 days (21 days for adaptation and 90 days for the actual feeding trial). The steers were slaughtered at 25 months of age and carcasses were evaluated for carcass traits, meat quality traits. *Seriphium plumosum* meal inclusion levels in the diets did not affect ($P > 0.05$) carcass weight, eye muscle area and back fat thickness. However, *S. plumosum* meal inclusion levels in the diets affected ($P < 0.05$) dressing percentage of Nguni steers. *Seriphium plumosum* meal inclusion level in a diet did not affect ($P > 0.05$) Sarcomere Length (SL), Collagen Solubility (CS). A 16.11% *S. plumosum* meal inclusion level in the diet was calculated, with the use of quadratic equations, to result in optimal Nguni steer meat myofibril lengths ($r^2 = 0.866$). It was concluded that *S. plumosum* meal inclusion levels at 10, 20 or 30 % in the diets did not adversely affect Nguni steer carcass traits, meat tenderness traits, meat colour, water-holding capacity, and lipid and protein oxidation properties. This is an indication that *S. plumosum* meal can be included in Nguni cattle diets without causing any adverse effects on meat characteristics and quality parameters. However, long-term studies are recommended to ascertain the present findings.

Audience Take Away Notes

- Woody specie *Seriphium plumosum* used in the current study did not cause any adverse effect on carcass and meat quality of Nguni cattle. Findings from this study indicated the potential use of *Seriphium plumosum* as supplementary feed particularly during dry season when grass production is low in nutrients
- Utilization of *Seriphium plumosum* will form part of the strategic planning or policymaking in controlling Bush encroachment, while improving meat sensory of ruminants
- Woody species have been used as livestock feed, however, information on the use of *Seriphium plumosum* as animal feed is new. This will help explore *Seriphium plumosum* utilization as feed in various ways
- Many techniques and methods have been employed to control Bush encroachment with no permanent solution. These methods are in many instance expensive to smallholder farmers whose livestock rely on rangeland species for feeding. Harvesting and feeding *Seriphium plumosum* to livestock could be a practical way of improving meat quality of livestock at minimal costs
- Utilization of *Seriphium plumosum* as feed ingredient in diet is new. It was evident from the current findings that it will contribute to management of Bush encroachment

- List all other benefits
 - o Meat quality traits of cattle
 - o Bush encroachment management
 - o Cost – effective strategies for ruminant meat quality improvement

Biography

Dr. Motswapo Phoko obtained her PhD degree at the University of Limpopo, South Africa in 2023. She also holds Master of Science in Animal Science from the University of New England, Australia. She is employed at the Agricultural Research Council, Animal Production Institute – South Africa as a Junior Research from 2018 to date. Her duties include amongst others, writing of proposals for funding, postgraduate student supervision, project design and implementation, scientific paper publication, participation at the local and international conferences. Dr. Phoko has recently submitted three-research articles with three international journals, and have three papers under review for publications with international journals. She is supervising one Master of Science candidate.

**Fatma Ali**

Tianjin University of Science and Technology, China

Nonthermal and thermal treatments impact the structure and microstructure of milk fat globule membrane

There is an increasing interest in the potential use of Milk Fat Globule Membrane (MFGM) as an ingredient in food and nonfood applications. This study investigated the effectiveness of Dielectric Barrier Discharge (DBD) plasma reactor on MFGM as a non-thermal alternative through analyzing the fatty acid composition, lipid oxidation, protein profiles, MFGM recovery, particle size and morphology. The saturated fatty acid concentration in the pasteurized sample was lower than that in plasma-treated MFGM samples. Cold plasma treatment reduced the *Escherichia coli*, *Salmonella* spp. and *Staphylococcus aureus* growth inhibition width of inoculated plasma-treated MFGM samples by 37%, 35% and 34%, respectively. The weakness of casein and whey protein bands of plasma-treated MFGM indicated the protein-MFGM interaction. Plasma might affect the small MFGs, which resulted upon the isolation stage more than the large MFGs, and induced the possibility of its interaction with milk proteins or even its accumulation on the large MFG surface. MFG size increased by increasing the plasma treatment time, which indicates the aggregation of fat globules into large globules.

Biography

Dr. Fatma Ali received her Ph.D from Tianjin University of Science and Technology, Tianjin, China. Since 2019, she works at Department of Biological Chemical Engineering, College of Chemical Engineering and Materials Science, Tianjin University of Science and Technology, Tianjin, China. She is the first author of more than 11 peer-reviewed papers in Food Engineering (<https://www.researchgate.net/profile/Fatma-Ali-43>). She collaborates with Food Science and Technology researchers on the regular basis. Her area of interest is dairy technology, non-thermal techniques, milk proteins, plant based food, and food chemistry. She has published a various papers in peer reviewed journals (Trends in Food Science and Technology, Carbohydrate polymers, Food Bioscience, International Journal of Dairy Technology, Journal of Food Process Engineering, etc). Fatma is an Editorial Board Member in International Journal of Dairy Technology (IJDT).

Sief Eldin A Mohammed

Department of Bee Research, Environment & Natural Resources and Desertification
Institute, National Center for Research (NCR), P.O. Box 6096 Khartoum- Sudan

Documented experience on nutraceutical and bioactive substances of sudanese honey

Sudan is a tremendous country with high diversification of climate, vegetation, biota, as well as norms & cultural inheritance. Beekeeping and honey traditional practicing are well recognized everywhere in the countryside. This presentation focuses on what have been achieved during past two decades in honey research considering isolation, identification and functional properties of molecules that render honey its medicinal and nutraceutical values.

Honeybees forage on numerous plants and gather nectar, pollen and resins from them, however, our experience focused on honey from Acacias, Ziziphus, Sun flower, and Cucurbits. Protein profiles of honey from these plants revealed many functional proteins/peptides and detected some novel ones. Among which we identified are a glycoprotein with anti-giardial activity. Also another protein with 62 kDa was detected with high antioxidant capacity. Further characterization indicated presence of apalbumins and Major Royal Jelly Proteins (MRJP) particularly mrjp3 in these honeys. Other experiments proved also the crude Sudanese honey potentials as anti-amoeba, anti-giardia, antifungal and antibacterial. The results were comparable with some standard antibiotics and have low cell line cytotoxicity.

Another clinical experiment conducted on children (> 1 year), results of both summer and winter honeys showed effectiveness to control acute infant diarrhea as compared to Oral Rehydration Syrup (ORS). Also documented experiment of feeding infants (1- 3 years) with honey-fortified milk resulted in increased weight gain and improved hematological parameters (Hemoglobin, Red blood cells, White blood cells) indicating improvement in infant immune system. It could be concluded that honey has many nutraceutical and bioactive molecules need to be further explored by research.

Audience Take Away Notes

- The audience will get information of this presentation to pick some research problems for their future projects
- These projects will enhance their careers and jobs
- Faculty staff could gain new interventions to be used to expand their research networks or teaching programs

Biography

Prof. Dr. Seif Eldin studied Biology at the University of Khartoum, Sudan and graduated as BSc. & MSc. respectively, in 1993 & 1998. He then recruited as researcher in the NCR. Then he awarded fellowship for PhD in the Sudan Academy of Science (Environment, Biosciences & Advanced Technologies) in 2008. In 2009 He won TWAS-Postdoctoral Fellowships in biochemistry and joined the International Center for Chemical & Biological Center (ICCBs), University of Karachi, Pakistan research group of Prof. M. Kamran Azim. He has published more than 50 research articles most of which in SI with impact factor journals.

11-13 SEPT

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JOINT EVENT ON

**FOOD SCIENCE AND
NUTRITION RESEARCH**



Vera Ferro Lebres

Instituto Politécnico de Bragança, Portugal

Prevent-prediabetes intervention tea: Protocol and preliminary data

Diabetes is one of the leading causes of death in the world and more than 420 million people live with it daily. Diet is of the most effective interventions to prevent and treat glycemic dysregulation, yet one of the most difficult to manage. Infusions of olive leaf tea have been used in traditional herbal medicine as a way to treat and prevent many diseases, including diabetes.

This study will investigate the effect of the daily consumption of olive leaves tea on glycaemic control and risk of developing type 2 diabetes. A triple blind randomized control trial is being implemented in a sample of 140 (70+70) prediabetic patients of a local primary care center.

The hypothesis of this study is that the integration of olive leaf tea on daily food consumption will favour glycaemic control and ameliorate insulin resistance in individuals with pre-diabetes. The presentation on NUTRITION 2023 event will focus on the RCT protocol and presentation of preliminary data.

Biography

Lecturer since 2005 in Instituto Politecnico de Braganca (IPB), Portugal. Has during past assumed assumed the role of degree coordination for Dietetics and Nutrition, co-coordination of the Diagnostic and Therapeutic Technologies Department and responsibility of several diferente curricular units, including the internships and field work of the Dietetics and Nutrition degree, in strong cooperation with IPB's stakeholders. Is a member of Instituto Politécnico de Bragança Presidence team, where assumes the role of Pro President for Entrepreneurship, Employability and Formative Innovation. Is the coordinator of the Entrepreneurship and Employability Office and pedagogical innovation and co-creation projects, as Demola North Portugal, of Instituto Politécnico de Braganca. Coordinates and integrates teams research and community action projects funded by national and international entities. Has published several peer reviewed papers. Has integrated several organizational and scientific committees for national and international conferences. Has been invited to participate as speaker for national and International conferences. Is an active member of the Portuguese Nutritionist Members, where she integrated the general council (Professional license 0032N).



Gulsen Delikanli Akbay

Karadeniz Technical University, Turkey

Sustainable nutrition and the mediterranean diet

The concept of sustainability is maintaining the ability to be permanent while ensuring the continuity of diversity and productivity. The term 'Sustainable Development' was first defined in the Brundtland Report. The Brundtland Report is published by the World Commission on Environment and Development of the United Nations. Brundtland report is also called as 'Our Common Future'. Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

Life depends on natural resources and natural resources can run out. Sustainability can be achieved by creating a balance between nature and people: This balance can be achieved through good education, right guidance and right choices. Sustainability of optimal health and well-being is possible with the sustainability of optimal nutrition. FAO defines sustainable nutrition as respecting and protecting biodiversity and ecosystem, accessible, economically feasible and affordable besides optimizing sustainable resources. Environmental impact of sustainable diet is low, sustainable diet supports healthy living for present and future generations and provides food and nutrition security.

Sustainable Diet concept is affected by climate change and the Increase in world population. Red meat has the highest environmental impact per serving of food produced; therefore plant-based nutrition is recommended to protect from climate change. Likewise, red meat has the most impact on water footprint. Mediterranean and Nordic Diets can be given as examples of sustainable nutrition models. Mediterranean Diet is a balanced, healthy diet and has many beneficial effects on illnesses. In many studies, the positive effects of adherence to the Mediterranean diet, which is a sustainable diet, in different diseases have been determined.

Biography

Gulsen Delikanlı Akbay has completed her PhD at the age of 34 years from Hacettepe University and postdoctoral studies from Karadeniz Technical University Faculty of Health Sciences at Turkey. She is a member of Turkish Dietetic Association and working on nutrition sciences and dietetics. She has personal interest on neurology and has papers on nutrition in MS patients. She also has research and review papers on nutrition sciences and community health. Her thesis of master was on infants and mothers about breastfeeding, baby nutrition and mothers' knowledge of child nutrition. Her thesis of doctory was conducted with healthy people and MS patients. She evaluated and compared general features, dietary habits, biochemistry results and physical performance of participants. She has published papers in reputed journals and attended international nutrition congresses as a speaker and listener.



Adeline Meriaux*, Claire Gaiani, Jennifer Burgain, Frantz Fournier, Lionel Muniglia, Jeremy Petit

Universite de Lorraine, Laboratoire d'Ingenierie des Biomolecules, Vandoeuvre-les-Nancy, France

Impact of air pressure and outlet temperature on physicochemical and functional properties of spray-dried skim milk powder

Spray-drying process is widely used for the production of dairy powders for food and pharmaceuticals industries. It involves the atomization of a liquid feed into fine droplets which are subsequently dried through contact with a hot air flow. The resulting powders permit transportation cost reduction and shelf life increase, but can also exhibit various interesting functionalities (flowability, solubility, protein modification or acid gelation), depending on operating conditions and milk composition. Indeed, particles porosity, surface composition, lactose crystallization, protein denaturation, protein association or crust formation may change.

Links between spray-drying conditions and physicochemical and functional properties of powders were investigated by a design of experiment methodology and analyzed by principal component analysis. Quadratic models were developed and multicriteria optimization was carried out by the use of genetic algorithm. At the time of abstract submission, verification spray-drying trials are ongoing.

To perform experiments, milk from dairy farm was collected, skimmed, froze and spray-dried at different air pressure (between 1 and 3 bars) and outlet temperature (between 75 and 95 °C). Dry matter, minerals content and proteins content were determined by standard method. Solubility index, absorption index and hygroscopicity were determined by method found in literature. Particle size distribution were obtained by laser diffraction granulometry. Location of the powder color in the Cielab color space and water activity were characterized by a colorimeter and an aw-value meter, respectively. Flow properties were characterized with FT4 powder rheometer; in particular compressibility and shearing test were performed. Air pressure and outlet temperature are key factors that directly impact the drying kinetics and powder characteristics during spray-drying process. It was shown that the air pressure affects the particle size distribution by impacting the size of droplet exiting the nozzle. Moreover, small particles lead to more cohesive powder and less saturated color of powders. Higher outlet temperature results in lower moisture level particles which are less sticky and can explain a spray-drying yield increase and the higher cohesiveness; it also leads to particle with low water activity because of the intense evaporation rate. However, it induces a high hygroscopicity, thus, powders tend to get wet rapidly if they are not well stored. On the other hand, high temperature provokes a decrease of native serum proteins which is positively correlated to gelation properties (gel point and firmness). Partial denaturation of serum proteins can improve functional properties of powder.

The control of air pressure and outlet temperature during the spray-drying process significantly affects the physicochemical and functional properties of powder. This study permitted to better understand the links between physicochemical and functional properties of powder, to identify correlations between air pressure and outlet temperature. Therefore, mathematical models have been developed and the use of genetic algorithm will allow the optimization of powder functionalities.

Biography

Adeline Meriaux is a food engineer and has a Master's degree in food science (University of Bordeaux). She is currently PhD student at laboratory of biomolecular engineering (LiBio – University of Lorraine). Her research focuses on multicriteria optimization of functional properties of spray-dried skim milk powders. Her research explores the impact of spray-drying conditions (air pressure and outlet temperature) and milk composition on physicochemical and functional properties of powder (flowability, storage, denaturation, acid gelation capacity) and integrate genetic algorithm technology to carry out the optimization.



Sinead M Ryan^{1*}, Minna Khalid Danish², John P Gleeson¹, David J Brayden¹, Jesus M Frias²

¹UCD School of Veterinary Medicine, University College Dublin, Belfield, Dublin, Ireland

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Improving the oral delivery of food derived peptides with antihypertensive properties

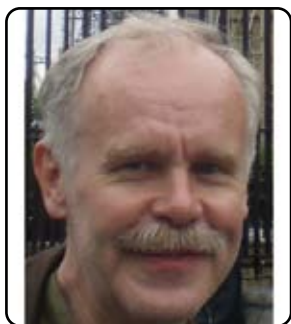
Isoleucine-Proline-Proline (IPP) and Leucine-Lysine-Proline (LKP) are food-derived tripeptides whose antihypertensive functions have been demonstrated in hypertensive rat models. However, peptides display low oral bioavailability due to poor intestinal epithelial permeability and instability. IPP and LKP were formulated into nanoparticles using chitosan via ionotropic gelation and then coated with zein. Following addition of zein, a high encapsulation efficiency of 80% was obtained for the nanoparticle. In simulated gastric fluid, 20% cumulative release of the peptides was achieved after 2 h, whereas in simulated intestinal fluid, ~90% cumulative release was observed after 6 h. Higher colloidal stability (39-41 mV) was observed for the coated NP compared to uncoated ones (30-35 mV). In vitro cytotoxicity studies showed no reduction in cellular viability of human intestinal epithelial Caco-2 and HepG2 liver cells upon exposure to nanoparticle and nanoparticle components. Administration of nanoparticle encapsulating IPP and LKP by oral gavage to spontaneously hypertensive rats attenuated systolic blood pressure for 8h. This suggests that the nanoparticle provide appropriate release to achieve prolonged hypotensive effects in vivo. In conclusion, chitosan-zein nanoparticles have potential as oral delivery system for the encapsulation of IPP and LKP.

Audience Take Away Notes

- Convert low value industrial co-streams into high value food supplements
- Food derived peptides with a health promoting effect on lifestyle diseases such as hypertension
- In this research we have used pharmaceutical drug assessment methods (in vitro, ex-vivo and in vivo) and adapted them for nutraceutical/food bioactive assessment

Biography

Dr. Sinead Ryan completed her PhD in the Alimentary Pharmabiotic Centre, University College Cork, Ireland. Later she completed a Postdoctoral Research Fellow in University College Dublin, Ireland where she moved to a new discipline – research area of drug delivery. Her research focused on the oral delivery of novel mucoadhesive polymeric peptide conjugates. She later joined The Irish Drug Delivery Research Network as Senior Postdoctoral Research Fellow where she gained expertise in overcoming barriers for efficient delivery of peptides for oral, injectable, and intra-articular delivery for osteoarthritis. Currently, her research area is multidisciplinary, involving the design and assessment of formulations for peptide and food derived peptide (nutraceutical) oral delivery. Her current position is Assistant Professor in the School of Veterinary Medicine in University College Dublin.



Alexander V Oleskin^{1*}, Cao Boyang²

¹Full Professor, General Ecology & Hydrobiology Department, School of Biology, Moscow State University, Moscow, Russia

²Graduate Student, MSU-BIT Joint University, Shenzhen, China

Neurotransmitters boost the growth of microalgae used to produce food ingredients and medicines: Biotechnological implications

Microalgae currently find application in producing food additives, antioxidants, colorants, cosmetics, and medicines. Given the size of the global market for microalga-based products, any new technique of increasing microalgal biomass yield is expected to be of significant biotechnological and commercial importance. In this talk, we specifically deal with the microalgal species *Scenedesmus quadricauda* that is widely used to produce a wide spectrum of biologically active substances, including antioxidants and UV protectors such as asthaxanthin and β -carotene. In our previous research, we established that several substances known as neurotransmitters can considerably stimulate the growth of this microalga. In this talk, we present new data on the stimulatory effect of the important neurotransmitter acetylcholine on *S. quadricauda* growth. The presentation is also concerned with the impact of acetylcholine on the contents of various fatty acids in algal biomass. Our preliminary data testify to an increase in the content of unsaturated fatty acids that have much nutritional and therapeutic potential.

Biography

Dr. Oleskin studied Microbiology at Moscow State University (MSU), Russia and graduated as MS in 1981. He did his postgraduate thesis project at MSU. Following the defense of his Ph.D thesis, he spent a long period of time at research centers in Germany, Greece, and the USA. Back in MSU, he was awarded (in 2003) the country-specific degree of Doctor of Science (Biology) for research in history of microbiology, enabling him to work as Full Professor. From this time on, Oleskin has been working on (1) the impact of neurotransmitters on microbial growth and communication and (2) the role of network structures in the functioning of various biological systems. Recently, he has switched to algal biotechnology as related to food and drug production. His research indicates that neurotransmitters can increase algal growth rate and the production of biotechnologically important substances by algae. He has published more than 120 research articles in SCI(E) journals as well as several monographs and guide-books.



Taylor Quinn

Social Entrepreneur, United States

Healthy delicious low-cost food for everyone, everywhere

Background: Food systems are broken; malnourished families are spending upwards of 60% of their income on food, food that is most often nutritionally deficient and high in salt, sugar, and fat. Malnutrition has many causes, but most often people lack access to affordable, delicious, nutritious food in their local markets. “Globally in 2020, 149 million children under 5 were estimated to be stunted, 45 million were estimated to be wasted [...] Around 45% of deaths among children under 5 years of age are linked to undernutrition.” (WHO fact sheet, 2021) The approach taken by the global development community is a reactive one, focused on emergency food aid that reaches 10% of those in need of food aid. The current food aid approach is insufficient in addressing the root causes of malnutrition - nutritious culturally-relevant food not being accessible in local markets where low-income people shop. We see the opportunity in using market-based solutions to curb malnutrition by supporting promising social entrepreneurs who are working to bring nutritious, delicious, low-cost food products to market that target low-income consumers struggling with malnutrition. Tailored Food was established in 2020, and operates in the countries where the challenges of a broken food system are most complex, due to corruption, internal conflict, industry monopolies, and economic-shifting climate change. Our team consists of passionate, project-specific consultants and university student volunteers led by Taylor Quinn, the founder and CEO.

Methods: To prove a new approach to food systems is not only possible, but profitable, we provide small-scale social entrepreneurs with technical and financial support to develop, launch, and scale nutritious low-cost food projects. Alongside our entrepreneur partners, Tailored Food is pioneering an innovative approach to food business models, to food manufacturing, to food product development, and to food distribution. On business models, we create a profit-sharing model that incentivizes all stakeholders to stay committed to long-term scaling. On food manufacturing, we design systems that rely on human power with locally-produced equipment, and scale out through decentralized manufacturing sites, rather than scaling up with large energy-intensive manufacturing facilities. On food product development, we leverage nutritious locally-harvested crops to create shelf-stable, delicious food products ready for the time-poor modern consumer. On food distribution, we work through local market women “influencers” to create businesses that can scale.

Conclusions: Tailored Food is a lean social-enterprise consultancy, partnering with promising entrepreneurs in the countries with the most broken food systems, to bring local, nutritious, culturally appropriate food products to market at a price those living in extreme poverty can afford. Unlike the traditional development approach which reactively treats the symptoms, we address the root-cause of malnutrition by listening to and working directly with our partners, and targeting our products towards the specific nutritional needs of each community. A Gates Foundation research study on the Tailored Food model in Liberia showed that 100% of low and middle income consumers viewed our products as affordable given their income levels. We understand that there is no “one-size-fits-all” solution, so we listen, and tailor our support in response to their needs. Tailored currently has active projects in Liberia, Congo, Mozambique, Cameroon and Ethiopia. The majority of our work is done remotely in order to keep our costs low, however when there is a need we imbed ourselves with our entrepreneur partners.

Biography

Taylor Quinn is a social entrepreneur dedicated to designing and implementing nutritious low-cost food systems. He was the Director of Business Development at Eat JUST for 5 years, leading efforts to raise \$400M+ in multiple funding rounds. After leaving Eat JUST, he has worked with social impact-focused food companies in Africa, Asia, and Latin America to raise capital and position companies for exits. He has led collaborations with stakeholders like Unilever, the UN World Food Programme, and the Gates Foundation.



J C Tarafdar

Former UGC-Emeritus Professor and ICAR-Emeritus Scientist Central Arid Zone Research Institute, Jodhpur, Rajasthan, India

Nanofertilizer: Key player for global food production

Different nanomaterial can be synthesized by microbial protein to enhance plant productivity, nutrient use efficiency, stress management, soil health management and environmental protection. Microbial synthesized nano-nutrients application in agriculture may serve as an opportunity to achieve sustainability towards global food production. Important benefits of nanonutrients over conventional chemical fertilizers rely on nutrient delivery system. For example, nutrient can be released over 40-50 days in a slow-release fashion rather than 4-10 days by the conventional fertilizers. The nutrient use efficiency also improved by 2-20 times, therefore, nutrient requirements is less as well as reduces the need for transportation and application costs. Moreover, by using small quantities soil does not get loaded with salts that usually are prone to over application using conventional fertilizer. Nanonutrients also can be used as nanobioformulations. The formulations containing one or more beneficial microorganisms after blending of required nanoparticles to enhance soil productivity. Nanobioformulations can be helpful to enhance the stability of biofertilizers with respect to desiccation, heat and UV inactivation. It can also solve some limitations of biofertilizers such as ease to handling, enhanced stability, protection against oxidation, retention of volatile ingredients, taste making, consecutive delivery of multiple active ingredients etc. In general, microbial synthesized nanomaterial mobilizes 30% more native nutrient than conventional fertilizer application. The average improvement of yield, irrespective of crops and soil types, varies between 24-32% as compared to 12-18% under chemical fertilizers. Nanomaterial, with a particle size less than 100 nm, influences key life events of the plants that include seed germination, seedling vigor, root initiation, stress management, growth and photosynthesis to flowering. Additionally, nanomaterial have been implicated in the protection of plants against oxidative stress as they mimic the role of antioxidative enzymes such as Superoxide Dismutase (SOD), Catalase (CAT) and Peroxidase (POX). But in spite of all these, nanomaterial and nanobioformulations should be applied as recommended doses; because at higher rate of application have been proved to be phytotoxicity as they enhance the generation of Reactive Oxygen Species (ROS). The elevated level of ROS may damage the cellular membranes, proteins and nucleic acids. The uptake rate of nanonutrients by plants also depends on their shape and sizes. In general, small sizes of nanoparticles can be penetrating through the cuticle while larger nanoparticles can penetrate through cuticle-free areas such as hydathodes, the stigma of flowers and stomata. Nanonutrients may be applied both on soils and on leaves as foliar. This can also be applied through drip, hydroponic, aqua and aeroponic. With recommended doses of application, it can be envisaged to become major economic driving force and benefit consumer and farmers with no detrimental effect on the ecosystem.

Audience Take Away Notes

- Nanofertilizers may prevent environmental (air, water, soil) pollution and help to mitigate climate change
- It has the potential to reduce chemical fertilizer application and can compromise with biofertilizers
- Nanofertilizers are very safe with recommended doses of application and can maintain soil health

- It can increase the nutrient use efficiency and crop yield over chemical fertilizer as well as draw more profit with much lower investment
- It can protect the plants from biotic and abiotic stresses and help to increase the efficiency of biofertilizer
- They will be able to make eco-friendly nanofertilizers for benefit of the global farming community
- It can be used very well both in research and teaching

Biography

Dr. J. C. Tarafdar did his M. Sc. and Ph. D. in Soil Science and Agricultural Chemistry from Indian Agricultural Research Institute and Post Doctorate from Institute of Agricultural Chemistry, Goettingen, Germany. He has made original and well recognized contribution on mobilization of native phosphorus. He is the first in the world successfully developed biosynthesized nano nutrients and nano induced polysaccharide powder for agricultural use. He published 377 research articles which include 41 book chapters and five books. Dr. Tarafdar has been placed amongst the top 2% scientists, across all sciences in the world, by Stanford University, USA.



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The role dietary heavy metals play in the epigenetic inheritance of autism and Attention Deficit/Hyperactivity Disorder (ADHD)

In 2021, the US Congress found heavy metals problematic in the American baby food supply but took no action. Heavy metal residues are pervasive in the United States (US) food supply and allowed by the Code of Federal Regulations because of food ingredient manufacturing practices. Evidence suggests prenatal dietary exposures, especially inorganic mercury and lead may impact gene behavior across generations. A nutritional epigenetics model published in 2009 and updated in 2012, 2021 and 2023 is strongly supported by clinical trial data collected all over the world. The model explains how concurrent dietary heavy metal exposures and poor diet lead to changes in key gene behaviors that create conditions for the development of autism and Attention Deficit/Hyperactivity Disorder (ADHD). An analysis of the US Centers Disease Control data indicates autism rates are accelerating in the US. An analysis of the US Department of Education data indicates the number of children ages 6-21 in the US receiving special education services increased 10.4% between 2006-2021 even with stable student enrollment. The percentage of children receiving special education services nearly tripled for the autism category and quadrupled for the developmental delay category from 2006-2021. The transgenerational epigenetic inheritance of autism and ADHD appears to be occurring in the US as prenatal dietary heavy metal exposures continue unabated and children are born without the ability to metabolize and excrete these neurotoxic elements.

Audience Take Away Notes

- Audience will develop an awareness of the problem of heavy metal residues in the food supply and how these metals may impact gene behavior leading to the development of autism or ADHD across generations
- Audience may be inspired to learn how to avoid dietary heavy metal exposures
- Teachers will become aware of available nutritional epigenetics curriculum
- Researchers may see the value of using nutritional epigenetics education as an intervention tool when designing clinical trials to determine how processed food consumption leads to the development of different disease conditions

Biography

Dr. Dufault completed her PhD at A.T. Still University. She retired early from her position as a US Public Health Service officer at the Food and Drug Administration (FDA) to publish her findings of mercury in high fructose corn syrup. As an FDA whistleblower, she could not find employment as a researcher, so she founded the non-profit Food Ingredient and Health Research Institute where she works as a volunteer. She supplements her income working as a licensed special education teacher. Dr. D is considered a leader in the field of nutritional epigenetics with 726 citations according to Google Scholar.



Bill Lauto

Environmental Scientist, International Sustainability and Energy Consultant,
Ateneo Pontificio Regina Apostolorum, Institute of Science and Faith, Rome,
Italy, St. John's University, New York, United States of America
Going True Green, Hicksville, New York, United States of America,

World's food supply: Predictions vs production solutions with probable effects on the poor

The world today is inundated by predictions from the media on the future “devastation” of the world's food supply. For supporting evidence, the media, politicians, celebrities and pretentious scientists, cite Thomas Robert Malthus' theory, which has been proven wrong time and time again. We are never given the complete picture to determine the truth. We are presented only with lies and twisted facts through the process of omission. The theories of William Godwin and Marquis de Condorcet's which have been proven correct each and every time in all areas and disciplines, are consistently avoided.

The fact is that there are viable solutions, but not the ones that are being touted in the media. Relevant and real solutions for the environment and our energy supply directly impact our food production in a positive way, thus eliminating the hunger currently creating destitution for many poor countries. The real problem is that these solutions are always sacrificed to ascertain a financial gain and to secure a position already held at a podium by the majority of world leaders.

As a result, the poor around the world will continue to suffer the most. Only when the possibility for viable worldwide teamwork that looks at all possible connecting solutions without the lens of “profits” becomes a reality, will the hunger and thirst be quenched.

My presentation will bring to light the truths regarding Earth's food supply and its effects on the environment and impoverished nations around the globe. Sadly, many of these solutions do not make for exciting news, but they do point to an exciting future if implemented with humanity's best interests in mind. Humankind's intelligence has prevailed throughout history. There are viable solutions to clean energy that NASA space shuttles have used since 1981, the problem we face is that no one has devised a way to make money from this clean endless energy answer. The process of progression for energy production is also halted in all the disadvantaged nations among us. From Haiti to the Congo we are helping to keep poor nations poor and preventing the “student” with high morals and scruples by the kerosene lantern from growing up healthy and finding the last needed break-through for successful hydrogen fuel cells to be our world's affordable solution. We all know that many countries already have hydrogen fuel cell technology, but greed is preventing further development because after equipment purchase there are only maintenance fees, no monthly fuel or utility bills. Food, energy and the environment all have a “cause and effect” and they are all connected to one another. Food waste, farming innovations and clean water are all critical areas for discussion. We will examine the solutions that can be a catalyst for worldwide teamwork based on the careful examination of complete and truthful facts and the innovations that are already in our reach.

Audience Take Away Notes

- The audience will be able to take greed off the table in all their future discussions by presenting encouragement about the connections between our environment, energy supply and food production, and place on the table the actions needed to be implemented for clean worldwide solutions

- List all other benefits
 - o First the presentation will examine the world's food supply retrospectively with theories of Godwin and Condorcet vs Malthus
 - o Previous predictions over the decades will be reviewed and doomsday predictions for tomorrow will be compared to real science and pretentious science
 - o Food Waste, the causes and solutions will be discussed
 - o Current and probable effects on the poor will be addressed
 - o Soil and water depletion will be added to the equation
 - o Solution to world's energy needs will be presented with discourse about Hydrogen Fuel cells working from water and on demand so no hydrogen storage will be necessary
 - o Discourse on political corruption and hypocrisy from advanced countries dictating to poor nations, such as Haiti and the Congo, about what they could do and not do, for energy independence. Basically, preventing better water supplies and energy for growth in all areas, not just food production. All this while sending their advanced country waste, such as E-waste and plastics to leach into their limited ground water supply

Biography

Bill Lauto is a lead Environmental Scientist and Energy Consultant at his Going True Green Consulting Firm, International Sustainability and Energy Lecturer, International Sustainability & Energy Consultant, Master Naturalist New York BOCES, BS Environmental Science; St. John's University, Energy Auditor Certification; NY Institute of Technology Thermal/Heating Certification; S.U.N.Y. at Farmingdale, Team Building, Survival and Communication Skills from New York State Board of Cooperative Educational Services (BOCES), Certified Citizen Preparedness; Homeland Security and Emergency Services U.S. Trademark holder, U.S. and International Patent holder, Publisher and Author of GoingTrueGreen.com website and blog, Religious and Pre-Cana marriage Instructor.

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DAY 03-VIRTUAL ROOM 1
KEYNOTE FORUM

JOINT EVENT ON
**FOOD SCIENCE AND
NUTRITION RESEARCH**

A2 milk: Where are we now?

Advances in molecular biology and genetics have made it possible to evaluate many ingredients commonly used in human nutrition at the molecular level and to examine their potential benefits or harms in terms of health. In this context, cow's milk, which is one of the essential protein sources in the human diet, has been the subject of many scientific studies. In recent years, many researchers from different countries have focused on highly polymorphic bovine β -casein variants. Among these, the most famous are the A1 and A2 variants in the bovine β -casein gene. These variants differ by a Single-Nucleotide Polymorphism (SNP) at the 67th amino acid position. The mutation in the gene coding for β -casein [g.8101C >A (p.His67Pro)] has been designated as the alteration from CCT on the A1 allele to CAT on the A2 allele. This is a missense mutation that leads to the production of mutant β -casein by changing its proline amino acid to histidine. This change results in altered digestion patterns and the release of Beta Casomorphin-7 (BCM-7) due to A1 variant-based milk. This substance shows opioid character and has been directly or indirectly associated with many diseases. While A2 milk is considered healthy milk in many countries; traditional milk containing A1 is considered unhealthy. In fact, it is challenging to claim that there is enough scientific evidence to come to this conclusion. Nevertheless, intensive selection has been performed to obtain A2A2 homozygous herds in dairy cattle around the world, and rapid progress is achieved by selecting both cows and bulls for A2A2. It is important to note that A2 milk production has created a huge market considering both farm and market dynamics. Therefore, A2 milk is a multidisciplinary subject that includes both genetics and nutrition. The aim of this presentation is to convey the current situation about A2 milk production and to make a molecular-level evaluation of the subject. At the same time, scientific papers with different results published in recent years will be discussed.

Audience Take Away Notes

- What is A2 milk?
- What is the difference between conventional and A2 milk?
- Evaluation of the results from studies on beneficial effects of A2 milk
- Discussion on the contradictory results on the A2 milk production regarding human nutrition and health
- Is A1 devil in the milk?
- The effects of β -casein variants on dairy production dynamics
- The limitations of in vivo studies on the effects A1/A2 alteration
- Discussion on the future of the A2 milk products



Sena Ardicli

Department of Genetics, Faculty of Veterinary Medicine, Bursa Uludag University, Bursa, Türkiye

Biography

Dr. Sena Ardicli is an associate professor at the Bursa Uludag University, Faculty of Veterinary Medicine, Department of Genetics in Türkiye. He received his first PhD degree in 2015 at the same institution. Dr. Ardicli started his second PhD at the Graduate School of Natural and Applied Sciences, Department of Biology in 2018. Now, he is participating studies and experiments in Swiss Institute of Allergy and Asthma Research (SIAF), Switzerland, regarding a scientific project on the effects of conventional/A2 milk. His areas of expertise are molecular biology and genetics, population genetics, genomic selection, meat science, and animal biotechnology. Dr. Ardicli has more than 150 publications related to his subject and has received many awards in different symposiums and congresses.

Harmonization principles of food nutrition labeling

In the current non-harmonised nutrition legislation, the author proposes an estimation of the similitudes factor (k-ratio of similitude) and gap index (g-absolute inconsistency value), as objective harmonization indicators to measure the similarities/differences between different nutritional standards regarding nutrients & energy DRV (Daily Reference Value) and RDI (Reference Daily Intake) from different international jurisdictions (Vintila, 2019).

Audience Take Away Notes

- Global harmonization of nutrition labelling
- Optimal solutions for the consumer choices
- Good ideas to be used by the consumer protection organizations
- Improvement of the industrial and casnic menu's production



Vintila Iuliana

Department of Food Science,
Food Engineering and Applied
Biotechnology, University "Dunarea
de Jos" Galati, Romania

Biography

Vintila Iuliana is actually Associate Professor, PhD in Food Science and Engineering. She is author of 22 books and book chapters in international and national publishing houses (Elsevier, Wiley, Lambert), first author and co-author for 14 articles in ISI journals and relevant ISI proceedings, 26 BDI scientific papers indexed in recognised international databases, 46 articles presented in national and international conferences and 23 articles reviews. Also, she is member of prestigious international organisation such European Federation of Food Science and Technology (2009), Co-Chair WG Nutrition in Global Harmonization Initiative (since 2013), International Society of Food Engineering (2010), Balkan Environmental Association (2008), Global Environmental Standard (GES) Community of Interest (2011), European Academy for Education and Social Research (2012). She acts as international projects expert for European Science Foundation, Eurostar Programme, EC « Expert area in the Participant Portal » and « Connecting Europe Facility », EU TAIEX, COST, EACEA, Erasmus Mundus (2010). She is Guest Associate Editor and Research Topic Editor for "Frontiers in food science and technology", Regional Editor "Advance Journal of Food Science and Technology", Academic Editor European Journal of Nutrition & Food Safety, Editorial Board Member SciEdTech, Editorial Board Member African Journal of Water Conservation and Sustainability, Editorial Board Member International Scholar Journals, etc.

Effect of cheese ripening on vitamin contents and their bioavailability

World cheese market was reached \$143 billion in 2021 (Euromonitor, 2022). Western Europe covered the largest cheese market, with nearly \$54 billion in sales, which was followed by North America at \$33.8 billion (Roux 2022). The fact that the cheese market is so large makes it very important to scientifically study its components, bioavailability and the factors affecting these properties. Therefore, this study aimed to compile the effects of the ripening period on the vitamin content of cheeses and the bioavailability of vitamins. In this way, it may be beneficial for cheese producers to collectively present guiding information for the production of ripened cheese. These values can also be used as marketing and promotional tools for cheeses in the light of scientific data. In addition, it is thought that consumers' purchasing preferences for fresh or ripened cheese may help them to choose more useful products in the light of this information. Thanks to its high fat content, cheese is rich in vitamin B2, vitamin B12 and vitamin A. It also contains fat-soluble vitamins such as vitamin D2. Depending on the fat content, varying amounts of fat-soluble vitamins can be found in cheese. Although cheese is not a rich source for some vitamins the presence of these vitamins has been reported to increase the bioavailability of some other important nutrients. It is known that there is a unfinished project in which reishi mushrooms are used for cheese ripening. With these studies, it is aimed to accelerate the ripening of cheese and to increase the prebiotic content. Due to its positive contribution to the cheese microbiota, the results are thought to indirectly produce positive contributions in terms of vitamins. Determining the vitamin content of cheese and their bioavailability during the ripening stage is important for nutritional physiology and a healthy life. Although cheeses are known to be a good source of vitamin K, reports of low K bioavailability in some cheeses limit them to be a good source of vitamin K. It is thought that more studies are needed to elucidate the factors affecting the vitamin content and vitamin bioavailability in cheese and to use these factors in the cheese industry. Various levels of vitamin content and bioavailability have been reported in studies. It has been stated that these values are related to some factors such as raw milk, cheese type, production method and ripening time. For this reason, it is possible for consumers to make healthier choices in line with the information about cheese vitamin contents and bioavailability which were provided by producers, public institutions or scientists.

Keywords: Cheese vitamins, vitamin bioavailability, cheese ripening time, ripened cheese, fresh cheese



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Biography

Dr. Yasin Ozdemir studied Food Engineering at the Ege University, Turkiye and graduated as MS in 2004. He received her PhD degree in 2011 at the Namik Kemal University. During PhD studies he started to work in Ataturk Horticultural Central Research Institute. He has 3 process patent and 2 national award in his scientific study area. He is currently leading 4 national research project which supported by Republic of Turkiye Ministry of Agriculture and Forestry, General Directorate of Agricultural Research and Politics (TAGEM) and 5 private sector supported food technology projects. Dr. Ozdemir also take parts as a researcher in international project focused on bioavailability and food science/technology. He published more than 100 article in international journals and congress proceedings.

Audience Take Away Notes

- It is thought that consumers' purchasing preferences for fresh or ripened cheese may help them to choose more useful products in the light of this information
- Therefore, this study aimed to compile the effects of the ripening period on the vitamin content of cheeses and the bioavailability of vitamins. In this way, it may be beneficial for cheese producers to collectively present guiding information for the production of ripened cheese
- It is thought that more studies are needed to elucidate the factors affecting the vitamin content and vitamin bioavailability in cheese and to use these factors in the cheese industry
- Vitamin content and bioavailability of them can also be used as marketing and promotional tools for cheeses in the light of scientific data
- It will improve the accuracy of a design, or provide new information to assist in a design problem

11-13^{SEPT}

DAY 03-VIRTUAL ROOM 1
SPEAKERS

JOINT EVENT ON
**FOOD SCIENCE AND
NUTRITION RESEARCH**



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Addition of dietary fibres from selected vegetables for diabetes market

High intake of refined carbohydrates with low consumption of Dietary Fibres (DFs), particularly from vegetables and has increased the risk of CVD, diabetes and other illnesses. The prevalence of chronic diseases is increasingly skyrocketing with the number of diabetic individuals expected to rise from 180 million in 2010 to 368 million in 2030. This is the main cause of morbidity and mortality all over the world because it can lead to the problems in health and affect the quality of life and wellbeing. The aim of this study is to investigate the effects of incorporation of dietary fibres from selected vegetation for diabetes market. The GI was determined according to WHO/FAO 1998's protocols as outlined by Brouns (2005) while the macronutrients was determined according to AOAC 2000. A low GI diet is beneficial to reduce the risks and complications of different health conditions such as diabetes. Mechanistically, the DF enhances glycemic response by raising the rate of absorption of glucose in the small intestine, thereby lowering the GI value. The incorporation of agricultural by-products from banana (over-ripe banana), oyster mushroom and cornlettes in a few baked-based products such as cookies, pasta, cakes, muffins and flatbread are successfully formulated and scientifically proven in improving nutritional composition and DF content while lowering the GI values. A low GI diet will make us feel full for a longer duration while minimizing overeating at the same time. Besides, the Scanning Electron Microscopic (SEM) observation reveals that the damaged cornlettes starch reduces starch hydrolysis, thus slowly raises blood glucose. Also, the ethyl acetate fraction of cornlettes was possessed higher antioxidant and scavenging capacities followed by other fractions in the antioxidant assay tested. Being physically active and eating a sufficient amount of DF from fruits and vegetables are vital in reducing the risks of having diabetes, maintaining the health status and sustaining quality of life and societal well-being.

Audience Take Away Notes

- The audience will be able to apply or practice the use of any locally available agricultural by-products from selected vegetables for the development of nutritious and low glycemic index foods in their diet
- The audience should be able to identify various types of locally available raw materials in the food products they want to develop
- The audience shall explore the possible joint research and innovations with relevant food companies to joint develop food that is not only healthy but also exhibits therapeutic benefits
- Any agencies or NGOs are also may use this knowledge and findings to promote and convince the communities to increase their daily intake of dietary fibres from selected vegetables for the reduction of the risk of non-communicable diseases especially diabetes

Biography

Wan Rosli Wan Ishak is a professor of Nutrition Program at the School of Health Sciences (SHS), Universiti Sains Malaysia (USM), Health Campus, Kota Bharu, Kelantan, Malaysia. Currently, he is a Dean of SHS of USM. His research theme emphasizes more on the utilization of natural agricultural by-products into popularly consume processed foods. Various low Glycemic Index (GI) based on these agricultural by-products has been developed. Wan Rosli has been appointed as Junior Faculty Member from SEAMEO-TROPMED RCCN, Indonesia in the Training of Leadership

for Nutritionists in Jakarta Indonesia. He was selected among Top 10 Innovators for SYMBIOSIS project funded by Malaysian Technology Development of Malaysia (MTDC) to facilitate the commercialization of functional and health cookies from oyster mushroom (Nutri-Mush® Cookies). He has published more than 120 articles in various indexed journals.



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Nutrition and food safety interface: The case of honey

Honey is a highly consumed and appreciated functional food due to its nutritional properties including antioxidant, antimicrobial, anti-inflammatory and anticancer components. In addition, the importance of beekeeping activity in the society, are of huge importance in accordance with the Sustainable Development Goals 2, 12 and 15, targeting the promotion of sustainable agriculture, quality production, and sustainable use of terrestrial ecosystems. Though, concerns about the possibility of the occurrence of contaminants in honeybee products, from anthropogenic activities (urbanization and intensive agriculture practices), must be monitored. In one hand we have the possibility of having contaminated food products which can be potential threatening for consumers, and, in the other hand, the possibility of using honey and by-products, as bioindicators of persistent human-hand contaminants in the ecosystem should be considered. The analysis of anthropogenic contaminants in the environment by use of hive products is being reported proving that this possibility may be used for policy research. In addition to the occurrence of contaminants, including pharmaceutical residues, the use of bee products to assess the antimicrobial resistance genes dissemination is also an issue of growing interest.

Audience Take Away Notes

- Be aware of potential persistent pollutants
- How anthropogenic contaminants can be found in food products and especially in honeybee products
- Understand the possibility of using a highly nutritional product also to bio-monitor contaminants in the ecosystem

Biography

Andreia Freitas studied Chemistry in the Instituto Superior Tecnico (IST), Lisbon, and graduated as MS, in Analytical Chemistry (2008) at the same institution. She received her PhD degree in Pharmaceutical Sciences (2015), specialty of Bromatology and Hydrology at the Faculty of Pharmacy, University of Coimbra. With more than 18 years of experience, she is currently a researcher in the field of Food Safety specially in veterinary drug residues analysis and contaminants in food of animal origin in the Nacional Institute of Agrarian and Veterinary Research (INIAV) in the National Reference Laboratory for Food Safety.



Ivana Šarac

Group for Nutrition and Metabolism, Center of Excellence in Nutrition and Metabolism Research Institute for Medical Research, National Institute of Republic of Serbia, University of Belgrade, Belgrade, Serbia

The role of vitamin D in reproductive health of men and women

In the last decades, the scientific interest in vitamin D has grown since many studies indicated that besides its well-established role in bone metabolism, it could have other important roles in the body, including its effects on immunity, endocrine, cardiovascular, and reproductive function.

The association between vitamin D and reproductive health is quite complex, and includes multiple pathways. Vitamin D affects calcium metabolism and availability of calcium, and it is known that calcium promotes steroidogenesis, and development and function of gametes. Vitamin D receptors and enzymes involved in metabolism of vitamin D are distributed through all parts of endocrine system involved in reproduction, including: hypothalamus (which secretes GnRH and CRH, hormones which stimulate pituitary gland); pituitary gland (which secretes LH and FSH, hormones which stimulate gonads, and ACTH, hormone which stimulates adrenals), testes and ovaries (which secrete sex hormones and produce gametes); adrenals (which also secrete sex hormones, and other steroid hormones which interact with sex hormones); bones (which secrete osteocalcin, a hormone which affects production and metabolism of sex hormones); fat tissue, prostate, breasts, placenta and skin (which are involved in metabolism of steroid hormones, particularly sex hormones); liver (which is also involved in metabolism of steroid hormones, but also secretes SHBG, a protein which binds sex hormones and influences their bioavailability to other tissues). Furthermore, vitamin D receptors and metabolizing enzymes are distributed in seminal vesicles and epididymis, prostate, fallopian tubes, uterus (endometrium, myometrium), and trophoblast. In addition, vitamin D influences immune system (has anti-inflammatory effect), has anti-oxidative effect (decreases production of reactive oxygen species), and decreases insulin resistance, and all those factors (insulin resistance, inflammation and oxidative stress) can negatively influence reproductive function both in men and women.

Numerous studies have shown that defects in levels and metabolism of vitamin D can adversely affect reproductive function. In both men and women with vitamin D insufficiency or deficiency, higher rates of reproductive abnormalities were shown, including infertility, hypogonadism in men, and syndrome of Polycystic Ovaries (PCOS) in women, lower pregnancy rates, higher pregnancy complications rates (pre-eclampsia, gestational diabetes mellitus, spontaneous pregnancy losses, preterm birth, fetal growth retardation), and worse neonatal development and increased post-partum and post-natal morbidity. Vice versa, data show that correction of vitamin D deficiency by supplementation in such subjects positively affected their reproductive health, leading to improvement in their reproductive function and hormonal status.

Audience Take Away Notes

- This presentation will provide the audience with the information on the association of vitamin D and reproductive function, both in men and women
- The presentation will also show the multiple pathways by which vitamin D can influence reproductive system and function both in men and women
- Additionally, data which confirm the negative effect of vitamin D deficiency on reproductive function

will be presented, as well as the data on the effects of vitamin D supplementation on improvement in reproductive function

- Also, the gaps in the present knowledge and controversies will be discussed

Biography

Dr. Ivana Šarac studied Medicine at Faculty of Medicine, University of Belgrade, and graduated in 1998. Then she entered her MSci postgraduate studies in Nutrition at the same institution, and finished it in 2004. In 2006 she also finished her medical specialization in Hygiene with medical ecology at Faculty of Medicine, University of Nis. She conducted her PhD studies in Diabetes and Metabolic Medicine at University of Surrey, UK, and obtained PhD degree in 2014. In 2016, she joined the Center of Excellence in Nutrition and Metabolism Research, at the Institute for Medical Research, University of Belgrade, as Research Associate.



Pooja Nikhanj

Punjab Agricultural University, India

Evaluation of edible coatings for quality maintenance of fresh cut cucumber

Six different edible coatings including chitosan, pectin, alginate, starch, carrageenan and CMC were evaluated to determine their effect on physicochemical properties and microbial growth inhibition over fresh cut cucumber and carrot. Microbial load over FCV was reduced by 1.03 log cfu/g total plate count, 0.49 log cfu/g yeast and mould, 0.61 log cfu/g coliforms count whereas microbial count over fresh cut carrot got reduced by 0.94 log cfu/g total plate count, 0.54 log cfu/g yeast and mould and 0.73 log cfu/g coliforms after disinfecting fresh cut cucumber and carrot with 100 ppm sodium hypochlorite solution for 23 minutes and 8 minutes at 10°C, respectively. After disinfection pretreatment, fresh cut vegetables were coated with above mentioned edible coatings. Evaluation of coatings showed chitosan and pectin showed comparable effects in restricting the microbial growth over fresh cut cucumber. However, chitosan coated FCV exhibited minimum microbial load over FCV after 9 days of storage as compared to other coatings and control FCV samples with maintaining all other quality attributes. Therefore, chitosan was selected for further optimization studies w.r.t coating concentration and dipping time that was statistically designed and analyzed using response surface methodology. Microbial analysis for TPC, Y&M and coliform count and physicochemical analysis viz. pH, TSS, total sugars, and firmness was taken. Fresh cut cucumber dipped in 1 percent (w/v) for 5 minutes and fresh cut carrot dipped in 1 percent (w/v) for 3 minutes was found to be optimum coating conditions, respectively. The validation investigations carried out at 3 kg scale resulted in firmness 4.5 and 24 (lb), total sugars 3.7 and 6.8 (g/100g), TSS 5.2 and 8.0 (°B), pH 5.0 and 6.5, TPC 4.0 and 3.9 (log cfu/g), Y&M 2.0 and 1.8 (log cfu/g) and Coliforms 2.1 and 2.0 (log cfu/g) in fresh cut cucumber and carrot with desirability of 90 percent and 93 percent, respectively. Shelf life studies of pretreated chitosan-coated fresh cut cucumber and carrot FCV cucumber and carrot were tested for a period of 12 days or till deterioration at a regular interval of 3 days under optimal coating conditions. Results revealed that chitosan coated FC cucumber and carrot can be consumed upto 12 days and 15 days, respectively while maintaining their desirable physicochemical and sensory characteristics with microbial loads under acceptable range. Microbial count over chitosan coated FC cucumber on 12th day of storage showed 4.54 log cfu/g TPC, 2.90 log cfu/g Y&M and 2.95 log cfu/g Coliforms under acceptable limits while uncoated samples had microbial count above acceptable limits on 6th day of storage. Microbial count over chitosan coated FC carrot on 15th day of storage showed 4.72 log cfu/g TPC, 2.90 log cfu/g Y&M and 2.95 log cfu/g coliforms under acceptable limits while uncoated samples had microbial count above acceptable limits on 6th day of storage. As a result, the present study found that pre-treated fresh cut cucumber coated with 1 percent (w/v) chitosan for 5 minutes and fresh cut carrot coated with 1 percent (w/v) chitosan for 3 minutes were able to inhibit the microbial load over FC cucumber and carrot during storage period under refrigeration conditions of 5-7° C maintaining its all physicochemical and sensorial characteristics.

Biography

Dr. Pooja is a Microbiologist in Punjab Agricultural University since 2018. She was an INSPIRE National fellowship holder from DST, New Delhi during her PhD and also qualified the ASRB-NET. She was awarded with two Gold medals for her excellence in academics during PhD and M Sc degree. She is currently working on Postharvest management of Horticultural crops along with quality analysis of water, waste water and all types of fresh and processed food products. She is handling researches on Fresh cut fruits and vegetables shelf life extension by the use of disinfection treatments, edible coatings and Modified atmosphere packaging techniques. She is also involved in the use of horticultural wastes for the production of valuable products by fermentation processes. She has published more than 35 publications including research papers, book chapters, review articles and popular articles on various aspects of fermentation, fresh cuts and value added products development.



Diana Catalina Castro Rodriguez

Catedras, CONACYT. Instituto Nacional de Ciencias Médicas y Nutrición
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Probiotics as a food supplement: What are they and how do they work?

With the accelerated pace of modern life, driven by the quest for greater comfort, diseases have also increased in the population. This makes it seem difficult to achieve the goal of total wellness for our civilization, and may even make us think that this is an unattainable goal. Human beings experience a wide variety of ailments such as diabetes, obesity or cancer, which significantly diminish their quality of life. These diseases have not only become personal problems, but have also increased in number, becoming a public health problem. Recent studies show that not only genetic factors are strongly associated with these diseases, but also diet and its impact on the intestinal microbiota have a significant influence on their development. Dietary habits can alter the intestinal microbiota, affecting its functionality and leading to drastic changes in energy generation and utilization, predisposing to the development of chronic degenerative diseases. Nutritional imbalance during the early stages of development alters metabolism, intestinal physiology and the composition of the microbiota, which negatively affects the overall health of individuals and becomes an important element for the development of a country. Therefore, implementing lifestyle modifications can prevent the adverse effects caused by poor nutrition during the development of each individual. One of these modifications could be the consumption of probiotics, microorganisms that stimulate the protective functions of the digestive tract and, when ingested in sufficient quantities, exert a beneficial action on the health of the host. Probiotics stand out for several characteristics, among the most important are their nutritional contribution, their ability to maintain a healthy intestinal microbiota, the attenuation of lactose intolerance, their improvement of gastric health, their ability to assist in antibiotic treatments, the reduction of respiratory infections and their ability to reduce serum cholesterol. In addition, in recent years, their contribution to the improvement of metabolic and immunological alterations associated with obesity has been demonstrated, which makes them a subject of great interest. Although numerous studies have been conducted to understand the relationship between probiotics, the microbiota and various diseases, it is still uncertain how probiotics act on the physiology of the individual. To achieve a more complete understanding of the probiotic effect on health, more research is needed that focuses on determining the functionality of probiotics on the microbiota, as well as understanding the relationship of the microbiota to the development or prevention of major diseases such as obesity or cancer.

Audience Take Away Notes

- Importance of adequate nutrition in early stages of development such as pregnancy and lactation
- Beneficial effects of the use of probiotics
- Characterization of bacteria with probiotic potential

Biography

Dr. Diana C. Castro Rodríguez has PhD in Science in Bioprocesses. She is currently a young researcher from CONACYT. She has carried out two research stays, one at the Institute of Agrochemistry and Food Technology, Valencia, Spain and another at Texas Biomedical Research Institute and Southwest National Primate Research Center, San Antonio, United States. She has three patent application records. She has been awarded honorable mentions for her work in both the Master's and PhD. Her line of research is aimed at the bio-synthesis of the secondary metabolites of probiotic and their effects in chronic degenerative diseases.



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The use of microencapsulated probiotics in livestock production system and gut health

Livestock play a significant role in the global agricultural industry. Maintaining optimal gut health is crucial for their overall well-being, growth, and productivity. Probiotics have shown great potential in improving gut health by modulating the intestinal microbial balance and enhancing nutrient absorption. However, the effectiveness of probiotics can be compromised due to their sensitivity to environmental conditions and low survival rates during passage through the gastrointestinal tract. Encapsulation techniques provide a viable solution to protect probiotics from harsh digestive conditions and enhance their delivery to the target site within the gut. The encapsulation process involves coating the probiotic cells with a protective matrix, which shields them from adverse conditions such as pH fluctuations, bile salts, and enzymatic degradation. The encapsulated probiotics exhibit increased viability and survival during storage and transit, ensuring a higher chance of reaching the intestinal tract in an active form. They promote the growth of beneficial bacteria, such as *Lactobacillus* and *Bifidobacterium*, while inhibiting the growth of harmful pathogens. The encapsulated probiotics also enhance the integrity of the gut barrier, reducing the incidence of gastrointestinal disorders, such as diarrhoea and enteric infections. Improved gut health leads to better nutrient absorption and utilization, resulting in enhanced growth performance and productivity in animals. Furthermore, encapsulation techniques allow for controlled release of probiotics within the gut, ensuring sustained exposure to beneficial microorganisms. This sustained release pattern enhances the colonization and establishment of probiotics in the gut microbiota, leading to long-lasting effects on gut health and performance. Therefore, encapsulation of probiotics may offer a promising strategy to improve gut health and productivity in animals and layer. Further, research and development in this field can pave the way for the practical application of encapsulated probiotics in livestock production systems, ultimately benefiting the industry by improving animal welfare and productivity.

Audience Take Away Notes

- By learning about encapsulation of probiotics, the audience gains the ability to make informed choices when it comes to selecting, storing, and using probiotic products. They can optimize their digestive health, make better purchasing decisions, explore innovative applications, and share their knowledge with others, thereby harnessing the benefits of encapsulated probiotics in their daily lives
- A comprehensive understanding of encapsulation of probiotics can provide professionals in various job roles with a competitive edge, enabling them to make informed decisions, develop innovative products, ensure quality control, contribute to research advancements, and effectively market probiotic solutions in their respective fields
- Definitely this research can be replicated in various model for the benefit of society. Now a days probiotics can be used in variety of application. Ensuring their better viability and availability and better performances will certainly benefit the food industry, human application as well as different class of animals

- The encapsulation probiotics may help to through experimentation and monitoring, the design can gather data on the impact of protected probiotics on specific parameters such as growth performance, feed efficiency, productivity and disease incidence. This information can help refine the design, make adjustments to the feeding program, and optimize the use of protected probiotics to achieve the desired outcomes
- Incorporation of protected probiotics into animal feed, can aim to optimize gut health, which is crucial for nutrient absorption, disease prevention, and overall well-being
- Performance Optimization: Protected probiotics can positively influence the growth performance of animals. By enhancing the gut environment and supporting a balanced microbial population, probiotics can promote optimal nutrient absorption and utilization, resulting in improved weight gain, feed efficiency, and overall productivity. This will certainly affect the economy of overall production system
- Facilitates combination and compatibility: Encapsulation allows for the incorporation of multiple probiotic strains or the combination of probiotics with other functional ingredients. This flexibility enables the development of custom formulations tailored to specific animal species, health conditions, or production goals
- Improve viability of selected probiotics under gastrointestinal condition
- Enhancement in immune response and antioxidant capacity of product
- Improvement in gut health, microbial diversity along with productive performances in animals along with quality and quantity of various products
- Various combinations of probiotics can be used with various numbers of polysaccharides compounds for encapsulation and it can be easily commercialized for industrial production and sustainable usage in animal production system

Biography

Dr. Abhishek Kumar Singh is currently working as Assistant Professor in the Animal Nutrition department at Banaras Hindu University, India. Dr. Abhishek Kumar Singh has completed his BVSc & AH degree he has persuaded his MVSc from Indian Veterinary Research Institute, India. He pursued his Ph.D. in Animal Nutrition from Nation Dairy Research Institute, Karnal, India. Dr. Sing has also worked as Scientist at National dairy Development Board, Anand, Gujarat in animal feed quality control laboratory for two years. Dr. Abhishek Kumar Singh has published more than 25 articles in esteemed scientific journals. He has also authored a book and written many book chapters in national and international books series. He has reviewed many research papers in reputed journals.



Amel Aouache^{1*}, Cherifa Benlatreche²

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Risk factors for vitamin a deficiency in pre-school children in an eastern Algerian city (Constantine)

This cross-sectional study was conducted on 133 preschool children from a disadvantaged population of Constantine City (Eastern Algeria). Questionnaires were administered to parents to obtain their consent for participation in the study and for the collection of data regarding their child. The findings revealed that 16.54% of the children were deficient in vitamin A, with 59.1% of them being 60 months.

Non-deficient children had a longer average breastfeeding duration (mean of 10.54 ± 7.8 months) compared to deficient children (mean of 7.54 ± 6.63 months). The prevalence of children who did not receive breastfeeding was lower among non-deficient children (6.70%) compared to deficient children (18.18%). Furthermore, the late introduction of complementary foods was more common in the group with vitamin A deficiency. Low levels of parental education, socioeconomic status, and insufficient daily intake of vitamin A, are also associated with vitamin A deficiency in children.

The results of this study highlight the positive impact of breastfeeding on vitamin A status in young children. In Algeria, efforts to promote breastfeeding and nutritional education of mothers specifically, are essential in the maternal and child protection structures to avoid nutritional deficiencies in preschool children.

Keywords: Preschool Children-Breastfeeding-Vitamin A deficiency-Constantine (Eastern Algeria).

Audience Take Away Notes

By identifying the risk factors for vitamin A deficiency among preschool children, this research provides information for designing targeted health interventions and programs to prevent this deficiency. By highlighting the importance of breastfeeding, dietary diversification, and maternal nutrition education, it can simplify and enhance efforts to improve children's nutrition

- This research can be used by other professors as a basis to expand their research in the field of child nutrition and health
- The findings of this research provide new insights into the risk factors for vitamin A deficiency among children in Algeria. This can help improve the accuracy of designing nutritional interventions and health programs to prevent this deficiency in both Algeria and other developing countries

Biography

Dr. Amel Alouache, teacher at the Veterinary Superior National School (ENSV) Algiers -Algeria. In 1998, I obtained a Master's degree in Applied Nutrition, from the Institute of Nutrition, Food, and Agro-Alimentary Technologies (INATAA) at the Constantine University in Algeria. I taught at Oum El Bouaghi University (Algeria) until 2009. I joined the ALNUTS Laboratory (Alimentation, Nutrition, and Health) at the Constantine University, of Professor Nezzal H., Dr. Mekhancha D.E, and Professor Benlatreche C., who was my supervisor. In 2019, I received my doctoral degree in the same field. I have published one article.



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Process development for ‘foods companion’ preparation from the waste-peels of fresh tomato fruits (*Solanum lycopersicum*) and three fresh vegetables using HACCP plan

The aim of this study is to develop a process using the Hazard Analysis and Critical Control Point (HACCP) System to develop a product named ‘Foods Companion’ from the Food Loss And Waste (FLW) including peels of processed fresh Tomato fruits, wastes (Tomato concentrate) generated from the Tomato paste factory, fresh hot pepper, fresh sweet pepper, fresh Onion, fresh Garlic and fresh Ginger, respectively. Furthermore, this ‘Foods Companion’ was developed from the FLW including those generated from the slices of fruits of fresh Tomatoes at the point of primary processing (before crushing) and the processed Tomato peels, Tomato concentrate at the point of secondary processing (after crushing) which are collected at various collection points of the factory. It is pertinent to know that FLW is a moral-related issue because roughly 12% of the World’s population is faced with hunger-threat due to excessive losses and wastages of food around the globe. In this study, after successfully developing the ‘Foods Companion’ sensory analysis results obtained from sensory judges of the foods prepared revealed that several foods can be expediently and successfully prepared using the Foods Companion as the sole ingredient and these foods include Cous-cous, cooked Rice, fresh beaten egg, Noodles, pastas, and boiled Yam and also stew can be prepared using the Foods Companion. And the developed ‘Foods Companion’ can be used for the preparation of various foods at homes, restaurants, hotels, schools, camps of the Internally Displaced Persons, boarding schools, and working class bachelors/spinsters and as well students of higher institutions of learning can conveniently use it for preparing their foods in their homes and hostels. The authors developed this Foods Companion to convert food waste to safe food that will generate wealth to minimize FLW within the Food Supply Chain and avert environmental degradation.

Keywords: Peels of Fresh Tomato fruits, Tomato Concentrate, HACCP, Foods Companion, Foods Preparations, Food Supply Chain, Food Waste, Food Loss, and wealth.

Audience Take Away Notes

- Generated wastes from the fresh Tomato fruits can be converted to commercially viable product
- Food Business Operators can use Foods Companion as the main ingredients for preparing several foods such as Noodles, Eggs, Yam, Stew, Jollof Rice, and Fried Rice
- Development of Foods Companion can curb food wastes that are always generated by the Tomato Paste Production factories
- Business men that are ready to invest their fund into food processing business can confidently do that in the commercial production of Foods Companion
- Jobs would be created by flagging a production factory that venture into production of Foods Companion; although some equipment would have to be designed and fabricated for this to be achieved successfully

Biography

Sirajo Mohammed Funtua is presently a Chief Instructor/Principal Lecturer with the department of Food Science & Technology, and Department of Nutrition & Dietetics, Federal Polytechnic, Kaura-Namoda, Zamfara State, Nigeria. He obtained an MSc in Food Safety and Quality Management in the year 2013 from the University of Greenwich, Medway Campus, Central Avenue, Chatham, London Borough, United Kingdom. He is a dedicated academician and researcher with special interest in Food Product Development, Food Quality Control, Food Safety & Quality Management. He has been serving the Nigeria Institute of Food Science and Technology at the chapter and national levels for several years as the Chairman NW II between 2014 and 2016, National Publicity Secretary between 2016 and 2018. He is the former Head of department, Department of Food Science and Technology, The Federal Polytechnic, Kaura-Namoda, Zamfara state, Nigeria; and presently he is the Centre Deputy Director, Centre for Innovative Entrepreneurship, The Federal Polytechnic, Kaura-Namoda, Zamfara state, Nigeria. He has published over fifteen (15) research findings in the national and international Journals of high reputes; and he is a reviewer for several international journals in Europe and Asia. He is a member of Council of Asian Science Editors. He has supervised projects for students at National Diploma and Higher National Diploma levels since 2005 till date. And he is a visiting lecturer in some Universities in Nigeria and a he has obtained Research grant from the TetFund Nigeria in 2019/2020 academic session.



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Effects of high pressure processing on bio accessibility of food components and future perspectives

New technology developments for food industry generally done to increase food quality, reduce costs, reduce nutrient losses, and increase production efficiency. Few studies are on the reduction of environmental pollution caused by food processes. Works on the increasing bio accessibility of food components with new food processes to be developed or modification of existing processes are not common. However, increasing the bio accessibility of many components, especially phenolics and vitamins and making them more beneficial for consumers is an issue that needs to be investigated. It may be useful to study this subject independently or as a continuation of studies in food processes and studies on preventing food component losses. There are studies on the effects of frequently used processes such as pasteurization, cooking, frying, drying or freezing on the bio accessibility of components in herbal products. The methods and parameters chosen in food processing are one of the most important factors affecting bio accessibility. These methods can act to increase or decrease the bioavailability of bioactive compounds. Some of these applications increase the bio accessibility of some components, while others, on the contrary, decrease it. Non-thermal processing technologies such as high pressure processing facilitate the release of phytochemicals from the plant matrix. Since both high pressure processing and bio accessibility studies are relatively new subjects, studies on the effects of high pressure processing on the bio accessibility of food components have not been reached sufficiently yet. High pressure processing has the potential to increase bio accessibility some phytochemicals. The researches done so far in this field have been examined. It has been observed that it is not possible to generalize on the effect of the high pressure process on bio accessibility. In addition to the high pressure process parameters, the effect on bio accessibility is different depending on which component is applied in which food. It has even been understood that sub-forms of the component can have an effect on bio accessibility.

It is known that high pressure or moderate pressure application techniques provide opportunities to extend the shelf life of foods without loss of nutrients. This practice is thought to have the potential to increase the absorption of nutrients. Therefore, in this study, a review was prepared on the effects of high pressure application on the bio accessibility of components that have beneficial effects for consumers. In addition, information is given about an on-going project (HOFOOD) that includes studies on this subject. It is likely that new research areas will emerge if bio accessibility is increased with new food processing technologies. For example, putting the valuable phytochemicals contained in herbal products and the components in food supplements to the market with increased bio accessibility may be beneficial in terms of increasing both added value and potential benefits.

Biography

Dr. Yasin Ozdemir studied Food Engineering at the Ege University. He received PhD degree in 2011 at the Namık Kemal University. He has 3 process patent and 2 national award in his scientific study area. He is currently leading 4 national research project which supported by Republic of Türkiye Ministry of Agriculture and Forestry, General Directorate of Agricultural Research and Politics (TAGEM) and 5 private sector supported food technology projects. Dr. Ozdemir also take parts as a researcher in international project focused on bioavailability and food science/technology. He published more than 100 article in international journals and congress proceedings.

**Nava Morshedzadeh**

Department of Nutrition, Faculty of Public Health, Kerman University of Medical Sciences, Kerman, Iran

The relationship of dietary phytochemical intake and non-alcoholic fatty liver disease

Introduction: Consumption of phytochemical-rich foods relates to the prevention of chronic diseases. In this study we assessed the dietary Phytochemical Index (PI) in liver enzymes and severity of fibrosis among non-alcoholic fatty liver disease patients.

Methods: This cross-sectional study was conducted on 150 patients with NAFLD. Fibrosis-4 index (FLB4), Nonalcoholic fatty liver disease Fibrosis Score (NFS), AST, ALT, ALP, and GGT was measured. The usual intake of participants was measured using a validated semi-quantitative food frequency questionnaire and dietary PI was calculated. Multiple regression models were used to estimate mean difference changes in anthropometrics associated with various dietary PI.

Results: Participants' mean $\pm$ SD of age and BMI were 39.23 ± 10.52 and 24.40 ± 2.64 , respectively. We found that a higher score in DPI is associated with lower scores in NFS and FIB-4. Multivariate linear regression showed that there is an inverse association between DPI and AST, ALT, ALP, GGT, NFS and FIB-4.

Discussion: Higher dietary PI could effects on reduction of NFLD progression and improvement of metabolic parameters.

Keywords: Dietary phytochemical index, Non-alcoholic fatty liver disease, metabolic syndrome

Audience Take Away Notes

- Our findings can be used to inform the development of strategies and dietary guidelines aimed at reducing NFLD progression
- Further studies should be conducted. In addition, prospective and interventional investigations are needed to clarify casual relationships

Biography

I am Dr. Nava Morshedzadeh, PhD in nutrition and diet therapy and assistant professor at Kerman University of Medical Sciences in Iran. In collaboration with the Endocrine Research Center, as well as Gastroenterology and Liver Research, I am working on research projects related to the relationship between nutrition and digestive diseases, as well as teaching students at the university. And this research has led to the publication of 23 articles in international journals.

11-13^{SEPT}

DAY 03-VIRTUAL ROOM 1
POSTERS



JOINT EVENT ON
**FOOD SCIENCE AND
NUTRITION RESEARCH**



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Comparative analysis of nutritional indicators in greek goat's milk yoghurt across various producers

The consumer market is consistently embracing goat's milk yoghurt due to its probiotic content, unique composition, potential health benefits, and differentiation from traditional cow's milk yoghurts. This study aims to contribute valuable scientific knowledge concerning the diverse nutritional composition found among various types of goat's milk yoghurt available in Greece, a prominent global producer of this dairy product. The primary objective of this research is to comprehensively compare 23 representative yoghurt samples from different categories of goat's milk yoghurt producers in Greece. These categories include 8 of the Largest National Producers (LNP) and 17 laboratory-scale yoghurts made from milk sourced from mountain goats grazing in the region of Western Macedonia (MGC). To achieve this objective, a wide range of analyses were conducted to evaluate chemical characteristics, such as fat, protein, carbohydrates, and moisture content. The compositional analysis of the yoghurts revealed variations in protein and fat content. Specifically, in LNP yoghurt, the protein content ranged from 3.9% to 4.7%, while the fat content ranged from 4% to 4.6%. In MGC yoghurt, the respective composition ranged from 3.2% to 6.9% at the protein level and 4% to 6% at the fat level. Furthermore, the antioxidant capacity of the goat's milk yoghurt samples was assessed using multiple methods (FRAP, DPPH, FC, ABTS), and the total flavonoid content was also evaluated. The comparative analysis of antioxidant capacity and flavonoid content, MGC yoghurt exhibited a significant difference of 14.6% (in DPPH) and 37.9%, respectively. Overall, this research sheds light on the nutritional differences among various goat's milk yoghurt products in Greece, providing valuable insights into their potential health benefits.

We acknowledge support of this work by the project “AGROTOUR” (MIS 5047196) which is implemented under the Action “Reinforcement of the Research and Innovation Infrastructure”, funded by the Operational Programme “Competitiveness, Entrepreneurship and Innovation” (NSRF 2014-2020) and co-financed by Greece and the European Union (European Regional Development Fund).

Audience Take Away Notes

- Effect of mountain grazing in goat milk yoghurt
- Quality parameters comparison of representative samples of yoghurt obtained from various categories of goat's milk yoghurt producers in Greece
- Antioxidant capacity of different goat yoghurt samples
- Flavonoids content of different goat yoghurt samples

Biography

Dr. Ganatsios studied Chemistry at the University of Patras, Greece. He then joined the research group Food Chemistry and Biotechnology Laboratory, Department of Chemistry, University of Patras. He received his PhD degree in 2015 at the same university. Since 2020 he is a visitor assistant professor and researcher in University of Western Macedonia. Dr. Imamura studied analytical chemistry at Kyushu University and graduated as MSc in 2003. She then joined Kikkoman, soy sauce company, where she worked on sensory evaluation for 20 years; she obtained her PhD in 2014 and published a paper on the flavour wheel of soy sauce in 2016. She has conducted numerous studies on the characteristics and components of soy sauce and their linkages.



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Comparative analysis antioxidant capacity in greek market goat milk samples in annual basis: Effect of thermal processing and production system

Lately, there has been a noticeable increase in consumer interest in goat milk, mainly due to its recognized health benefits. Notably, Greece has become a significant player in the global goat milk production scene, further highlighting the importance of this growing trend. This current comparative study is centered around an annual examination of the natural antioxidant capacity present in goat milk samples obtained from the Greek market. It explores how varying thermal processing methods and the contrast between conventional and organic production systems influence and alter the antioxidant capacity of milk. The experimental design incorporates a variety of analytical techniques, including Ferric Reducing Antioxidant Power (FRAP), 2,2-Diphenyl-1-Picrylhydrazyl (DPPH) radical scavenging assay, Total Phenolic Content (TPC), and 2,2'-Azino-Bis (3-ethylbenzothiazoline-6-sulfonic acid) (ABTS) radical cation assay. These methods collectively provide a thorough assessment of the antioxidant capacity of the sample collection. Relevantly, the effects of various thermal processing methods were explored by analyzing 168 commercially sourced goat milk samples on a yearly basis. Among these, 36 samples underwent Ultra-High Temperature Treatment (UHT-GM), while 132 samples underwent Conventional Pasteurization (CP-GM). The data obtained from the comparative analysis of antioxidant content revealed a significant increase in the antioxidant capacity of the UHT-GM samples compared to the CP-GM samples. This difference ranged from 6.99% to 25% across all the different analytical methods used. Moreover, the investigation also encompassed an examination of the impact of the production system, which included a total of 48 samples sourced from Organic Origins (OR-GM) and 120 samples from Conventional Origins (CO-GM), all collected annually. The analysis of antioxidant content through TPC, DPPH, and ABTS assays unveiled significantly greater levels of antioxidants present in the OR-GM samples. These differences ranged from 0.48% to 12.63%. In conclusion, these discoveries highlight the complex relationship between the utilized processing methods and the origin of the milk, which are crucial factors influencing the antioxidant capacity. The significance of these results extends to providing valuable insights relevant to both consumers and producers in the goat milk market.

We acknowledge support of this work by the project “AGROTOUR” (MIS 5047196) which is implemented under the Action “Reinforcement of the Research and Innovation Infrastructure”, funded by the Operational Programme “Competitiveness, Entrepreneurship and Innovation” (NSRF 2014-2020) and co-financed by Greece and the European Union (European Regional Development Fund).

Audience Take Away Notes

- Effect of thermal process treatment in antioxidant capacity of goat's milk
- Effect of production system in antioxidant capacity of goat's milk

- Comparing the antioxidant content in representative samples of commercial goat's milk from various producers in Greece
- Evaluating the antioxidant capacity of different goat milk samples

Biography

Georgios Papatzimos studied Veterinary Medicine at the Aristotle University of Thessaloniki Greece. He obtained a MSc degree in Applied Public Health and Environmental Hygiene, with focus on Food and Water Quality and Safety, from the University of Thessaly. Currently, he is a PhD Candidate at the Department of Agriculture of the University of Western Macedonia. His research centers on replacing synthetic additives with natural alternatives in meat products. Since 2013, he is working as a senior Product and Quality Assurance manager in the meat industry. He has participated in research projects on the nutritional value of commercially available meat products.



Ion Romulus Scorei¹, Andrei Biță^{1,2*}, Gabriela Rău^{1,3}, Maria Viorica Ciocîlteu^{1,4}, George Dan Mogoșanu^{1,2}

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The impact of prebiotic boron complexes on the microbiota: Diester chlorogenoborate complex

Although boron (B) is essential for plants, some bacteria, fungi, and algae, in terms of human health, its role has recently been defined as essential nutrient into host–bacterial symbiosis in human and animal health. B promotes biofilm formation by up-regulating the expression levels of biofilm-related genes, improving the activity of the quorum sensing system. Autoinducer-2 (AI-2) is synthesized inside the bacteria, while AI-2–borate (AI-2B) is synthesized outside the bacteria in the presence of borate anion. AI-2B might be involved in host association with commensal bacteria rather than pathogens, as commensal bacteria are usually associated with epithelia, whereas pathogenic bacteria are usually detected on the basolateral surface. Microbiota-accessible B complexes are essential nutrients in the symbiosis between the microbiota and the human and animal host. Most of the known effects of B on human and animal health can be explained by the fact that B is an essential nutrient on healthy symbiosis. The mechanism of action of naturally occurring borate species is related both to the B signaling molecule (AI-2B) and to the fortification of the gel layer of the colonic mucus with prebiotic boron complexes (PBCs), such as recently discovered diester chlorogenoborate (DCB) complex. DCB may be a promising new prebiotic candidate to target the human/animal microbiome. New knowledge about the essentiality of B species for a healthy symbiosis between human/animal hosts and microbiota will lead to the use of natural B-based nutraceuticals, such as DCB complex, to target the human/animal microbiome. Of these, the gut microbiome is the most important for human health. Subsequently, PBCs have become novel prebiotic candidates and target the colon as novel colonic foods. Moreover, B species target colon nutrition, resulting in a healthy gut microbiome, as well as a healthy microbiome in the mouth, vagina, skin, and scalp. Consequently, DCB complex, as a PBC claimed to be nutritionally essential for the symbiosis between the microbiota and the host, plays a role in the prevention of certain diseases, such as osteoarthritis, osteoporosis, rheumatoid arthritis, cardiovascular diseases, thyroid diseases, depression, oral diseases, obesity, diabetes, viral, bacterial, and parasitic infections. DCB complex is potentially useful for increasing the buffering capacity of saliva, positively impacting the oral and gut microbiome, protecting significant probiotic bacteria, such as *Lactobacillus* spp. and *Bifidobacterium* spp., improving short-chain fatty acids production, improving intestinal barrier integrity and impermeability, improving the immunity system, developing psychobiotic products with nootropic effects, improving antioxidant and anti-inflammatory actions of the microbiome, and providing protection against natural radioactivity in water and soil.

Audience Take Away Notes

- DCB complex, as a PBC claimed to be nutritionally essential for the symbiosis between the microbiota and the host, plays a role in the prevention of certain diseases, such as osteoarthritis, osteoporosis, rheumatoid arthritis, cardiovascular diseases, thyroid diseases, depression, oral diseases, obesity, diabetes, viral, bacterial, and parasitic infections
- DCB complex is potentially useful for increasing the buffering capacity of saliva, positively impacting the oral and gut microbiome, protecting significant probiotic bacteria, such as *Lactobacillus* spp. and *Bifidobacterium* spp., improving short-chain fatty acids production, improving intestinal barrier integrity and impermeability, improving the immunity system, developing psychobiotic products with nootropic effects, improving antioxidant and anti-inflammatory actions of the microbiome, and providing protection against natural radioactivity in water and soil
- New knowledge about the essentiality of B species for a healthy symbiosis between human/animal hosts and microbiota will lead to the use of natural B-based nutraceuticals to target the human/animal microbiome
- It will improve the accuracy of a design, or provide new information to assist in a design problem

Biography

Dr. Andrei Bița, Postdoctoral experienced researcher, aged 34, Pharmacist (2013), PhD in Pharmaceutical Sciences (2017), Lecturer of Pharmacognosy and Phytotherapy (2018) at the Faculty of Pharmacy, University of Medicine and Pharmacy of Craiova, Romania, with research interest on natural organic boron compounds. As a member of the research team (BioBoron Research Institute), he participated in four research grants: POSCCE (POSCCE-A2-O2.3.2-2008-4, 2008–2011), PD (PN-III-P1-1.1-PD-2019-0214, 2020–2022), and two PED Projects (PN-III-P2-2.1-PED-2016-0410, 2017–2018, and PN-III-P2-2.1-PED-2021-0804, 2022–2023). Main scientific contributions: 25 ISI Web of Science papers (H-index 6), 12 abstracts in journals/proceedings of scientific meetings.



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Quality attributes of regionally-produced goat cheese: A comprehensive analysis on nutritional indices

In recent years, there has been a noticeable increase in consumer interest in goat milk cheese due to its recognized health benefits. This investigation aims to contribute to the scientific understanding of the intricate variations in nutritional composition among different types of goat's milk cheese available in Greece, which is one of the prominent global producers of this type of cheese. The primary objective of this study is to conduct a comprehensive comparison of 45 representative samples of cheeses obtained from various categories of goat's milk cheese producers in Greece. These categories encompass 8 Local Artisanal Producers (LAP), 10 Larger National Producers (LNP), 10 Domestic Producers (DP), and 17 laboratory-scale cheeses derived from milk sourced from Mountain Grazing Goats (MGC) in the western Macedonia region. To achieve this objective, a range of analyses were performed to evaluate chemical and organoleptic characteristics including fat, protein, moisture, salinity, and fatty acid profile. The nutritional analysis results revealed the superiority of DP cheeses over LNP cheeses in terms of fat and protein content, with DP cheeses exhibiting higher levels (4% and 1.7% respectively). Furthermore, the antioxidant capacity of different goat cheese samples (LAP, LNP, DP, MGC) was assessed using multiple methods (FRAP, DPPH, FC, ABTS). The findings indicated a potentially higher total antioxidant capacity in goat milk cheese produced in Western Macedonia (LAP, DP, MGC) compared to LNP cheeses. Additionally, a comparative analysis of the fatty acid content in cheese samples allowed for the calculation of nutritional indicators related to healthy fat consumption, such as the Atherogenic Index (AI) and Desirable Fatty Acid (DFA) value. These results contribute to the understanding of the nutritional profile of goat's milk cheese produced by different categories of producers in Greece, providing valuable insights for both researchers and consumers. Furthermore they give an insight on abundant antioxidant profile of goat cheese produced in a mountainous area in contrast with the same type of cheese produced by the industry most probably from stabled animals.

We acknowledge support of this work by the project “AGROTOUR” (MIS 5047196) which is implemented under the Action “Reinforcement of the Research and Innovation Infrastructure”, funded by the Operational Programme “Competitiveness, Entrepreneurship and Innovation” (NSRF 2014-2020) and co-financed by Greece and the European Union (European Regional Development Fund).

Audience Take Away Notes

- Effect of mountain grazing in goat milk cheese
- Quality parameters comparison of representative samples of cheeses obtained from various categories of goat's milk cheese producers in Greece
- Antioxidant capacity of different goat cheese samples

Biography

Dr. Ganatsios studied Chemistry at the University of Patras, Greece. He then joined the research group Food Chemistry and Biotechnology Laboratory, Department of Chemistry, University of Patras. He received his PhD degree in 2015 at the same university. Since 2020 he is a visitor assistant professor and researcher in University of Western Macedonia. Dr. Imamura studied analytical chemistry at Kyushu University and graduated as MSc in 2003. She then joined Kikkoman, soy sauce company, where she worked on sensory evaluation for 20 years; she obtained her PhD in 2014 and published a paper on the flavour wheel of soy sauce in 2016. She has conducted numerous studies on the characteristics and components of soy sauce and their linkages.



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Hemp flour as a functional ingredient for partial replacement of nitrites in burgers: Effect on nutrient composition and shelf life characteristics

Nowadays consumers express great concern over the utilization of synthetic preservatives like nitrites in meat products. Consequently, the meat industry is challenged to search for strategies to reduce product supplemented and residual nitrite content to minimize the nitrite intake. Industrial hemp products, like flour, oil, and seeds, have gained attention as potential functional ingredients due to their rich content of bioactive compounds with antioxidant and antimicrobial properties, such as polyphenols and tocopherols. This study examined the effect of addition of hemp flour on chemical and shelf-life characteristics of burgers, following reduction of added nitrites.

Three types of burgers were prepared as follows: HF0 (control) (0% hemp flour, 30 ppm NaNO₂), HF4 (4% hemp flour, 15 ppm NaNO₂) and HF6 (6% hemp flour, 15 ppm NaNO₂). Samples were over-wrapped with oxygen permeable film and stored at 4°C for 3 days as in commercial practice. Burger colour was determined daily using CIELAB L*a*b* colour space. Product composition (moisture, ash, protein and fat contents) was determined according to reference methods. Analysis of the fatty acid composition was carried out with gas chromatography and the following lipid quality nutritional indices, related to healthy fat consumption in meat products, were calculated: atherogenicity index (AI), thrombogenicity index (TI) and hypocholesterolemic/hypercholesterolemic ratio (HH). One factor variance analysis for the comparisons between the three treatments was applied.

Hemp flour had a significant impact on moisture ($P < 0.05$) and ash ($P < 0.01$) contents, but the effect was not uniform across treatments HF4 and HF6. However, there were no significant differences ($P > 0.05$) in protein and fat contents among the three groups. The average composition of burgers across all treatments was 61.19% moisture, 2.25% ash, 14.39% protein, and 15.00% fat, respectively.

Inclusion of hemp flour did not significantly affect the nutritional value of the burgers. No differences in the AI and TI indices were observed among the groups. The average AI and TI values for all treatments were 0.50 and 1.49, respectively. Both indices demonstrated low values, which are advantageous for human health, preferably < 3 . The HH ratio, with an average value of 3.58, characterizes the impact of fatty acid composition on cholesterol levels, and higher values are considered desirable.

The addition of hemp flour had a significant impact on redness (a^*) and color saturation (Chroma) values during storage on day 2 ($P < 0.01$) and day 3 ($P < 0.001$). The average redness and Chroma values on day 3 were 10.16 and 12.00, respectively, for treatments HF4 and HF6. In contrast, the corresponding values for treatment HF0 were 12.65 (redness) and 14.11 (Chroma).

The findings of this study indicate that addition of hemp flour did not significantly affect the nutritional value of burgers. However, instrumentally assessed color changes revealed that incorporating hemp flour, along with the reduction of nitrite content, was not successful in maintaining the color of burgers during storage. Nevertheless, to comprehensively assess the application of hemp flour as a functional ingredient in meat products, further research is needed to investigate the antioxidant profile and the eating quality characteristics along with optimum supplementation levels.

Audience Take Away Notes

- The effect of cannabis flour addition on the chemical composition of burgers
- The effect of cannabis flour addition on the lipid quality nutritional indices of the burgers
- The effect of cannabis flour addition in combination with sodium nitrite reduction on color stability during storage

Biography

Georgios Papatzimos studied Veterinary Medicine at the Aristotle University of Thessaloniki Greece. He obtained a MSc degree in Applied Public Health and Environmental Hygiene, with focus on Food and Water Quality and Safety, from the University of Thessaly. Currently, he is a PhD Candidate at the Department of Agriculture of the University of Western Macedonia. His research centers on replacing synthetic additives with natural alternatives in meat products. Since 2013, he is working as a senior Product and Quality Assurance manager in the meat industry. He has participated in research projects on the nutritional value of commercially available meat products.



Julianna Serna Ortiz*, Alfred Santos

Harvest Preparatory Academy, Yuma, Arizona, United States of America

A novel biosourced and biodegradable plastic with antimicrobial and antitranspiration functions

Plastics in the market are produced from fossil sources. These plastics have extremely stable chemical structures against natural degradation, leading to great concern over plastic pollution. Thus, there is considerable interest in biodegradable plastics. Current biodegradable plastics, such as polylactic acid, and oxo-degradable plastics require a special composting facility to degrade, which are largely inaccessible to individuals. The objective of this project is to produce a biosourced and biodegradable plastic through the utilization of invasive algae and waste corn cobs – both of which are environmental concerns – and to measure its characteristics and anti-bacterial properties.

In our production process, we extracted starch from waste corn cobs and synthesized sodium alginate from *Undaria pinnatifida* through the addition of acetic acid and sodium carbonate to the alginate. We then added distilled water, vinegar, and glycerin into the as-made starch and sodium alginate to form a mixture. After heating to promote polymerization, liquid biopolymer solutions were prepared. Further drying the solution, we obtained the engineered bioplastic.

The properties of our engineered bioplastic, including the biodegradation rate, strength, and melting point, were characterized and compared to cling wrap plastic. The antimicrobial effects of the bioplastic were evaluated by quantifying *E. coli* colony numbers on apples coated with the bioplastic.

Our engineered bioplastic exhibited superior performance in biodegradation, antimicrobial function, anti-respiration, and fresh food protection as an edible coating. As compared to the 2% degradation of oxo-degradable plastics, about 68% of our bioplastic was degraded when buried in the soil for 10 days. The bioplastic had significant antibacterial properties, as the greater the concentration of the liquid bioplastic, the lower the bacterial coverage, where 80 μ L of the bioplastic on a Mueller-Hinton agar plate killed almost all the *E. coli* bacteria. Additionally, the bioplastic slowed down the deterioration of chlorophyll in leaves as compared to the control, showing that our bioplastic slows down the dehydration and death of plants. The bioplastic can also function as an edible food coating to prolong the freshness and shelf-life of fruits. Our novel bioplastic can serve as a great alternative to petroleum-based plastics due to its biocompatibility, biodegradability, antimicrobial activity, cost-effectiveness, and environmental benefits.

Audience Take Away Notes

- Plastic pollution poses a significant threat to our planet. Existing solutions for plastic pollution often fall short, as they rely on non-biodegradable plastics. For instance, plastics like polylactic acid and oxo-biodegradables require specialized composting facilities for proper degradation, which are not readily available to individuals. This limitation calls for a more accessible and biocompatible alternative. In response, our project focuses on developing a bioplastic using biosourced materials
- The formula of this bioplastic is environmentally friendly by addressing national disposal problems and

coastal habitability concerns. Particularly, waste corncobs were used in the creation of the bioplastic, where corn makes up a third of the total solid waste in the United States. Invasive species of algae, namely *Undaria pinnatifida*, were also used

- Our synthesized bioplastic demonstrates a range of beneficial qualities, including antimicrobial properties, improved biodegradability, and antitranspiration functions. The bioplastic can be leveraged to slow down transpiration rate, protecting leaves and plants against desiccation to ensure high quality and optimal freshness. The bioplastic also serves as an excellent and edible food coating to prolong the shelf-life of fruits

Biography

Julianna is a 12th grader at Harvest Preparatory Academy. As a high school researcher, she is interested in environmental and food biology, combating pressing global issues using local resources. Her research has been recognized by her accomplishments in competitions statewide, including at the Arizona Science and Engineering Fair and Southern Arizona Regional Science and Engineering Fair, and internationally, at the Regeneron International Science and Engineering Fair. During her last year of high school, she still plans to expand her research and enhance her 3-year passion project.



Ivana Šarac

Group for Nutrition and Metabolism, Center of Excellence in Nutrition and Metabolism Research Institute for Medical Research, National Institute of Republic of Serbia, University of Belgrade, Belgrade, Serbia

Restrictive eating pattern in women with polycystic ovary syndrome (PCOS) and functional hypogonadal oligo/amenorrhea (FHA)

Introduction: Many nutritional factors can influence - directly cause or make worse - various menstrual cycle disorders. This negative factors include: unhealthy dietary patterns, obesity, under nutrition, significant weight reduction, weight cycling and eating disorders. While obesity and unhealthy dietary patterns are associated with worsening of all characteristics of polycystic ovary syndrome (PCOS), dietary restriction is often advised in women with this syndrome. On the other hand, restrictive eating, dieting, significant weight reduction, under nutrition are connected with development of functional hypo gonadal oligo/amenorrhea (FHA). Therefore, both conditions can be connected with restrictive eating patterns.

The aim of study: To study restrictive dietary patterns in women with menstrual cycle disorders (PCOS and FHA), and to compare with healthy controls.

Methods: In 92 women with PCOS (aged 23.6 ± 3.7 years, $BMI=22.6 \pm 4.8$ kg/m²), 27 women with FHA, (aged 23.3 ± 2.7 years, $BMI=17.7 \pm 2.3$ kg/m²), and 62 control women—without menstrual cycle disorders (aged 23.6 ± 2.4 years, $BMI=20.1 \pm 2.9$ kg/m²), the restrictive dietary patterns were examined. Anamnestic data on dietary patterns (meal number, frequency of certain food consumption, food avoidance score and healthy eating score), restrictive dietary regimes (dieting, weight cycling), cognitive restraint (modified Restraint Scale of Herman and Polivy), and eating disorders were collected.

Results: Women with PCOS had less frequent daily meals, compared with controls and FHA. Women with FHA had less frequent consumption of refined (“white”) cereal products, full fat dairy products, fatty sauces, condiments and salad dressings, pork meat, fried food, salty snacks, sugar-added soft drinks and fruit juices, compared with PCOS and controls, as well as sweets, compared with controls only. Women with PCOS also differed from controls regarding less frequent intake of full fat dairy products, fruit juices and alcohol. Regarding food avoidance, women with FHA more often reported cognitive avoidance of at least 1 type of food, particularly oils and animal fat, fried food, dairy products, sweets, bread, meat and eggs; in average 2.6 foods per person, much more than controls (0.6 foods per person) and PCOS (1.1 foods per person); additionally they had higher healthy eating score. Women with PCOS also had higher food avoidance score, compared with controls, particularly regarding intake of refined cereal products, animal fat, and eggs. Significant change in body weight (significant weight loss) preceded development of menstrual cycle disturbance in 81.5% of FHA women (and 17.2% of PCOS women), while after development of menstrual cycle disturbance, 39.8% of PCOS women (and 18.5% of FHA women) reported a significant increase in body weight. Both FHA and PCOS women reported higher rates of activities to reduce body weight, mainly though caloric restriction, compared with controls (in 70.4%, 77.2%, and 48.4% of subjects, respectively). Some of FHA women denied caloric reduction, despite very low body weight and food avoidance. At the moment of the examination, 48.6% of FHA and 36.1% of PCOS women were on restrictive diet (which was much higher than in controls, 6.5%). While the women with FHA were more on a continuous restrictive diet, compared with PCOS and controls, women with PCOS reported to be more time on discontinuous restrictive diets, and more often have shown weight cycling, compared with FHA and controls. On the

cognitive Restraint scale, both FHA and PCOS women reported higher scores. Only in 3 women with FHA diagnosis of eating disorder was established before this examination, while after this examination, eating disorders were suspected in 15 women with FHA (65.2%), 8 women with FHA (8.7%), and 2 control women (3.2%).

Conclusion: Women with both FHA and PCOS reported more restrictive eating patterns: Food avoidance, dieting, and cognitive restraint, compared with healthy controls. While women with FHA more often reported continuous dieting, women with PCOS more often reported discontinuous dieting and weight cycling. Dieting (weight loss) preceded development of FHA, while increase in body weight appeared after PCOS developed, as a result of hormonal disbalance. Some women with FHA denied dieting, despite low body weight, and only after careful examination of food habits, food restraint and dieting were uncovered. Therefore, both PCOS and FHA women should be screened for unhealthy dietary patterns, disordered eating, cognitive restraint and dieting, and provided with proper nutritional counselling.

Audience Take Away Notes

- This presentation will provide data on restrictive eating patterns in women in PCOS and FHA.
- Even though it is widely known that improper dieting and eating disorders can trigger menstrual cycle disturbances in women with FHA, some of the patients hide such dietary practices, and more deep examination is needed to discover hidden dieting among them.
- Not only women with FHA, but also women with PCOS more often practice dieting, exhibit food avoidance and cognitive restraint. The most important difference is that in women with PCOS, increased body weight can develop as a consequence of menstrual cycle disorder and underlying hormonal disbalance. As a consequence, they are advised to reduce body weight, which leads to dieting, often not continuous and improper, leading to weight cycling, which can make hormonal disbalance even worse.
- Women with both FHA and PCOS need proper screening for dieting, restraint, unhealthy dietary patterns and disordered eating, and need to be provided with proper nutritional counseling.

Biography

Dr Ivana Šarac studied Medicine at Faculty of Medicine, University of Belgrade, and graduated in 1998. Then she entered her MSc postgraduate studies in Nutrition at the same institution, and finished it in 2004. In 2006 she also finished her medical specialization in Hygiene with medical ecology at Faculty of Medicine, University of Niš. She conducted her PhD studies in Diabetes and Metabolic Medicine at University of Surrey, UK, and obtained PhD degree in 2014. In 2016, she joined the Center of Excellence in Nutrition and Metabolism Research, at the Institute for Medical Research, University of Belgrade, as Research Associate.



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Wild mushrooms as potential pharma-nutrition products: The benefits and the risks

In an increasing healthy self-conscious population, the search for food presenting health benefits or reduction of risk of disease has been increasing in the last years. The concept of pharma-nutrition interface has appeared as a response to characterize this interaction between functional foods and pharmaceuticals. Mushrooms are ubiquitous in nature with global biodiversity hotspots, that provide a wide range of nutritional compounds, such as proteins, minerals, vitamins and carbohydrates, and biological activities with potential medicinal value that include anti-inflammatory, anti-tumoral, antioxidant, and immunomodulation capacities. The most common wild mushrooms widely used due to its pharma-nutrition properties include *Ganoderma lucidum*, *Grifola frondosa*, *Inonotus obliquus*, and *Trametes versicolor*, with the first one being used as a medicinal mushroom in China for more than 2000 years. The potential for new mycological products to answer to the benefits of a gastronomic delicacy aligned with pharmaceutical properties is of great challenge, since the increasing market demand requires proper regulatory frameworks and quality production schemes to ensure both quality and appropriate medicinal efficiency.

In this matter, this work aimed at acknowledging the main actions on a global food safety and sustainable development perspective integrating food chain steps since harvesting to commercialization of wild mushrooms, by linking both health benefits of target wild mushrooms, together with potential risks associated to its consumption in a preliminary assessment of these prospective valuable market products.

Audience Take Away Notes

- The beneficial attributes of wild mushrooms
- The risks associated with wild mushrooms consumption
- The main actions to be applied on mushroom production systems

Biography

Freitas studied Chemistry in the Instituto Superior Tecnico (IST), Lisbon, and graduated as MS, in Analytical Chemistry (2008) at the same institution. She received her PhD degree in Pharmaceutical Sciences (2015), specialty of Bromatology and Hydrology at the Faculty of Pharmacy, University of Coimbra. With more than 18 years of experience, she is currently a researcher in the field of Food Safety specially in veterinary drug residues analysis and contaminants in food of animal origin in the Nacional Institute of Agrarian and Veterinary Research (INIAV) in the National Reference Laboratory for Food Safety.

11-13^{SEPT}

DAY 03-VIRTUAL ROOM 2
KEYNOTE FOURM

JOINT EVENT ON
**FOOD SCIENCE AND
NUTRITION RESEARCH**

The potential of university science in the food supply of the region: Content analysis of assets, responses to the challenges of the time

The socio-political turbulence of world economic relations has determined new challenges. The situation in food supply has changed, the problem of social nutrition of vulnerable categories of the population has become more urgent. In the context of responding to the challenges of the time, new tasks of agrarian universities have appeared in the scientific support of the system of production, processing and distribution of food; training of specialists of new generation. The presentation is an applied study in which the goal is to study the possibility of using the information of scientometric databases to assess the interest shown by consumers (readers) in the scientific products of the scientific school of the Agrarian University. Such an assessment will make it possible to make a decision on the use of available assets to respond to the challenges of the time. The assets available to the team include completed scientific developments, publications based on the materials of 40 defended dissertations, 38 monographs, 18 textbooks and manuals for the period of operation of the school.

By the method of content analysis of the resources of the open archive of the Munich Library (the base of the RePEc.org) and the Russian national electronic library Elibrary, parameters are identified by which it is possible to judge the demand for the work of members of the scientific school. Publications that aroused the greatest interest, having a prospect for development among domestic and international consumers of information, identified sensitive areas for the region. The task of determining priorities in the scientific provision of the food complex of the region in the conditions of socio-political turbulence of society is being solved.

The object of observation, the scientific school "Problems of developing the infrastructure of the agro-industrial complex of the Siberian region" of the Omsk Agrarian University. The school in different years employs 31-35 people, of which 8 are representatives of foreign universities, heads of business structures.

Working hypothesis: on the basis of measurement and evaluation of the assets available to the creative team, to identify by quantitative methods the relevance of research of the scientific school, to determine priorities in scientific support for the needs of the region.

In the open archive of the Munich Library (RePEc.org database) for the period from 2012 to 01-09-2022, 68 works of the authors of the school were published. The reader (consumer of information in this archive) is international. As a measure, interest in the topic, or in the way of solving a specific problem by the method of content analysis, was studied as a



Stukach Viktor Fedorovich

Doctor of Economic Sciences, Sciences, Professor of the Department of Management and Marketing, Omsk State Agrarian University, Omsk, Russia

Biography

Victor Stukach received a diploma in agricultural economics from the Omsk Agricultural Institute in 1969. In 1998 he defended his thesis for the degree of Doctor of Economic Sciences. Since 2000, he has been working as a professor at the Department of Management and Marketing of the Omsk Agrarian University (Russia). He created a scientific school "Problems of development of the infrastructural agro-industrial complex of the Siberian region", prepared 44 candidates and doctors of science. He has 60 monographs and textbooks. Among them: foresight research in the field of strategic management; transaction costs; informal institutions, organizational behavior, cultural code of the population. He has the honorary title of Honored Worker of the Higher School of Russia. The Chamber of Science and Production of the European Commission awarded Professor V. F. Stukach with the Gold Medal for the results of original research on infrastructure.

measure. A typical reaction of the consumer of information (reader) to the array of scientific publications may be as follows: do not react, abstract familiarization, download. Access to the list of works of the scientific school is free. The summary table shows the number of references to the texts of the works of the participants of the school in the RePEc system as of 01-09-2022.

Based on the needs of the real sector in the scientific products of scientific schools, it becomes possible to take targeted measures for scientific and personnel support for the functioning of the socio-economic on a regional scale.

A systematic approach, within the competence of an agrarian university, involves development in the following areas:

solving the problems of the region through the scientific and educational process, practice-oriented training; providing the region with specialists of a new generation in the conditions of practice-oriented training with the maximum participation of the business community; the scenery of the future, the possession of methods of influencing organizational behavior, the cultural code of populations in the conditions of digital transformation of processes, etc. become important; conducting research aimed at ensuring food security in the region and combating poverty; introduction of resource-saving technologies to stimulate the restoration of "abandoned" and degraded lands as a resource for the production of environmentally friendly food to socially vulnerable categories of the population with state support tools: cost management, reduction of transaction costs, overcoming market barriers, infrastructure development, creation of a network of industrial and logistics enterprises, centrally purchasing raw materials from local producers, and supplying consumers in the form of packaged ready meals, or semi-finished products of a high degree of readiness. Thus, the working hypothesis about the potential of university science in the food supply of the region, the directions of work in the framework of responding to the challenges of the time, is justified.

Keywords: Scientific School of Professor Viktor Stukacc, answers to the challenges of the time, Content analysis, demand by the real sector of the economy for scientific products of scientific schools.

Audience Take Away Notes

- On the theoretical aspects of food aid to socially unprotected categories of the population of the region in the context of responding to the challenges of the time
- Receive information on the interaction of universities with the real sector of the economy in the following areas: impact on the scientific provision of food policy in the region; development of the system of production, processing and distribution of food; training of specialists of new generation
- Master the methodology of working with scientometric databases Elibrary, RePEc. Ways to reflect the parameters involved in the study
- The proposed algorithm can serve as a methodological basis for conducting similar studies
- Methods of working with scientometric databases in cross-country studies Elibrary, RePEc. For information when comparing the level of demand for scientific research by international consumers
- In the RePEc system, you can use the technique to assess the dynamics of the origin or attenuation of trends in socio-economic processes, behavioral reactions. In the RePEc system, this is provided by the possibility of capturing information on an accrual basis, for one, three and 12 months.

Plasma metabolic profiling reveals that chromium yeast alleviates the negative effects of heat stress in mid-lactation dairy cows

Chromium Yeast (CY) supplementation has the potential to alleviate the negative effects of heat stress of dairy cows, but the underlying mechanism remains elusive. We aimed to identify the metabolic mechanisms whereby CY supplementation alleviates the negative effects of heat stress in mid-lactation dairy cows. Twelve Holstein dairy cows with similar milk yield (24.6 ± 1.5 kg/d), parity (2 or 3) and days in milk (125 ± 8 d) were fed the same basal diet containing 0.09 mg of Cr/kg of DM. They were allocated randomly to 2 groups: a control group (CON, without CY supplementation) and a CY group (CY, administered 0.36 mg Cr/kg DM). The experiment was performed over 8 weeks during a hot summer, in which the mean temperature-humidity index was 79.0 ± 3.13 (> 72), indicating that the dairy cows were exposed to heat stress. Chromium yeast supplementation reduced rectal temperature ($P = 0.032$), and increased the lactation performance by increasing the yield of milk ($+ 2.6$ kg/d), protein, lactose and total solid ($P < 0.05$), and protein and lactose percentages in the milk of the heat-stressed dairy cows ($P < 0.05$). Supplementation with CY increased the serum glucose and thyroxine concentrations, but reduced the urea nitrogen, insulin, and triiodothyronine concentrations on d 56 ($P < 0.05$). Furthermore, plasma metabolomic analysis was performed using liquid chromatography tandem-mass spectrometry, which identified 385 metabolites in the two groups. Subsequently, 16 significantly different metabolites, such as nicotinamide, oleamide, and atropaldehyde in the plasma, were significantly higher in the CY group (variable importance for the projection > 1.0 , $P < 0.05$), which were interrogated, and found to be involved in 6 Kyoto Encyclopedia of Genes and Genomes pathways, including those involved in nicotinate and nicotinamide metabolism. Specifically, nicotinamide was present at a high concentration in heat-stressed cows and its concentration was higher after CY supplementation, which might also contribute to the reduction of rectal temperature, the regulation of glucose homeostasis, and an improvement in the lactation performance of heat-stressed dairy cows. In conclusion, CY supplementation reduces rectal temperature, influences metabolism by reducing serum insulin concentration and increasing the serum glucose and plasma nicotinamide concentrations, and finally increases lactation performance of heat-stressed dairy cows. These findings provide insight into the mechanism whereby CY supplementation alleviates the negative effects of heat stress in dairy cows.

Audience Take Away Notes

- CY reduced rectal temperature and increased lactation performance of mid-lactation dairy cows during heat stress



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Yuhang Jin, Peng Sun*

State Key Laboratory of Animal
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China

Biography

Dr. Peng Sun received her PhD degree majoring in Animal Nutrition at China Agricultural University. Now she joined the research group of Prof. Hongfu Zhang at the Institute of Animal Sciences, Chinese Academy of Agricultural Sciences (IAS-CAAS). Dr. Peng Sun have obtained the position of a Professor at IAS-CAAS. Her recent research is focused on dairy nutrition and milk quality. As the first or corresponding author, she has published more than 60 papers, among which 36 papers have been embodied by Science Citation Index (SCI), which have been cited more than 400 times by other SCI papers.

- CY supplementation influences metabolism by reducing serum insulin concentration and increasing the serum glucose and plasma nicotinamide concentrations
- These findings provide insight into the mechanism whereby CY supplementation alleviates the negative effects of heat stress in dairy cows

11-13 SEPT

DAY 03-VIRTUAL ROOM 2
SPEAKERS



JOINT EVENT ON
**FOOD SCIENCE AND
NUTRITION RESEARCH**

**Yongkai Yuan**

School of Food Science and Technology, Jiangnan University, Wuxi 214122, China

Improving the survival of probiotics by the strategy of in situ re-culture

Cell-mediated chemistry is an emerging strategy that leverages the metabolic process of living cells to build advanced materials. Here, a simple yet versatile microbe-mediated in situ re-culture approach using calcium alginate gel beads to improve the survival of probiotics was reported. After re-culture, *Lactobacillus rhamnosus* GG (LGG) in both liquid and Solid Core Gel Beads (LCGB and SCGB) exhibited 100% gastric acid resistance, while the bile salt resistance varied from 59.38% to 92.39%. LGG in LCGB generally showed higher bile salt resistance than SCGB, and the resistance would be further improved with high initial bacterial concentration due to more extracellular polymer secretion. Besides, the re-cultured LGG in beads exhibited survival of 95.02%-96.05% in calcium-supplemented MRS broth within 6 weeks at 4 °C. And the survival of the re-cultured LGG in LCGB was more than 90% in yogurt, milk, milk tea, and juice respectively within 6 weeks at 4 °C, followed by semi-solid jelly (85.81%). The addition of inulin had no adverse effect on the above storage survival of re-cultured LGG in LCGB, indicating the possibility of the construction of synbiotic. Combined transcriptome and metabolome analysis of LCGB implied that the mechanism of LGG damage by gastric acid included 8 pathways, among which, 2 pathways including propanoate metabolism, phenylalanine, tyrosine and tryptophan biosynthesis were responsible for the improved gastric acid resistance of re-cultured LGG. The unique re-culture strategy provides a powerful platform for microbial agents to smoothly enter the gut to serve host health.

Audience Take Away Notes

- This strategy provides the idea of efficient oral delivery of probiotics
- The idea of this strategy can be applied to other scientific research fields
- This strategy has industrial application value

Biography

Yongkai Yuan, Doctor of Jiangnan University, Master of Ocean University of China. The research direction is food hydrocolloids and chemistry. He has published more than 30 articles in SCI journals.



Pardeep Kumar^{1*}, Pratibha Thakur¹, Ayushi Singh², Himshikha², Arvind K Shukla³, N P Butail⁴, Sanjib Kumar Behera⁵, Deepika Suri¹, and Munish Kumar¹,

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Micro additions of boron and molybdenum bring macro impacts on one health

In plant and human nutrition, micronutrient cations specifically zinc and iron are over-prompted while anions viz. Boron (B) and Molybdenum (Mo) have always been soft-pedaled. In relation to plant, soil and human health, both B and Mo are least studied and understood elements. Further, B has emerged as second most deficient element throughout the world and the area suffering from Mo deficiency has not been estimated yet. However, several experiments conducted in North-Western Himalayan (NWH) region shows that supplementation of these elements to the plants bring eye-catching improvements not only in crop productivity and quality but also on soil health. Apart from agriculture, B and Mo have prime roles in human health. B deficiency in humans is known to cause arthritis, abnormal bone growth, osteoporosis, rapid heart rate and muscle cramps. While, Mo deficiency in humans can lead to tachycardia, headache, mental disturbances and coma. Studies depict that B and Mo follow the Liebig's limiting factors in NWH region and responsible for low crop yields and micronutrient malnutrition in humans and animals. However, such deficiencies are more prevalent in the rural regions due to heavy reliance on cereal-based diet. Apart from being directly involved in human and plant health, it has been observed through several experiments that B and Mo supplementation to plants enhance the uptake of other essential nutrients also, therefore improve the nutritional quality of the food. Several researchers registered a significant increase in crop productivity ranging from 5-30 % with the application of micronutrients depending on soil types and crop management practices. Moreover, the optimum application of these nutrients contribute to better nutritional composition of the harvest viz. Total Soluble Salts (TSS), Zn & Fe content, ascorbic acid, protein and starch. In acid soils, application of B and Mo documented an increase of 10-22% and 15-28%, in cereals and vegetable crops, respectively. Several genotypes of different crops were identified for different soil types which are more responsive to external B application. Furthermore, the foliar application of micronutrients in chelated form besides enhancing the crop productivity, improves the nutrient uptake and their recovery efficiency, thus, minimize the negative environmental impacts. Application of micronutrient anions not only improves the productivity and nutritional quality of crops, but also has positive economic benefits. Considering their significance; B and Mo need immediate attention in achieving sustainability development goals. However, for reaping the potential yields, the optimum management of micronutrient anions is very essential. Further, there is a need revisit the optimum doses for different crops and soil types.

Audience Take Away Notes

- The significance of boron and molybdenum in food, nutritional security and human health
- It will helpful for the audience in their job
- This research that other faculty could use to expand their research or teaching
- This this provide a practical solution to a problem that could simplify or make a designer's job more efficient

- It will improve the accuracy of a design, or provide new information to assist in a design problem
- List all other benefits
 - o This will certainly help the concerned audience to learn and understand the key roles of boron and molybdenum in food quantity and quality and ultimately on human health
 - o Definitely other faculty should include such underrated, least studied and understood nutrients in research pursuits and teaching as well considering their role in human health and environment management
 - o It is the only practical solution to have the balanced and nutrient rich food stuff
 - o To meet the sustainable development goals, soil and nutrient management strategies should be the central focal point to achieve the one health mission

Biography

Dr. Pardeep Kumar, Ph.D. in Soil Science in 1996 from CSKHPKV, Palampur, India, joined as Assistant Scientist (Soil) in 1998 in the same Institute, elevated to the position of Principal Scientist (Professor) in 2013. He is a pioneer worker in the field of systematic micronutrient research in Himachal Pradesh and has contributed significantly by publishing a geo referenced Atlas on Micro and Secondary Nutrients' status. Evaluated different sources of Zn and B for enhancing their use efficiency and nutritional quality in different crops. Identified micronutrient efficient genotypes of cereals and vegetables. Recently he is doing pioneer work on molybdenum; the least studied ultra-micronutrient. He has published more than 85 peer reviewed research papers in Journals of International and National repute.



Zida Pawindé Elisabeth^{1*}, Kintega Konwendé Raïssa^{1,2}, Soalla Wendoléan Romain¹, Tarpaga Windpouiré Vianney¹, Sankara Philippe², Sereme Paco¹

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Essential oil of *Lippia multiflora*: A potential natural fungicide against fusarium wilt of onion

The consequences related to fungal diseases are very important. Annually, economic losses due to these diseases in world agriculture were estimated at more than 200 billion euros. The use of synthetic fungicides remains the main means of combating pathogens. However, the consequences of their use are multiple: development of resistance, toxicity for the environment, animals and producers, contamination of agricultural commodities, etc. With regard to these problems, the development of effective but simple local means of control, respectful of the environment and accessible to the majority of the populations, would make it possible to ensure a healthy protection of the cultures, in particular the vegetable cultures and to preserve the environment. The objective of this study is to demonstrate to vegetable growers and agricultural extension workers that by a simple plant extract, it is possible to fight effectively against Fusarium wilt of onion and to significantly increase production. To this end, it was a question of evaluating the antifungal efficacy of aqueous extracts of *B. aegyptiaca* and *Agave sisalana* and essential oils of *Lippia multiflora*, *Ocimum americanum*, *Cymbopogon schoenanthus* and *Eucalyptus camaldulensis* against two fungal species: *Fusarium oxysporum* and *F. proliferatum*, responsible for onion fusarium wilt in Burkina Faso. The inhibitory effect of the plant extracts was evaluated in vitro on the mycelial growth of fungi, followed by the evaluation of the effectiveness of the best products in the treatment of onion seeds or plants against Fusarium wilt, carried out under greenhouse conditions. Essential oils of *L. multiflora* and *O. americanum* caused total inhibition of mycelial development of both fungi. In seed treatment, these two oils significantly reduced pre-emergence damping off and post-transplanting damping-off compared to the untreated control. Plant treatments also significantly reduced post-transplanting damping-off caused by *F. oxysporum*. These treatments also resulted in better leaf formation and a significant increase in bulb production, compared to the untreated control. However, it should be noted that the production of bulbs was significantly greater with *L. multiflora* than with *O. americanum*, regardless of the inoculum used to contaminate the seeds or plants, attesting to the greater efficacy essential oil of *L. multiflora* as a seed or plant treatment against fusarium wilt than that of *O. americanum*.

Specific items: Plant Extract, Seed Treatment, Fusarium, Onion, Seedling Damping-off.

Audience Take Away Notes

- The target audience for this research is notably vegetable growers and agricultural extension workers
- This public will be made aware of the extent of Fusarium wilt on onions but also of the possibility of using a simple and practical mean (a local plant extract) to protect onions against this disease
- Vegetable growers and extension agents will learn how to use natural, simple, low-toxic, low-polluting products to preserve their onion crops against this important disease of Fusarium wilt and improve their production
- This research could well be used by other researchers on other crops, other diseases or even crop pests

Biography

Dr. Zida studied plant pathology at the Faculty of Life and Earth Sciences, Joseph KY-ZERBO University and obtained her DEA in 2001. She then joined the research team of Dr. Paco SEREME at the Institute of Environment and Agricultural Research (INERA). She obtained her Unique Doctorate in 2009 in the same Institution. After several research works in the field of bio-control, coordination of collaborative research projects, and supervision of several MS and PhD students, she obtained the position of Charge de Recherche, then that of Maitre de Recherche of Conseil Africain et Malgache pour l'Enseignement Supérieur (CAMES). She currently serves as Head of the Plant Production Department of her institution, INERA. She has published more than 40 articles in scientific journals.



Abhishek Kushwaha*, Raghuram Sathyamurthy, Anju Das B, Soumabrata Chakraborty, Sudipta Das, Harinarayanan KK, Lokesh Kumar Sambasivan

Indian Institute of Technology, India

Deep learning based automated in-depth quality inspection for fruits & vegetables

Fruits and vegetables are an essential part of everyone's life and their quality is a key factor in consumer buying decisions. Because of this, Quality Inspection (QI) by retailers while sourcing becomes essential. Performing QI as per defined standards at scale and with consistency is a challenging task. This paper presents a method to automate the inspection (visual) of almost all the fruits and the vegetables following any set of defined standards. The QI (visual) problem is formulated into an Object Detection & Classification (ODC) problem and our algorithm, a convolutional deep neural network, was trained for several types of defined defects and their severity. Another QI parameter, produce object size, was estimated for individual objects by first segmenting it, then creating contours and processing it to find distance between two farthest points. On evaluating the respective ODC model on cucumber and lime test set, the models achieve accuracy of 75% on cucumber and 69% on lime. Similar results were obtained for other produce. On size estimation, the method achieves the accuracy of 91.56% and precision of 97.94%.

Audience Take Away Notes

- The audience will learn the deep learning application for fresh produce quality assessment
- The results will help them gain insight about neural network performance with respect to defect assessment
- This solution removes the human subjectivity in quality assessment
- This solution will speed up the quality assessment and provide more information to quality inspector to make decisions

Biography

Abhishek Kushwaha studied at the Indian Institute of Technology, India in 2009. He has been working in the field of computer vision for last 7 years. He has previously worked with in medical domain building computer vision solution for automating urinalysis. Currently he is with Walmart from last three year and working on various solution to solve supply chain problems.



Vincenzo Alfeo^{1*}, Valeria Sileoni², Elisabetta Bravi¹, Ilary Belardi³, Giovanni De Francesco³, Ombretta Marconi^{1,3}

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A sustainable valorisation of spent hops from dry-hopping

Dry-hopping is the cold extraction of non-volatile and volatile compounds from hops into beer and it impacts the costs per hectolitre of beer production generating a considerable amount of waste (spent hop, SH) which still contains compounds that can be reused in brewing. The study aimed to evaluate the non-volatile and volatile compounds retained in the SH and their brewing potential carrying out brewing tests at laboratory and pilot scale with Spent (SH) and new Fresh Hops (FH).

The blended spent hops, after dry-hopping, were collected on three batches of production from a local craft brewery (Capodacqua, Perugia, Italy) and stored under vacuum at -25 °C before analysis or beer sample preparation. The hops were tested following the standard methods of Analytica European Brewery Convention (A-EBC), the volatile compounds of hop oil and the hop-derived aroma compounds in wort and beer were determined based on Solid-Phase Microextraction (SPME) using a gas chromatograph equipped Mass Spectrometer (GC-MS). The sensory analysis was performed by a professional, trained beer-tasting panel, and furthermore, the obtained beer samples were compared by triangle test.

The results highlighted how during static dry-hopping the non-volatile compounds, α - and β -acids, and phenolics were released into the beer to a limited extent, while for volatile compounds, as expected the extraction was different according to the physicochemical characteristics of the hop essential oils. The extraction efficiency during static dry hopping was low (18.8%) and SH still contains a significant amount of hop oil. Concerning the volatile compounds, the SH showed on average lower monoterpenes and terpene alcohols content than FH, while sesquiterpenes were at a comparable level.

The use of SH in wort production at the pilot scale underlined no differences in α -acids isomerization rate (25.2%) compared with the fresh hop, FH (24.8%). The wort produced showed higher monoterpenes and sesquiterpenes levels and lower terpene alcohols. The 30 IBU (International Bitterness Units) beers, similar for the main qualitative parameters, showed significant differences in the polyphenol content (260 and 229 mg/l for FH and SH, respectively) and in the amount and composition of the hop volatile compounds (451 and 243 μ g/l for FH and SH, respectively), lower in SH samples; however, the sensory evaluation did not highlight significant differences between samples, as confirmed by the triangle test. Results clearly indicate the suitability of SH for brewing purposes.

Audience Take Away Notes

- Spent hops are a sustainable way to bring flavour enhancement to beer
- Reduction and valorization of brewing waste containing valuable compounds
- The beer brewed with spent hops was appreciated by the judges, and the triangle test showed no significant differences among FH and SH beers, even if SH beers had fewer terpenoids

Biography

Dr. Alfeo studied Agriculture, food, and forest sciences at the Palermo University, Bulgaria and graduated as MS in 2013. He then joined the research group of Prof. Aldo Todaro at the Food science and technologies lab, of the University of Palermo, Italy. In 2018, he received his Ph.D. in food science and technology at the same institution. After six months of postdoctoral fellowship supervised by Prof. Rosa Palmeri at the University of Catania, Italy, he joined the research group of Prof. Ombretta Marconi at the Italian Brewing Research Centre, University of Perugia. He has published 18 research articles in SCI(E) journals.



Leunufna Samuel^{1*}, Woltering Ernst², Hogeveen Van Echtelt Esther², Van der Waal Johannes³

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²Food and Biobased Research, Wageningen University and Research, Netherlands

³AgroFair Company, Barendrecht, Netherlands

Genetic diversity of cultivated banana in the market place of Ambon, Maluku province, Indonesia

The study was conducted with the aims of identifying genotypes traded at the market place, describing some of the market characteristics of banana commodity, as well as observing supply chain of banana commodity in Ambon, Maluku Islands (Province), Indonesia. A survey method was used by visiting the markets, planting field (villages), related institutions, conducting observation, interviewing as well as Focus Group Discussions (FGD) with farmers, traders, connecting traders, government officials etc. There are at least 17 genotypes of banana contain certain percentage of four different species; *Musa acuminata* Colla, *M. balbisiana* Colla, *M. paradisiaca* L. and *M. troglodytarum* L., eight genotypes belong to plantain sub- group while nine were of banana sub-group. Two genotypes were the most demanded, most frequently present in the market and with high amount of availability; Black King Banana of *Musa x paradisiaca* L. plantain sub-group, AAB genome, 8 hands/bunch, 25 fingers/hand, 15 cm finger length and sold for IDR per hand, and 40 Days Banana, *Musa acuminata* Colla of banana sub-group, AA genome, 9 hands/bunch, 21, fingers/hand, 12 cm finger length, sold for IDR 10.000 -15.000 per hand. *Musa troglodytarum* L. a species present in two different genotypes/cultivars were endemic to Maluku islands and thought to have a promising possibility for further development in food industry and to international market. However, further studies and infrastructure development are required.

Audience Take Away Notes

- Banana is one of the most important fruit tree in the world supporting food security in many countries of Africa, Asia and Latin America. Worlds' Banana production in 2021 reached 125 million tons with India rank first at 34 million tons followed by China, Philippines, Indonesia and other countries. World export of banana, however, has been dominated by Latin American countries, in which, Ecuador at the first position with 6.6 M. tons and market share of 33% in 2020. Historically, international trading of banana involved only two cultivars since 18 hundreds, Gross Michel (Big Mike), which dominated the world's export up to the end of 1950s before taken out of international market due to its vulnerability to Panama disease (*Fusarium wilt.*) caused by *Fusarium oxysporium* fp. Pubescence. The Big Mike was replaced by Cavendish since 1960s until the present date. Recently, however, the cultivar has been threaten to be wiped out of the world's export by the attacked of a new type of panama disease, Tropical Race 4 (TR4) and Black Sigatoka disease (black leaf spot or black leaf streak) caused by the fungus *Micospaerella fijiensis*, resulting in a high reduction in plant productivity
- With the knowledge and awareness of the importance of banana in supporting food security and international trading, the audience will be encouraged to take part through the roles they play either as graduate students, researchers, professors, government officials, corporate executive officers, activists of non-government organizations or others in promoting the development of the crops trough teaching, researching, providing knowledge and research findings to community especially agriculture community, business community, government or policy makers. Some of the works include
- Surveys, collecting, and conserving genetic diversity of banana

- Describing and Evaluating banana germplasm in terms of genetic diversity, resistance to diseases, nutritional potentials, adaptability to changing climatic condition etc
- Utilizing identified genes in breeding of banana for productions, disease resistance, and adaptability both through conventional method and with the use of biotechnology
- Implementing various conservation strategy, method and techniques to preserve banana genetic diversity for future uses
- Implementing business strategy to develop potential germplasm in different directions including food industry, medicine, etc

Biography

Dr. Leunufna received his MSc. from the University of Guelph, Ontario, Canada and PhD from the Martin Luther University Halle-Wittenberg, Germany, employed one year as a Scientific Staff at the Institute for Plant Genetics and Crop Plant Research (IPK) Gatersleben, Germany; Recently an Associate Professor at the Pattimura University, Indonesia, has published a great number of Scientific articles in international journals, invited as keynote speakers and attended various scientific conferences. Dr. Leunufna serves as the general secretary of Wallacea Center of the Pattimura University, Indonesia and the Director of the Center for the Conservation of Maluku's biodiversity (CCMB).



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Effect of different cropping associations based on maize legumes and mineral fertilizers on the productivity of *Manihot esculenta* crantz in the forest zone (commune of pissa) Central African Republic

The objective of the study, conducted under integrated management in a forest zone with the participation of members of an agro-pastoral group, is to improve the agricultural yield of cassava in rural Central Africa. The design chosen for this work is a completely randomized block design (BCR) with sixteen treatments (from 0 to 15) and four random replications, comprising 64 elementary plots of 25m². The variabilities between the growth and yield parameters are evaluated. The software ® version 4.0.3 and XLSTAT 2016 version 4.2.1 were used to analyze the data. Analyses of variance (ANOVA) and Principal Component Analysis (PCA) were used to discriminate between parameters consistent with the treatments. Treatments T13 (cassava + groundnut + NPK), and T9 (cassava + cowpea + PK) have plants with better growth in height and diameter. A weak linear correlation was observed between plant diameters and heights. Principal Component Analysis (PCA) confirmed that fresh root yields showed a highly significant difference; T13 (cassava +arachid +NPK) gave the highest yield compared to the other treatments. The T13 treatment proposed by the International Atomic Energy Agency (IAEA) showed better performance on all evaluations. Mineral fertilization associated with legumes can contribute to the improvement of cassava production.

Key words: Cassava, Fertilizers, Yield, Peanut, Cowpea.

Audience Take Away Notes

- This study provides results that can be built upon by other researchers in helping farmers improve their practices to enhance cassava production
- The results are technical and can be applied to solve the problem of cassava food in producing countries and will improve the economic situation of the producers

Biography

Ephrem Kosh Komba is a full professor of plant biology. He did his thesis and Developmental Biology, option: Agro-nomic Sciences at the Faculty of Sciences of the University of Lome (Togo) in collaboration with CIRAD in Montpellier, France. He is currently a lecturer at CAMES and is in charge of a project for the restoration of soil fertility for agriculture in the Central African Republic. He is also the counterpart of a regional project (RAF 5081) on soil fertility for cassava production.



Jolly Rajat*, Jefwa J M, Mwafaida, J M

Pwani University, Kenya

Harnessing edible crops of kaya forests

The Kaya forests are reservoirs of high biodiversity and local communities' around these forests are custodian to rich indigenous knowledge on plants and are highly dependent on these diversified vegetation for their livelihood. The Kaya system and biodiversity are both threatened and yet is core to conservation and utilization of the important forest resources. A study was conducted to document the knowledge on Fruit and Vegetable plant species prevalent inside these two sacred forests: Kaya Kauma in Kilifi county and Kaya Tsolokero in Junju location in Kenya with the aim of conservation of plants and to gain autochthonous knowledge associated with these plants in the population. Results based on a questionnaire survey for forest study with the Kaya elders and quadrants laid in the two forests presented that a total of out of the total useful plants recorded from the forest 15% and 33% species were edible food plants from Kaya Kauma and Kaya Tsolokero respectively. Out of the recorded edible food plants in the forests 75% species were fruits, 12% vegetable and 12% condiments from Kaya Kauma and 80% fruits and 19% vegetables from Kaya Tsolokero respectively. More fruit plants were recorded from both forests. The commercialisation and domestication of fruit plants was on a higher side as compared to vegetables. It was evident by these survey that the biodiversity of indigenous forest flora marks in horticultural systems amidst the local communities.

Key words: Biodiversity, Conservation.

Biography

Dr. Jolly Rajat studied Masters in Botany from India at Patna University and graduated in 1999. She did her bachelors in Education 2002. She got her Ph.D from Pwani University, Kenya in 2020. She did the first survey to document ethno-botanical knowledge in communities around sacred African forest of Kaya Kauma and Tsolokero. She studied the biodiversity of these forests and documentation of entire useful flora which aids the communities to sustain their livelihood. She also validated herbal species in use with the communities to demonstrate the efficacy of these plants against common bacteria. She has published 9 research papers. She works as a part time lecturer in the department of Environmental Science in Pwani University in Kilifi, Kenya. She emerges as the first Indian expatriate in Kenya to have successfully attained the degree of Philosophy.



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Enhancing lowland rice physiology with integrated nitrogen nutrient sources in Nigeria's derived savannah ecology

Rice production in many Nigerian fields faces challenges due to limited Nitrogen (N) availability in the soil, resulting in low yields for farmers. To combat the adverse effects of climate change and improve crop productivity, integrated nutrient management methods have been employed in lowland rice cultivation. This study focused on investigating the impact of integrated nutrient sources on NERICA L-34 and ARICA 3 varieties during the years 2017, 2018, and 2019. Several treatments were applied, including 100 kg N ha⁻¹ (NPK), 75 kg N ha⁻¹ (NPK) + 25 kg N ha⁻¹ (manure), 50 kg N ha⁻¹ (NPK) + 50 kg N ha⁻¹ (manure), 25 kg N ha⁻¹ (NPK) + 75 kg N ha⁻¹ (manure), 100 kg N ha⁻¹ (manure), and Control (without fertilizers). The experimental design was a randomized complete block with a split-plot arrangement, replicated three times. Data were analyzed using analysis of variance and the Duncan multiple range test ($p \leq 0.05$) in GENSTAT to compare rice's physiological parameters. The results indicated that applying 75 kg N ha⁻¹ (NPK) + 25 kg N ha⁻¹ (manure) significantly improved NERICA L-34's nutrient recovery (0.2430 kg kg⁻¹) and nitrogen utilization efficiency (21.57 kg kg⁻¹). Overall, NERICA L-34 outperformed ARICA 3 in terms of nutrient uptake and nitrogen utilization. Consequently, rice farmers are advised to prioritize cultivating NERICA L-34 due to its higher productivity and sustainability potential.

The effects of soil amendments from poultry manure and mineral fertilizer on the physiological parameters of Rice plants.

The impact of different fertilizer treatments, and their combination, on nutrient uptake and utilization of lowland rice varieties.

Keywords: Physiology, lowland, rice, varieties, climate-change, sustainable solutions.

Audience Take Away Notes

- The audience will be able to incorporate poultry waste as organic amendments to enhance the physiological parameters and quality of Rice plants
- This will help the audience in their job to optimize waste application rates and techniques to improve soil health and nutrient availability for rice cultivation
- This research can serve as a basis for other faculty members to expand their studies on the utilization of organic waste in sustainable agricultural practices and waste management solutions
- Designers or agricultural engineers can explore the practical application of poultry manure in developing efficient and environmentally friendly agricultural systems
- The findings can contribute to more accurate designs and recommendations for rice cultivation, considering the impact of organic amendments on physiological parameters

- Increased income for Nigerian farmers through improved rice production
- Enhanced food security in regions with marginal rainfall
- Reduction of environmental pollution by utilizing organic waste materials
- Improved soil structure, water retention capacity, and nutrient availability
- Potential extension of findings to other crops and agroecological zones
- Exploration of long-term effects on soil health and interactions with different crops

Biography

Dr. Iyanda studied Plant Physiology and Crop Production at the Federal University of Agriculture, Abeokuta and graduated as M. Agric. in 2016. He received his PhD degree in 2021 at the same institution.



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Recovery of carrot discards and evaluation of the bioactivity of isolated fibres. Example of circular economy

In several provinces of Argentina, including Santa Fe, around 300,000 tonnes of carrots are produced annually. The quality requirements imposed by the consumer market lead to a significant discarding (between 30-40% of the total produced) of a product that is fit for consumption but does not meet the customer's requirements. In Santa Fe alone, the volume of discards is estimated at 80-100 tonnes per day during the harvesting period, which is mainly destined for animal consumption. This causes economic losses, an environmental problem, proliferation of rodents, decomposition products that end up degrading the soil. This problem is repeated in other areas of Latin America and Europe, which is a problem that needs to be solved as soon as possible. A practical solution to the problem is the valorisation of discards by applying a circular economy scheme, through the production of high value bioproducts. The University, providing technical knowledge, in partnership with the agro-industrial production sector, obtained a technological solution that makes it possible to make full use of these discards, providing socio-economic and environmental sustainability to carrot cultivation. One of these bioproducts is dietary fibres, a valuable additive in the food industry that our country imports in its entirety. These fibres are used not only for their health benefits, but also to reduce the fat content of food products, without altering their taste or texture. The extraction process developed, which is subject to intellectual property protection, consists of obtaining the juice and bagasse. The bagasse obtained is subjected to stages of refining, drying and adaptation of its properties to obtain a dietary fibre of excellent quality that can be used as additives for the preparation of functional foods or dietary supplements. Subsequently, the influence of the isolated fibre was evaluated in adult male and female Wistar rats, to establish reference patterns on the effectiveness of this therapy according to sex, having as hypothesis the decrease of body weight, triglycerides, total cholesterol, low density lipoprotein cholesterol and high density lipoprotein cholesterol, by dietary supplementation with fibres isolated from agro-industrial discarded carrots. The results imply a lower cost for an effective therapy and the quality of the response is related to sex. In addition, the interaction of these fibres with the drugs used simultaneously was evaluated to guarantee an adequate therapeutic effect and minimise the possibility of adverse effects.

Audience Take Away Notes

- Through this work, attendees will learn about the development and implementation of a simple technological process. It is useful to solve a public health problem. In addition, it can be used as an experimental model to teach in the classroom to university students

Biography

Researcher Maria Rosana Ramirez, did her MSc in Biological Sciences (Biochemistry) and her PhD in Pharmaceutical Sciences at the Federal University of Rio Grande do Sul, Brazil. She then returned to her country (Argentina), where she obtained the position of Researcher at the National Council of Scientific and Technical Research (Conicet).



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The effect of livelihood diversification on rural farm household food security in Ghana

Food insecurity and poverty have been a problem in Ghana, especially in rural areas where livelihoods are heavily dependent on rain-fed agriculture. Recent erratic rain fall patterns exacerbated by climate change have heightened the risk of reliance on agricultural livelihoods. The high risk involved in rain-fed agriculture has led many to consider spreading the risk across multiple livelihood ventures, livelihood diversification. This study, therefore, analysed the effect of livelihood diversification on rural farm household food security in the Upper East Region of Ghana. A total of 405 rural farm households were sampled using a multi-stage sampling technique. An ordered probit model was employed to estimate the effect of livelihood diversification on household food security. The findings revealed that diversification in non-agricultural livelihoods and integrated agricultural and non-agricultural livelihoods positively influenced household food security. However, diversification of agricultural livelihoods did not have a significant effect on household food security. Thus, it can be concluded that diversification is promoted among non-agricultural livelihoods and integrated agricultural and non-agricultural livelihoods to overcome the problem of food insecurity. Interventions towards the promotion of workable livelihood strategies should be introduced to empower people faced with the challenge of food insecurity.

Audience Take Away Notes

- The audience stands to gain valuable knowledge on the state of research regarding the best livelihood strategies to overcome the problem of food insecurity, especially post Covid-19
- This will help fashion out interventions and policies that support the adoption of the best livelihood strategies to combat food insecurity
- This study will reveal that the problem of food insecurity is still a major course for concern globally, most especially, in the African context. More research is needed in that regard to unearth workable solutions
- No interventions from national or regional levels work better in solving the food insecurity problem without empowering the people to be resilient. There is a need for social structures to be put in place to support livelihoods

Biography

Jude Dokbila Kolog is an up-and-coming researcher who applies multi-disciplinary approaches in his research. Jude graduated from the University of Ghana in 2016 with a B.A in Economics and Philosophy. He proceeded to pursue an MPhil at the same University, where he graduated in 2019 with an MPhil in Agricultural Economics. He was offered a contract as a Teaching and Research Assistant at the University of Ghana in which he worked in that position for three and half years. He is currently a researcher with the West Africa Regional Horticulture Innovation Lab.



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Nigeria

Thermal, mechanical, and electrical properties of selected tropical roots and tubers crops

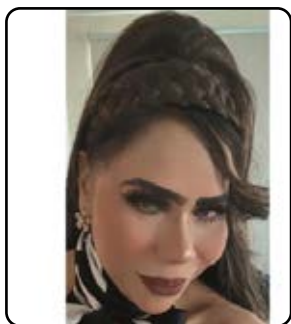
Roots and tubers are important food crops with high industrial potential. In Nigeria, however, only very small percentage of crops produced are processed industrially due to varying physical characteristics. Physical, thermal, mechanical, and electrical properties of white yam (*Discorea rotundata*), water yam (*Discorea alata*), bitter yam (*Discorea dumetorum*), cocoyam (*Colocasia esculenta*), and sweet potatoes (*Ipomoea batatas*) were investigated. Weight of the roots varied between 41.22 and 1169.80g respectively for cocoyams and white yam and density varied between 1332.99 and 1990.35g/mm³ respectively for cocoyam and bitter yam. Thermal conductivity of the roots and tubers varied from 0.40 to 0.47 Wm⁻¹K⁻¹, specific heat capacity, latent heat of fusion, and thermal diffusivity ranged between 2.78 to 3.303 S/cm, 167.44 to 228.54 kJkg⁻¹ and 0.64 to 0.99 m² s⁻¹ respectively. Compressive and tensile strengths varied from 0.609 to 2.354Kgm⁻¹s⁻² and 0.091 to 0.822Nm⁻², respectively. The electrical conductivity ranged from 1145 to 1701 μS/cm. Study showed that physical characteristics varied greatly among the roots and tubers crops. However, the thermal and mechanical properties and electrical conductivity of the roots and tubers are related and somehow dependent on moisture content.

Audience Take Away Notes

- The audience will learn of some physical (weight, density, length, area and volume), thermal and mechanical properties and proximate compositions of selected tropical roots and tuber crops
- The knowledge gained may be applied in the design of processes and process equipment
- This will help in planning accurate process control systems for the processing of these crops
- This research results can be utilized by mechanical, electrical and Agricultural process engineers in the design and fabrication of processing machineries for these roots and tuber crops
- The results of the variations in physical characteristics of the crops will aid in the designing of appropriate mechanized and automated peeling, thermal and electrical equipment for processing
- The knowledge of the mechanical and thermal properties of the crops will improve accuracy of design of size reduction and thermal processing equipment for the specific applications

Biography

Prof. Arisa studied Food Science and Technology at Federal University of Technology, Owerri, Nigeria and got a Master of Science degree in Food Technology from University of Ibadan, Nigeria in 1999. She joined Abia State University Uturu, later Bells University of Technology, Ota, Nigeria. She received her PhD degree in Food Technology from University of Ibadan, Nigeria in 2014. She teaches, conducts researches, supervises under graduate and postgraduate students and serves in university committees. A professor of Food Processing and Preservation and Director of Academic Planning, Bells University of Technology, Ota, Nigeria. She has published more than 45 research articles.



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Importance of probiotics and their mechanism of immune action against COVID-19

Probiotics are living organisms that, when ingested, beneficially affect the host by improving its intestinal balance. The most studied organisms nowadays are lactic acid bacteria, especially *Lactobacillus* spp. and *Bifidobacterium* spp. considered safe for human use. An emerging fact is the importance of the effect of the alteration of the intestinal microbiota (dysbiosis) on the susceptibility and severity of the patient with COVID-19, related to the intestine-lung axis, which refers to the exchange between the intestine and the lung, where the virus together with inflammatory mediators via blood and lymph, migrate to the intestine and bind to the receptors of the converting enzyme-angiotensin 2 (ACE2) highly expressed in enterocytes. Currently, new therapeutic strategies are focused on the stimulation of the immune system with prebiotics, probiotics, and some micronutrients such as vitamins C, D, E, Zinc and Omega 3, among others. In the present investigation, it was observed that the digestive system is the second most affected organ followed by the respiratory system and digestive manifestations are more frequent in the pediatric age with higher viral fecal excretion, which should be considered for prevention measures.

Keywords: Probiotics, Prebiotics, Infections, COVID-19, Immunological system.

Audience Take Away Notes

- The end of this presentation, you will have a comprehensive understanding of the importance of probiotics in supporting immune health and their mechanisms of action against COVID-19.
- You will be equipped with valuable knowledge to make informed decisions about incorporating probiotics into your lifestyle and potentially enhancing your defense against viral infections.
- In addition, incorporating probiotics into daily routines and diet, choosing the right probiotic supplements, precautions and considerations for probiotic use.
- This presentation is interesting because it is novel and useful for teaching about probiotics of food science.

Biography

Dr. Norma Angelica Santiesteban Lopez studied Pharmacological and Biological Chemistry at the Benemerita Universidad Autonoma de Puebla (Mexico), later she studied a master's degree and doctorate in Food Science at the UDLAP, currently working in the Bachelor's Degree in Gastronomy at the Benemérita Universidad Autónoma de Puebla. She is currently a researcher at the affiliated site, a member of the BUAP Researchers' Register and the Dolphin Program, a Journal INDEX publisher, advisor for Research and Graduate Studies, as well as a publisher and reviewer of books and articles in national and international journals.



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Sensory evaluation and characterization of supplemented pasta with carrot pomace

Mexico generates 120, 128 tons of garbage per day, from which 46.42% are organic waste. It is well-known that juice bars produce thousands of kilos of pomace which represents a serious pollution problem and a lack of exploitation of nutrients and of course a loss of additional income. It also presents several benefits such as, high content of dietary fiber, minerals, carotenoids and protein which made it a functional ingredient that helps inhibit cancer, it's a good radical scavenger and also anti-mutagenic and immuno-enhancer. Food consumer's trends force the industry to produce minimally processed food with nutritional and nutraceutical properties. Hence, carrot pomace is an alternative to incorporate it in foods consumed by most of the population such as pasta.

The objective of the research was to formulate a paste with wheat flour and carrot bagasse, to increase the content of soluble fiber and vitamin A, as well as give added value to the organic waste of juice stores. It was divided into two stages, in stage one, the collection and obtaining of carrot bagasse flour was carried out, in stage two the three proposed formulations identified as control samples, F1, F2, were evaluated, the variables were concentration of carrot flour wheat and carrot bagasse, the pasta was cooked at 230°C for 15 min. A sensory evaluation was also carried out by 22 untrained panelists, with an age range of 21-60 years through a 7-point hedonic scale, the attributes evaluated were color, smell, taste, texture and general acceptability.

The results of the sensory evaluation tests were analyzed and interpreted with the one-way ANOVA method and Tukey's test. The results indicate that the formulation with 48.27% of wheat flour, 20.68% of carrot bagasse, 27.58% of egg and 3.44% of water, presented higher levels of acceptability and with this a substitution of wheat flour was achieved in 20%. %, as well as an increase in fiber in the pasta compared to other commercial pasta.

Audience Take Away Notes

- Carrot pomace has several benefits as a cancer inhibitor, free radical scavenger and anti-tumoral agent. This, make it a great functional ingredient
- Although carrot pomace has been used as an ingredient in lots of food, pasta making using it has been understudied
- Pasta making supplemented with carrot pomace is a great food product that has a high consumer acceptance in factors such as taste, texture, color and smell, giving also a great alternative for decrease pomace waste and increasing consumer's health

Biography

Dr. Teresa Ceron studied Food Science at Universidad de las America Puebla, Mexico an graduated as MS in 2008. She worked in Universidad del Mar in Oaxaca at which joined the Food Innovation investigation group. She received her PhD degree in 2014 at the same institution working with the research project entitled "Pulsed electric field pre-treatment evaluation in different extraction methods over the chemicals characteristic and yield of three pepper species". She obtained the position of Full time professor in the Benemerita Universidad Autonoma de Puebla in the same year. She has worked in several research projects focused in decrease food waste through sustainable food innovation.



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Seasonal grain yield variations and poultry manure optimization for hybrid maize in a derived savanna

Maize is a vital crop for food security and economic growth in Nigeria, but declining yields due to low nitrogen levels and expensive fertilizers pose challenges for farmers. To address this, the study explores the use of cost-effective and nutrient-rich poultry manure as an organic fertilizer. Two trials were conducted during the early and late seasons in 2014 at the Federal University of Agriculture, Abeokuta. The experiment utilized a randomized complete block design with five maize hybrids and poultry manure rates of 0, 5, 10, and 15 tonnes per hectare. The results revealed that applying 15 t/ha of poultry manure led to the longest cob (23.1 cm) and optimum grain yield (2.4 t ha⁻¹), with the hybrid TZEI 124 × TZEI 25 demonstrating the best overall grain yield (2.3 t ha⁻¹). The study emphasizes the significance of fertility management, nutrient availability, genotype selection, and agronomic practices in optimizing maize yield and grain quality in the derived savanna. The findings have practical implications for farmers, contributing to improved crop management decisions and enhanced agricultural productivity in the region. Further research is recommended to explore other factors impacting grain yield in hybrid maize for sustainable and productive cultivation in the derived savanna and similar agroecological zones.

Keywords: Poultry Manure, Hybrid Maize, Yield Components.

Audience Take Away Notes

- In this presentation, the audience will learn about the effects of utilizing poultry waste on the growth and yield components of hybrid maize
- The following specific items will be covered
- Understanding the impact of poultry waste on maize growth: The presentation will delve into the experimental results, highlighting how the application of poultry waste affects various growth parameters of hybrid maize. This will include factors like plant height, leaf area, stem diameter, and overall plant vigour
- Exploring the effects on yield components: The audience will gain insights into the influence of poultry waste on the yield components of hybrid maize, such as the cob length, and overall yield per hectare. The presentation will provide statistical data and discuss the significance of these findings
- Practical application and benefits for the audience: The presentation will explain how the audience can utilize the research findings in their own work. It will outline practical guidelines for incorporating poultry waste into maize cultivation practices, including recommended application rates and techniques. By implementing these methods, the audience will be able to enhance hybrid maize growth and optimize yield in their own agricultural endeavours

- List all other benefits
 - o Job-related advantages: The research findings offer valuable insights to professionals in the agricultural sector, specifically those involved in hybrid maize cultivation. By utilizing poultry waste, they can potentially improve the growth, yield, and overall productivity of hybrid maize. This knowledge can be directly applied in their day-to-day work, leading to more efficient and successful maize farming practices
 - o Expansion of research and teaching: Other faculty members and researchers can utilize this research to expand their studies or teaching materials. The findings contribute to the existing knowledge on sustainable agricultural practices, waste management, and crop yield optimization. The data and methodologies presented can serve as a foundation for further investigations and academic discussions in related fields
 - o Practical solution for designers: The utilization of poultry waste as organic amendments offers a practical solution to improve soil fertility and nutrient availability for maize plants. Designers and practitioners involved in designing agricultural systems, such as greenhouse setups or organic farming frameworks, can benefit from this research by incorporating this organic waste into their designs. This can simplify and optimize the process of providing adequate nutrition to maize crops, resulting in increased efficiency and reduced dependence on synthetic fertilizers
 - o Improved accuracy and informed decision-making: The research findings provide new information on the effects of poultry waste on maize growth and yield components. This knowledge can assist designers and practitioners in making informed decisions related to crop management, resource allocation, and sustainable agricultural practices. By considering the research outcomes, they can improve the accuracy of their designs and enhance the overall effectiveness of their agricultural systems

Biography

Dr. Iyanda studied Plant Physiology and Crop Production at the Federal University of Agriculture, Abeokuta and graduated as M. Agric. in 2016. He received his Ph.D. degree in 2021 at the same institution. Furthermore, he demonstrates strong academic background, extensive research contributions, notable publications and conference presentations, diverse skill sets, grant and award associations, vocational training, and active participation in professional organizations. With his expertise and dedication, he is well-positioned to make significant contributions to the field of crop physiology and continue making a positive impact on society.



Adryana Cordeiro

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Vitamin D and adipose tissue dysfunction: Recent evidence

The prevalence of obesity is growing exponentially worldwide, and current projections predict that more than 1 billion individuals will have obesity by 2030. Observational studies classically find an inverse relationship between human serum 25- hydroxyvitamin D (inactive form of vitamin D) concentration and high adiposity. Adipose tissue is a metabolically dynamic organ that is the primary site of storage for excess energy, but it serves as an endocrine organ capable of synthesizing several biologically active compounds that regulate metabolic homeostasis. However, when the capacity of expansion of this tissue exceeds, dysfunction occurs, favoring ectopic accumulation of fat in the visceral, which has been implicated in several disease states, most notably obesity.

The extra skeletal effect of vitamin D on adipose tissue biology and modulation in human obesity is of great interest and has been extensively investigated. Current evidence from preclinical and clinical studies in human adipose tissue suggests that the anti-inflammatory effects of vitamin D are evident and consistent. Whereas the effects of vitamin D on adipocyte differentiation, adipogenesis, and energy metabolism and the effects of vitamin D supplementation on adipokine levels are growing with many researches about it.

Additionally, the benefit of vitamin D supplementation for the reduction in visceral adipose tissue has been demonstrated in some studies. However, further studies are required to confirm the beneficial effects of vitamin D on ameliorating adipose tissue dysfunction.

The speech aims to present recent evidence about the relationship between nutritional status of vitamin D and adipose tissue dysfunction through the mechanisms involved in the structure of adipose tissue, tissue expandability, adipocyte dysfunction, as well as the impact of these events on the metabolism of vitamin D.

Audience Take Away Notes

- The audience can improve their knowledge with all information about vitamin D and adipose tissue dysfunction and can develop new and innovative studies about this subject
- Recent evidence that will present in this conference can be used in a clinical practice
- Vitamin D has a relationship with adiposity, mainly visceral, and an important role in metabolic processes
- To verify Adequacy in nutritional status of vitamin D is relevant to assess the development of adipose tissue dysfunction, therefore, to evaluate the serum concentrations of this vitamin is important in clinical practice

Biography

Adryana Cordeiro Clinical Nutritionist, PhD and MSc in Science of Medical Clinic Program/Faculty of Medicine/ University Federal of Rio de Janeiro (UFRJ)/Brazil. Professor of Universidad Internacional Iberoamericana Puerto Rico and Mexico. Researcher of Micronutrients Research Center (NPqM)/ University Federal of Rio de Janeiro/Brazil. Researcher of Post-doc/Institute of Nutrition Josuede Castro/ University Federal of Rio de Janeiro/Brazil. Researcher of Post-doc/ Biomedicine Department/ Biochemistry Unit/ Faculty of Medicine/ University of Porto – Portugal and Director of Institute Adryana Cordeiro.



Camila Cornejo, Estefani Pullas, Edwin Vera*

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Quito, Ecuador

Evaluation of gamma irradiation and sterilization on the enzymatic hydrolysis and antioxidant capacity of whey proteins

Whey is a by-product obtained during the manufacture of cheese. Among proteins, whey contains mainly α -Lactalbumin (α -LA) and β -Lactoglobulin (β -LG). In recent years there has been great interest in the identification and characterization of bioactive peptides obtained from the enzymatic hydrolysis of whey proteins. These peptides have different bioactivities such as antihypertensive, antioxidant, antimicrobial and immunomodulatory activity, among others. The objective of this study was to determine the effect of gamma irradiation and sterilization, as a pretreatment for the enzymatic hydrolysis of whey with trypsin and papain, and evaluate the relationship with the antioxidant capacity of the peptides obtained. The enzymatic hydrolysis was carried out on one whey sample without pretreatment, four samples subjected to gamma radiation at different doses (5, 10, 15 and 20 kGy) and one sterilized sample at 121 °C for 15 min. Samples were hydrolyzed for 9 h with trypsin and papain at the optimal pH conditions for each enzyme, with an E: S ratio of 1:10 (w/w) and at 37 °C. All experiments were performed with at least two replicates. The degree of hydrolysis of the different hydrolysates was determined with the OPA method and the antioxidant capacity was measured by the ABTS and DPPH method, using Trolox Equivalent Antioxidant Capacity (TEAC) values. The results showed that the whey subjected to the sterilization pretreatment and hydrolyzed with trypsin showed the highest values of degree of hydrolysis and antioxidant capacity, which were $3.46\% \pm 0.10$ and $2030.7 \pm 14.7 \mu\text{M}$ of Trolox equivalent (TEAC) respectively. Besides, a correlation was found between the degree of hydrolysis and the antioxidant capacity. These results show that sterilization and the use of enzymes for the hydrolysis of whey could be an alternative to improve its antioxidant capacity.

Audience Take Away Notes

- The research provides new information about the influence of different pretreatments and use of enzymes on the antioxidant properties of whey proteins
- It presents new alternatives to improve the biological functionality of whey
- This work explores new options to valorize whey, which is usually a by-product of cheese production
- Gives insights of the influence of gamma radiation on the degree of hydrolysis of whey proteins

Biography

Dr. Edwin Vera studied Chemical Engineering at the Escuela Politécnica Nacional, Ecuador, and obtained a Master of Science degree in 2001 at ENSIA-SIARC, France, and received his Ph.D. degree on Chemical and Biological Processes in 2004 at the University of Montpellier, France, with a fellowship of the International Foundation for Science IFS (Sweden). He worked for nine months as researcher of the CNRS-France, in a project related with the transport of compounds in ion exchange membranes, and he is professor at the Department of Food Science and Biotechnology of the Escuela Politécnica Nacional. He has published more than 20 research articles in indexed journals.

11-13 SEPT

DAY 03-VIRTUAL ROOM 2
POSTERS



JOINT EVENT ON
**FOOD SCIENCE AND
NUTRITION RESEARCH**



Yuki Tatemichi¹, Miho Imamura^{2*}

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Flavor-based pairing of foodstuffs and seasonings in India

India is known to have a unique food culture, with a vegetarian diet and extensive use of spices and herbs. In addition, India grown-up to become the world's most populous country in 2023, and understanding Indian food is of great interest to food companies that are expanding globally. We therefore conducted a study on the compatibility of food ingredients and seasonings consumed in India using flavour pairing.

In our study, we first surveyed more than 3000 Indian recipes to identify the ingredients and seasonings most frequently consumed in India. Next, information on the aroma and taste components of the listed ingredients and seasonings was collected from previous literature. The compatibility of these listed ingredients and seasonings was also investigated by means of a questionnaire to 254 chefs from different regions of India. Furthermore, an attempt was made to develop a model to explain the compatibility of ingredients and seasonings in India, using the compatibility rating of the ingredients and seasonings as the objective variable and the information on aroma and taste components as the dependent variable. However, it was difficult to explain the compatibility of all listed ingredients and seasonings in one model. Therefore, seasonings and ingredients were classified by cluster analysis based on information on the aroma and taste components, and a predictive model of compatibility was created for each cluster, with good results. In the compatibility assessment, not only the similarity between the ingredients and seasonings was taken into account, but also the contrast and masking effects. Finally, to confirm the validity of the obtained regression model, a sensory evaluation test was conducted with 53 chefs to confirm that the compatibility evaluation model obtained was correct.

This study is expected to help advance the understanding of Indian food preferences and the evaluation of food compatibility using the concept of flavour pairing.

Audience Take Away Notes

- The audience will be able to understand the process of learning
- It will be helpful for the audience in their job
- This research that other faculty could use to expand their research or teaching
- This provides a practical solution to a problem that could simplify or make a designer's job more efficient
- It improves the accuracy of a design, or provides new information to assist in a design problem
- List all other benefits
 - The study provides knowledge on the preferred food and seasoning combinations in India and how to evaluate them, which is useful for successful food-related business in India
 - The study is useful for a deeper understanding of the origins of food compatibility, as it evaluates food and seasoning compatibility from a more realistic perspective by taking into account not only similarity but also contrast effects and masking effects

- o This study is probably the first study to validate the model by adopting the chef's evaluation value as an indicator of compatibility in food compatibility research, and will help to broaden the scope of research

Biography

Dr. Imamura studied analytical chemistry at Kyushu University and graduated as MSc in 2003. She then joined Kikkoman, soy sauce company, where she worked on sensory evaluation for 20 years; she obtained her PhD in 2014 and published a paper on the flavour wheel of soy sauce in 2016. She has conducted numerous studies on the characteristics and components of soy sauce and their linkages.

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Exploring biofilm behavior and disinfectant response in *Lactiplantibacillus plantarum* across static and flowing conditions

Biofilm formation, a key microbial adaptation, is mostly examined in static settings. This research investigates biofilm development in *Lactiplantibacillus plantarum*, exploring into the behavior of six food spoilage isolates (FBR1-FBR6) and reference strain WCFS1 under static and dynamic flow conditions. The study also examines the effect of Peracetic Acid (PAA) and Benzalkonium Chloride (BKC) on planktonic, static, and dynamic flow biofilm cells.

The outcomes highlight strain-specific disparities in biofilm formation and resistance to disinfectants, underscoring the importance of a comprehensive understanding of both static and flow-related biofilm characteristics.

Static biofilm development in *L. plantarum*, a non-motile bacterium, appears to be predominantly passive, involving cell aggregation and surface attachment. When subjected to flow, responses differ among strains. While WCFS1, FBR1, FBR2, FBR5, and FBR6 maintain consistent CV staining results between static and flow conditions, FBR3 and FBR4 exhibit enhanced biofilm production under flow, possibly due to shear-trapping effects and increased extracellular polymeric substance formation. Concerning disinfection resistance, biofilm cells consistently exhibit greater tolerance to PAA and BKC than planktonic cells across strains, with specific nuances. Noticeably, dispersed flow biofilm cells demonstrate comparable resistance to disinfectants as in situ flow biofilm cells, implying that the flow biofilm environment naturally makes them more resistant. Nutrient availability and physiological adaptations due to shear stress and microenvironment variances contribute to strain-specific resilience patterns.

In the food industry, these findings have significant implications for managing contamination and spoilage risks. The study underscores the complex interplay between biofilm dynamics, disinfectant responses, and microenvironmental factors in *L. plantarum*, providing insights that can shape effective biofilm control strategies.

Audience Take Away Notes

- The audience engaging with this research will gain valuable insights into the intricate dynamics of biofilm development and disinfectant resistance in *Lactiplantibacillus plantarum* under both static and dynamic conditions
- These insights offer practical implications across various fields
- Application in Industry: Professionals in the food industry will benefit by better understanding the behavior of *L. plantarum* biofilms. This knowledge will aid in developing more effective strategies for managing contamination and spoilage risks, leading to improved food safety and quality control
- Research and Teaching: Other researchers and educators can use this study as a foundation to expand their research or enhance their teaching materials. The insights into biofilm behavior under varying conditions contribute to the broader understanding of microbial adaptations and their responses to changing environments

- **Informed Decision-Making:** The study's findings offer new information that can assist in addressing complex biofilm-related challenges. This knowledge empowers professionals to make informed decisions when developing interventions against biofilm-associated issues

Biography

Parisa Rashtchi completed her bachelor's and master's degrees in Food Technology at Tehran and Tabriz University, Iran. With seven years of experience in various sectors of the food industry, she embarked on a new academic journey at Wageningen University. In 2018, she commenced her doctoral studies at Wageningen University, focusing on the fields of Physics and Physical Chemistry of Foods, as well as Food Microbiology.

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*"We wish to meet you again at our
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