Abstract Book

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Keynote Presentations

Nutritional Yeast: A Novel Functional Ingredient in Expanded Pulse-Based Extruded Snacks

Jose De J. Berrios*

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Abstract

Yeasts can be considered man's oldest industrial microorganism. Ancient Egyptians were using yeast and the process of fermentation to produce alcoholic beverages and to leaven bread over 5,000 years ago. Nutritional yeast is grown from pure strains of Saccharomyces cerevisiae, on a purified nutrient source, specifically for its nutritional value. Lentil (Lents Culinaris L.) are the oldest pulse crop known to man and one of the earliest domesticated crops. They are rich source of nutritious and healthy food components and considered original functional foods and superfoods that have great potential to enter the food pipeline in a convenient snack form, as ready-to-eat breakfast cereals and snacks-type foods. This study developed unique, healthy, crunchy extruded snack-type foods from lentil-based formulations fortified with nutritional yeast. The novel formulations were extruded using a Clextral EVOLUM HT-32-H twin screw extruder, run at die temperatures of 140-160°C and constant screw speed of 500rpm. The specific mechanical energy (kWh/kg) of the process significantly decreased ($p \leq 0.05$) with an increase in nutritional yeast addition to the formulation undergoing extrusion cooking. In general, the expansion ratio was proportional to values of SME. The developed expanded snack products presented great stability, with water activity in the range of 0.44-0.50. The In vitro protein digestibility was significantly increased ($p \leq 0.05$) by effect of extrusion processing. The incorporation of nutritional yeast into lentil-based formulations produced extruded snack-type products with enhanced textural and acceptable characteristics than control extrudate. Expanded extrudates snacks, formulated with lentil and nutritional yeast, have great potential to provide the population with convenient, highly nutritional and healthy food alternative.

Biography

Dr. Jose De J. Berrios completed his Ph.D from the Department of Food Science at Washington State University in 1995. He is a Research Food Scientist with the USDA-ARS-Western Regional Research Center where he has led the extrusion food program for 24 years. He is author and co-author of more than 100 publications; reviewer for 20 major national and international journals; invited speaker to more than 100 international and national conferences and symposia. Adviser and collaborator for a large number of national and international projects; Chairman of the Northern California Section of AACC-International and Member of the Legume Pulses Approved Methods Committee of AACC-International 2000-2019.

Enzymatic Cross-Linking of Food Proteins to Alter their Functional Properties and Immunoreactivity

Srinivasan Damodaran*

University of Wisconsin-Madison, USA

Abstract

A two-step enzymatic modification approach to reduce immune reactivity of whey protein isolate (WPI) and casein (CN) has been studied. Each protein was first partially hydrolysed using trypsin, chymotrypsin, or thermo-lysin to disrupt immuno-reactive epitopes. To further mask/disrupt any remaining reactive epitopes, the hydrolysate was re-polymerized using transglutaminase (T Gase) to produce branched-chain polymers. The results showed that WPI partially hydrolysed with chymotrypsin, trypsin, or thermo-lysin retained about 80%, 30%, and 20% of the original immune reactivity of control WPI, respectively. Upon re-polymerization using transglutaminase (T Gase), the immune reactivity of these samples decreased further to 45%, 35%, and 5%, respectively, of the control WPI. In the case of CN, however, the immune-reactivity dropped

to a negligible level upon hydrolysis by these three proteases and the re-polymerized samples also showed negligible immune-reactivity. Re-polymerized WPI and CN hydrolysates were resistant to digestibility under simulated gastro-duodenal digestion conditions. Peptides released during the time course of digestion of repolymerized thermo-lysin-WPI hydrolysate had less than 5% immune-reactivity, whereas the digestion products of WPI control exhibited a sinusoidal reactivity ranging from 5 – 20% during the time course of digestion. These results indicated that it is possible to produce hypoallergenic milk protein products using the two-step enzymatic modification method. Foaming and emulsifying properties of the enzymatically modified WPI was same or better than the native WPI.

Biography

Srinivasan Damodaran earned his Ph.D in Food Science from Cornell University in 1981 and currently he is a Professor of Food Chemistry at the University of Wisconsin-Madison. He has published more than 150 papers in reputed journals and has 11 patents to his credit. He is the lead editor of "Fennema's Food Chemistry", a textbook that has been translated into Russian, Spanish, and Portuguese, and being used widely throughout the World.

Instant Controlled Pressure Drop as Intensification way of Various Unit Operations such as Drying, Microbiological Decontamination, Essential Oil Extraction, and Extraction of Natural Antioxidants

Sabah Mounir[1,2], Ezzeddine Amami[1], Colette Besombes[1], Tamara Allaf[1], Baya Berkai[1] and Karim Allaf[1]*

[1]La Rochelle University, France

[2]Zagazig University, Egypt.

Abstract

In many unit operations of drying, transformation and extraction, the kinetics can easily be brought as limited and thus controlled by the internal diffusion. Indeed, the agitation in the surrounding environment and / or the insertion of an ultrasonic system make the operation Negligible External Resistance NER. This situation is even deeper and much more particular in the case of cell materials such as plant-based natural materials. Intensification then requires a deep and well controlled structural and textural modification. Such a modification must also be able to ensure the preservation of the biochemical composition and to include no degradation. The instantaneous controlled pressure-drop DIC texturing is a high temperature short-time HTST treatment, almost always when adequately specifically optimized, ensures such a modification with the preservation of the various compounds even thermosensitive molecules. Performance of the operation in terms of yields and kinetics will be greatly improved, as well as reducing the energy consumption and particularly improving the environmental impact. DIC effects are dramatically intensified when coupled with innovative processes such as Swell-Drying, TRIPOLIUM, Micro-Wave accelerated drying and extraction processes, Ultrasound accelerated drying and extraction processes. . .

Biography

Prof. Karim ALLAF, Head of "Intensification of Transfer Phenomena on Industrial Eco-Processes", at Laboratory of Engineering Science for Environment UMR 7356 CNRS (France), born on February 15th, 1952, in Tripoli in Lebanon, was graduated in 1976 from the University of Paris-XI University as Ph.D in Physics of low temperature Plasmas, and, five years after, he completed a Ph.D in Thermodynamics and Chemical Engineering in 1981. He commenced a career as an Associated Professor, Director of the Department of Physics of the Faculty of Science in Lebanese University (1981/1988), and then as Associated Professor, and Professor scientific responsible of Agro-Industrial Technologies research team DTAI at the Department of Chemical Engineering of the University of Technology of Compiegne UTC (1988/1994). In 1988, he defined, invented, studied, and developed the new concept of "Instantaneous Controlled Pressure-drop (DIC). In 1994, Prof. ALLAF's joined La Rochelle University as a Professor, director at the Department of Process Engineering, director of Laboratory of Mastering Technologies for Agro-Industry LMTAI where he developed specific activities on DIC, with transfer processes towards various industrial sectors using it in drying, texturing, extraction and decontamination operations. His research team recently completed work by coupling DIC with spray-drying leading to the new concept of expanded granule powders. Novel and innovative processes of Drying and extraction have been defined and designed. Recently, Pr. ALLAF's research team in La Rochelle started a study on in situ transesterification of different oleaginous seeds. Prof. ALLAF has got 9 Patents and 17 extensions (concerning mainly the instant controlled pressure drop DIC technology), 116 international papers and numerous European and industrial reports (34). Pr. ALLAF has been the mentor of 48 Ph.D works; he has been the coordinator of 8 European projects since 1993.

Featured Presentations

Effects of Water Addition and Microwave on Natural Deep Eutectic Solvents (Nades) and their Extraction Properties

Atanu Biswas [1]*, Analía V. Gómez[2], Carmen C. Tadini[2] and Cheng H.N[1]

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Abstract

One of the common processes employed in food preparation and manufacturing is the extraction of specific components from Agro-based materials. Although many extraction methodologies are known, continued improvements are still desirable. A recent new development is the use of natural deep eutectic solvents (NADES) for extraction. In this work, we studied NADES/water combinations and found them to be viable alternatives to conventional solvents for extraction of polar ingredients in foods. Moreover, we found microwave heating to facilitate the preparation of NADES/water solvents, decreasing the heating time by ¼ or more. Selected NADES/water systems were characterized with respect to viscosity, refractive index, electrical conductivity, water activity, and NMR. In addition, we utilized the microwave-assisted process to carry out the extraction of non-starch polysaccharides in over-ripe or rejected bananas. NADES/water solvents were shown to be more effective than conventional solvents (H2O and ethanol) for this extraction. The microwave process was found to be efficient, save time, and decrease energy usage. Furthermore, the NADES/water solvents are eco-friendly, inexpensive, chemically inert, and biodegradable. Thus, the combination of NADES/water/microwave is a promising "green" method that can provide improved extraction in food applications.

Biography

Dr. Atanu Biswas has been a Research Chemist at NCAUR, USDA-ARS, Peoria, IL since 2003. He received his Ph.D in Organic Chemistry from the University of Notre Dame, Notre Dame, IN. Dr. Biswas is a member of a team of scientists conducting research on green chemistry, polysaccharides, and vegetable oils. Dr. Biswas and his team focus on the chemical and enzymatic, microwave-assisted modifications of renewable resources (i.e. starch, protein, and bio-oils) to produce value-added commercial products. Dr. Biswas also was the first to discover and utilize ionic liquids as solvents for starch and zein modifications. Dr. Biswas' accomplishments include developing new products, processes, and methodologies that are of commercial significance using synthetic, organic, polymer, physical, and analytical chemistry as well as an intimate familiarity with both agricultural bio-based polymers and petrochemical feedstocks.

Multiway Analysis of Food Systems

Erdal Dinç*, Nazangül Ünal and Z. Ceren Ertekin

Ankara University, Turkey

Abstract

In practice, qualitative and quantitative measurements of food samples are based on the estimation of the signals at different formats e.g. spectrum, chromatogram and voltammogram obtained from instruments. Some of main problems in the analysis of food samples are complexity and overlapping signals of analytes in samples. The use of multiway analysis methods is a new perspective and a simple way to overcome these problems in the quality control and routine analysis of complex samples [1-5]. In this study, an example was demonstrated for the implementation of a multiway spectral analysis method for the quantitative resolution of a marketed energy drink and determination of colorant's acidity constant in the same food sample. In the practical application of the method, three-way analysis (or multiway analysis) of pH-absorbance dataset gave us a simple quantitative resolution of an energy food sample containing complex matrix without using any chromatographic separation method. In this lecture, three-way analysis method and its application to third order data array of pH-absorbance measurements will be presented for the quantitation of an additive colorant in food sample and estimation of its pKa value within the same experimental data space.

Biography

Erdal Dinç is a professor of Analytical Chemistry in Faculty of Pharmacy at Ankara University, Ankara, Turkey. Erdal Dinç has published more than 182 research papers in scientific journals, more than 112 papers in conference books and proceedings and seven book chapters. Professor Dinç gave several presentations as invited lecturer and standard lecturer in international and national conferences. In 2010, Ankara University gave a scientific award (in the field of health science). His papers were cited approximately 2500 times and he have a h-index=28.

Value Incorporation of Green Technologies in Food Supply Chain-Elimination of Food Contamination through use of Eco-Friendly, Biodegradable and Safe Non-Food Substances

Ashish Sachan[1*], Jacquelyn Thayer Scott[2], Thomas P. O'Keefe[3*]and James Stephens[4*]

[1] Chief Science Officer, Airesun Global Limited, Canada

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Abstract

According to the Food and Agriculture Organization of the United Nations, roughly one third of the food produced in the world for human consumption every year-approximately 1.3 billion tonnes-gets lost or wasted. Food losses and waste amounts to roughly US$ 680 billion in industrialized countries and US$ 310 billion in developing countries. Global quantitative food losses and waste per year are roughly 30% for cereals, 40-50% for root crops, fruits and vegetables, 20% for oil seeds, meat and dairy plus 35% for fish. FAO studies indicate that medium- and high-income countries' food is wasted and lost mainly at later stages in the supply chain. While contamination at these later stages may come from microbiological, physical and allergen hazards, a significant source of contamination is from various chemicals to which the food is exposed in processing, including metals/metalloids, polycyclic aromatic hydrocarbons (PAHs), persistent organic pollutants (POPs), per-fluorinated compounds (PFCs), pharmaceutical and personal care products (PPCPs), radioactive elements, electronic waste, plastics, and nanoparticles. These chemical contaminants may arise from soil, environment, cleaning and lubricating agents, food additives, personal care products, air, water and packaging material. Taken together, they represent a significant risk not only to human (and animal) health, but a large business risk to processors and distributors. These current problems may be expected to grow as global population and urbanization increase and as farmers, other businesses and geopolitical shifts affect the quantity, quality and distributional challenges facing producers and processors.

Airesun Global, Ltd. is a Canadian clean-tech firm whose oilseed-based products are designed and certified to address chemical contamination issues through lubricants, degreasers and cleaners applicable throughout the food supply chain, from producer to retailer and including professional food preparation and serving enterprises. Their products are third-party certified 100% food grade, fully biodegradable, non-toxic and non-caustic, thereby also providing collateral reduced workplace risks to food handlers at all supply chain stages. Early market use also provides evidence of improved efficiency and cost-effectiveness over products containing trace-and-larger additions of petroleum-based derivatives.

Equally critical to the problems noted above, the firm has developed production technology that is mobile and cost-effective against traditional refining capital and operating costs. Its unique business ecosystem model also "disturbs" normal commodity chain rules to potentially bring all suppliers into several stages of the value chain to enhance opportunities for early problem identification and more rapid remediation of contamination threats.

Biography

Dr. Sachan received his Ph.D in Toxicology from the Department of Biochemistry, Biophysics and Molecular Biology, Iowa State University, USA. His Ph.D involved development of Nano-sensor technologies to detect toxic chemical species of forensic significance. Publications and books have widely covered advancements in the field of pharmacology and toxicology including research topics related to ethnopharmacology, pesticide toxicology, and Nano-sensor technologies. Dr. Sachan has also been inducted to the Iowa State University chapter of the Honours Society of Gamma-Sigma-Delta. He served on the board of directors for the Society of Toxicology of Canada (STC) and is the recipient of Canada 150 community leadership award from the House of Commons.

For more than 25 years Thomas P. O'Keefe has been spearheading ground-breaking initiatives in a variety of industries. This has included technological design work for primary and secondary processing, manufacturing, as well as subsequent testing and certification. He has developed numerous business plans from start-ups to expansions and acquisitions in the range of $500,000 to $405 million in revenues, ranging from Greenfield construction to technical manufacturing and processing initiatives. He presently holds two Patents in construction materials and commercialized Trade Secrets in biofuel technologies and derivatives. He is the founder of Airesun Global Ltd. and is the company's President and CEO.

Dr. James D. Stephens earned his Ph.D in Mechanical Engineering at Clarkson University, Wallace H. Coulter School of Engineering. Dr. Stephens work has focused on innovation through the implementation of modern materials, methods, and design space schema. He has developed pioneering solutions that include high speed dental hand piece quality test rigs, plastic injection moulding first principle testing geared towards FEM material parameters, laser doppler vibrometer toner particle adhesion measurement testing, and pharmaceutical powder and tablet testing using NDT ultrasonic techniques geared towards process analytical technology (PAT) and in-silico simulation. Dr. Stephens is a member of the American Society of Mechanical Engineers (ASME) American Association for Pharmaceutical Scientists (AAPS), the International Society for Pharmaceutical Engineers (ISPE) and is on the committee of the NJ Pharma. Assoc. for Science & Technology (NJPHAST).

Coaxial Microwave Assisted Hydro-Distillation of Essential Oils

Carlo Ferrari[1*], José González-Rivera[2], Celia Duce[2] and Maria Rosaria Tine[2]

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[2]University of Pisa, Italy

Abstract

Coaxial microwave assisted hydro-distillation of essential oils from lavender, sage, rosemary, fennel seed and clove bud essential has been carried out using a Clevenger-type device. Microwaves where applied by means of a coaxial antenna and reference extractions have been carried out by conventional hydro-distillation. The yield and chemical composition of essential oils were analysed as a function of the microwave extraction time. A complete chemical characterization and thermal behaviour and stability was performed by several techniques: gas chromatography, gas chromatography, mass spectrometry and thermogravimetry coupled to infrared spectrometry. The coaxial microwave assisted extraction leads to a high concentration of oxygenated monoterpenes, different product selectivity, energy savings, and reductions in heating time compared to the conventional extraction process. The coaxial antenna approach allows an easy industrial scale-up, without any limit of power and size.

Biography

Carlo Ferrari is researcher at the INO-CNR since 2002. He has been Intensity Frontier Fellows at Fermilab in 2017/18. He has published more than 75 papers in reputed journals.

High-Pressure Phase Transitions and Thermophysical Parameters of Camelina Sativa Oil Investigated by Ultrasonic Methods

Piotr Kiełczyński[1*], Marek Szalewski[1], Andrzej Balcerzak[1], Krzysztof Wieja[1], Stanisław Ptasznik[2] and Aleksander J. Rostocki[3]

[1]Institute of Fundamental Technological Research, Poland

[2]Institute of Agricultural and Food Biotechnology, Poland

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Abstract

Knowledge of high-pressure behavior of the processed liquids is necessary to control technological processes in many branches of industry (e.g., in chemical, pharmaceutical and food industries). However, data on high-pressure behavior of liquids are still incomplete. The aim of this study is to investigate the high-pressure behaviour (i.e., thermo-pysical parameters and possible high-pressure phase transitions) of liquids (on the example of Camelina sativa oil), applying ultrasonic methods (i.e., sound velocity and parallel density measurements). Camelina sativa (false flax) oil has found application in many branches of industry as well as a raw material for biofuel production. Generally, conventional methods for measuring thermophysical properties of liquids fail at high pressures. The solution to the problem can be the use of ultrasonic methods. Ultrasonic measurements were performed at f = 5 MHz for pressures 0.1 - 660 MPa, and for temperatures 3 - 30°C. Pronounced high-pressure phase transitions were discovered by the authors in Camelina sativa oil. The use of ultrasonic methods has enabled the determination of many physicochemical parameters of Camelina sativa oil, such as: 1) adiabatic compressibility β_a, 2) thermal expansion coefficient α_p, 3) specific heat at constant pressure c_p, 4) thermal conductivity k and 5) thermal diffusivity α. The results obtained in this study are novel and can be employed to design and control technological processes in many branches of industry.

Biography

Dr Piotr Kiełczyński works as a professor at Institute of Fundamental Technological Research (IPPT) of Polish Academy of Sciences (PAN) in Warsaw, Poland. He is the head of the Laboratory of Acousto-electronics. His research interest includes: surface and bulk acoustic waves, high-pressure properties of liquids, ultrasonic sensors, numerical simulations, mathematical modelling. Dr Kiełczyński published about 100 research papers, worked as an invited scientist in many Universities in Europe, USA and Japan. Dr Kiełczyński is an author of three book chapters,

Published in Europe and USA. He presented the results of his research as an invited speaker in many international conferences.

Whole Genome Sequencing used in an Industrial Context: An Example

Katia Rouzeau-Szynalski*, Caroline Barretto, Coralie Fournier, Deborah Moine, Johan Gimonet and Leen Baert

Nestlé Research, Switzerland

Abstract

Whole genome sequencing (WGS), due to its high discriminatory power, is routinely being used for source tracking, pathogen surveillance and outbreak investigation by authorities. This tool can also be applied for pathogen source tracking as part of a microbial root cause investigation of a contamination event in the food industry.

A suspicion of a laboratory cross-contamination between the *Salmonella* Hadar isolate used in the laboratory proficiency testing and the *Salmonella* Hadar isolate found on the finished product by the same laboratory, was investigated. Since the classical serotyping method was not enough to differentiate strains of the same serotype within the subspecies, whole genome sequencing was used to test the laboratory cross-contamination hypothesis.

The results of the analysis showed a maximum of ten single nucleotide polymorphisms (SNPs) between the isolates coming from the laboratory and the finished product, and thus confirmed the laboratory cross-contamination. Consequently, with all additional investigations done at the factory, the release of the finished product was possible, thus avoiding unnecessary food waste and economic losses for the factory.

The application of WGS for source tracking showed to be promising, although today it is still a research tool.

Biography

Dr. Katia Rouzeau-Szynalski is a food safety microbiologist working for 14 years for Nestlé Research. During these years, she was working on several different subjects, and more recently on *Bacillus cereus* growth and cereulide toxin production, *Staphylococcus aureus* and in the area of Whole Genome Sequencing.

Gracilaria gracilis as a Novel Source of Food Colorants

Maria Manuel Gil* and Tatiana Pereira, Susana Mendes and Sónia Barroso

ESTM, Instituto Politécnico de Leiria, Portugal

Abstract

Colorants have been used in the food industry for centuries, but nowadays with the ever changing consumption trends, there is a high demand to replace the widely used artificial colorants with those derived from natural sources. In this study, the extraction of Phyco-erythrins (Pes), from *Gracilaria gracilis* was optimized, using several extraction methods, namely maceration, ultrasounds, sonicator, freeze/thaw, and high-pressures. Different extraction conditions such as the concentration of phosphate buffer (C), solvent/biomass ratio (R), homogenization time (T1), extraction time (T2), and pressure (P) were optimized using a Response Surface Methodology. Maceration was the most efficient method (optimal conditions T1=T2=10 min.; C=0.1M; R=1:50) reaching values of 3.583 ± 0.033 mg of phycoerythrin/g of algae, giving yields ~45% higher than with the other methods tested. Finally, PEs were semi-purified by precipitation with ammonium sulphate (65%) followed by dialysis and used as colorant in pancakes and yogurts. Pigment incorporation in food resulted in a pink coloration of the products. This study showed the potential of *Gracilaria gracilis* to be used as a source of pigments for food applications as an alternative to synthetic colorant. It was also demonstrated that the PEs extracted can be used in food products, especially in products that do not require heating in their confection, such as yogurts.

Biography

Maria Manuel Gil is a Professor at the Polytechnic of Leiria (Portugal) and Coordinator of MARE- Marine and Environmental Sciences Centre, Polytechnic of Leiria. She obtained her Degree in Food Engineering (2000) and Ph.D in Food Science and Engineering (2009) at the College of Biotechnology, Catholic University (Portugal). She is principal investigator of several research projects, and evaluator for different international agencies. Her current research focuses on add economic value to marine resources, including areas such as edible coatings from marine resources to extend shelf-life of food products, development of marine bio-based ingredients as additives in food formulations, risk/benefit assessment associated with seaweeds consumption.

Extraction of Functional Oils from Brewer´s spent Grain by Supercritical Carbon Dioxide

Giovanna Ferrentino*, John Ndayishimiye, Nabil Haman and Matteo Scampicchio

Free University of Bozen-Bolzano, Italy

Abstract

Supercritical fluid extraction was applied to valorize the brewer´s spent grain and explore the functionality of the obtained extracts. The process was performed at 20 and 30 MPa, 40 and 50 °C without and with ethanol as co-solvent in percentage equal to 4 and 8 %. Supercritical fluid extraction was compared with Soxhlet using hexane as solvent. The extracts were characterized for their antioxidant capacity by 2,2-diphenyl-1-picryhydrazyl radical (DPPH) assays, total phenolic content by Folin-Ciocalteu assay, fatty acids profile by GC-FID and oxidative stability by isothermal calorimetry. Moreover, their capacity to retard the oxidation of linseed oil was also studied. Samples from Soxhlet and supercritical carbon dioxide (30 MPa, 50 °C and 8 % of ethanol) showed the highest yields (6.1 ± 0.3 % and 6.5 ± 0.1 %, w/w), recovery (78.3 ± 2.1 % and 81.3 ± 1.8 %, w/w), total phenolic contents (28.3 ± 0.5 and 26.2 ± 0.3 mg GAE/ g of sample) and antioxidant activity (16.7 ± 0.1 and 14.2 ± 0.1 mg TEA/ g of sample). The fatty acids composition of brewer´s spent oil extracted by SFE was similar to that extracted by Soxhlet. The same extracts also reported the highest oxidative stability and ability to slow down linseed oil oxidation.

Biography

Dr. Giovanna Ferrentino is senior assistant at the Faculty of Science and Technology of the Free University of Bozen-Bolzano.

She is a food chemical engineer with experience in the field of supercritical fluid technology for the pasteurization, extraction and encapsulation of bioactive compounds. Her research activity is mainly focused on the valorization of food by-products using green extraction technologies. During the years, she applied supercritical fluid extraction for the recovery of antioxidants from apple pomace, coffee spent powder and malt residues after the production of beer. Besides the extraction technology, she is interested in identifying the bioactivity of the extracts to provide new classes of natural antioxidants or oils.

Bread Fortification with By-Products of the Olive Oil Industry: Technological, Nutritional and Sensory Aspects

Fabio Favati*, Roberta Tolve, Stefano Salgari and Barbara Simonato

University of Verona, Italy

Abstract

In the extra virgin olive oil (EVOO) production one of the main problems is the disposal of the by-products, and this can represent an important issue at industrial level. Over the years many studies have been carried out to improve the EVOO extraction process trying to reduce the amounts of water utilized as well as to obtain by-products that can find an appropriate utilization. Within this frame this research has investigated the possibility to use the by-product (pate) obtained by using a special decanter (Leopard DMF - Pieralisi, Italy) for bread fortification, due to its high content in polyphenols and physical characteristics. Different types of bread as far as shape and size were prepared at industrial level, by adding up to 10% by weight of pate, to investigate the phenols retention, as also influenced by the cooking process due to the different volume/area ratio. The assessed phenol levels showed that during cooking the phenol losses ranged from 12 to 20%, thus allowing to obtain a fortified bread whose consumption, within the Mediterranean diet suggested levels of 100-150 g/day, may allow the intake of up to the 30% of the recommended dietary reference intake for phenols, corresponding to the consumption of about 650 mL of EVOO having a phenol content of 400 ppm. The bio-disponibility of the added phenols was also assessed by *in vitro* studies and the consumers' acceptability of the fortified bread was evaluated by sensory analysis, with obtained scores above 7 using a 9 points hedonic scale.

Biography

Prof. Fabio Favati is an Associate Professor of Food Science & Technology and his research is mainly focused on food product development and optimization of food production processes. His research interests are also focused on the use of green technologies, such as supercritical fluids extraction and use of deep eutectic solvents, for the recovery of moieties of interest for the food, cosmetic and pharmaceutical industry from by-products of the Agro-food sector. Another area of expertise is related to olive oil production and most of his research has been carried out in cooperation with industries.

Applications of Bacteria as Food Source

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[2]Centro Interdisciplinar de Investigação Marinha e Ambiental (CIIMAR/CIMAR), Portugal

Abstract

The importance of bacteria in many fields, from the global biogeochemical cycles to the human gut, is being more and more recognized. Here we will focus on potential applications of Planctomycetes, a scarcely known and explored bacterial phylum, tackling different aspects of their use in food related issues. These bacteria and in particular the species Rhodopirellula rubra have shown great potential as color providers namely to the water flea Daphnia magna which could be used in aquaculture to enhance the flesh color of fishes like salmonids and rainbow trout. Furthermore, feeding D. magna with R. rubra as supplement enhanced the growth and the reproductive output of this daphnid. These results point to the importance of Planctomycetes as single-cell-protein source and their relevance in increased fertility. Our pioneering work on the nutritional role of planctomycetes using Daphnia magna as the model organism evidences the biotechnological potential uses of these bacteria especially in fish farming, food and pharmaceutical industries for which future studies are needed.

Biography

Maria Marinho is a Ph.D Student in Biology on the Faculty of Sciences, University of Porto. His area of scientific research has focused on adequacy of Planctomycetes as an alternative or supplementary food for Daphnia magna and increasing the reproductive performance of this organism. Assessment of ecotoxicological effects of anthropic compounds in non-target organisms have also been areas of study developed.

Essential Oil Application in the Food Sector

Valeria Rizzo* and Giuseppe Muratore

University of Catania, Italy

Abstract

The increasing interest in reducing packaging wastes, considering that food packaging is a necessity, but its disposal is becoming a burgeoning problem. Food packaging alone contributes to almost 66% of total packaging wastes by volume in the world. On the other hand, consumers judge the food quality on the basis of appearance and freshness but also using their awareness of the environmental implications of packaging. Nowadays the application of edible films or coatings, from biodegradable materials or biopolymers, on food may reduce the package barrier requirements and incorporate natural bioactive compounds. Essentials oils (EOs) among the natural compounds have been extensively investigated in recent years because of their antimicrobial and antioxidant activities. Thanks to their active components EOs can be added directly to the food, incorporated into packaging material, or used in a separate emitter. EOs addition is a safe, sustainable and not expensive methods, because they are often used in very low percentage, that can enhance the shelf life while simultaneously retaining the quality attributes. An application was made as example, on potato slices packaged in sous vide bags in association with rosemary essential oil (REO), these approaches were confirmed as a good strategy for the quality preservation of sliced potatoes over refrigerated storage until 11 days. Results demonstrated that the presence of REO have no effect on the nutritional content of cooked samples, while sensory and microbiological data highlighted a good attitude of potato slices to be processed with the addition of REO and cooked in sous vide bags. All nutritional components studied were slightly reduced after sous vide cooking. The ascorbic acid (AsAc) as well as total polyphenol content (TPC) were well preserved after cooking, and the antioxidant activity (AA) calculated showed a loss mean value of 48% among cultivars, so we can conclude that sous vide cooked vegetables in comparison with boiled, steamed, or microwaved tubers retain nearly all their nutritive value. Analysis of nutritional characteristics after the application of edible coatings enriched with EOs should be improved.

Keywords: food packaging; cooked potato; ascorbic acid; phenols; antioxidants

Biography

Valeria Rizzo did her Ph.D in Food Science and Technology, her professional skills and scientific research activity cover different field of the food technologies, from chemical and qualitative analysis of nutritional compounds to food processing, from packaging systems to the overall quality and safety of food products. She worked in different research centres as University, CRA (Council for Agricultural Research) and CNR (National Research Council of Italy).

Since the academic year 2017/18 he has carried out teaching activity in the University of Catania as lecturer of "Food Analysis and formulations" and in 2018/19 for the course in "Quality and safety management" in the master degree course in Food Science and Technology during such activities she has tutored thesis and apprenticeships.

Her research activity has produced more than 40 publications on qualified national and international journals and on congress proceedings. She is a referee for various international scientific journals.

Importance of Bioacessibility and Bioavailability Studies of Bioactives from Food Products

Andreia Bento da Silva[1,2], Elsa Mecha[3], Teresa Serra[3,4], Sandra Silva[4] and MR Bronze[1,3,4*]

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[4]Instituto de Biologia Experimental e Tecnológica, Portugal

Abstract

The identification of bioactive components in food products and the fortification of food products with functional components is achieving a great importance nowadays. However, the real composition of these products is not well known, as most of the times extraction procedures used are not efficient to return the real amount of the compounds present in the samples. However, more efficient techniques of extraction have been developed recently and more information has become available. This information is important to support the activity found for bioactive compounds responsible for modulating some metabolic processes contributing to promote a better health. The concept of bio-accessibility, defined as the amount of compounds released from the food matrix into the gastrointestinal tract, and therefore available for absorption, has become crucial in food studies. Also, information about the bioavailability, which corresponds to the amount of the compound that is available for a physiological function, acting in a certain target, is mandatory. In this presentation, study cases will show the importance of using adequate approaches to help to understand the real impact of compounds in human health and also possible interactions that can lead to variability among individuals.

Biography

MR Bronze research has been conducted mainly at iBET where she is the head of Food & Health Division which includes three laboratories working in different areas, from extraction and purification, until evaluation of bioactivity using from cell-based assays to intervention studies with humans and optimization of formulation procedures. MR Bronze is focused on the evaluation of the quality, safety, authenticity and more recently the study of the beneficial health effects of different food components from olive tree products to fish products and microalgae. MR Bronze is also Associate Professor at Pharmacy Faculty from Lisbon University and responsible for the Food Science and Toxicology Department.

Day 2 | Wednesday | November 13, 2019

Featured Presentations

Edible Plant-Derived Nanovesicles: Isolation, Characterization and Exploitation

Gabriella Pocsfalvi*

National Research Council of Italy, Italy

Abstract

In recent years, extracellular vesicles (EVs) secreted by mammalian cells raised considerable interest due to the discovery of their roles in various physiological and pathological processes, including a novel form of cell-cell communication. EVs secreted by mammalian cells have found important applications as targeted delivery vectors for various therapeutics. Plants have also been shown to secrete phospholipid membrane-bound vesicles into the apoplast that morphologically similar to mammalian EVs. Recently, we and others have isolated exosome-like particles from different fruit juices (lemon, orange, grapefruit, clementine, grapes, tomato, etc) and homogenized plant tissues (ginger, carrot) by ultracentrifugation-based methods. These preparations represent a complex arsenal of vesicles that can be dissected into various intra (secretory vesicles, transport vesicles) and extracellular vesicle populations. Knowledge on bio-cargo and bioactivity of plant-derived vesicles is still in its infancy that hampers their prompt biotechnological translation. In this context, the talk will focus on the isolation, physical and molecular characterizations as well as the possible exploitation routes of edible plant-derived nano-vesicles. Encapsulation of nutraceuticals into edible plant-derived nano-vectors is emerging as a promising strategy for bioavailability enhancement of poorly absorbed active food ingredients.

Biography

Dr. Pocsfalvi head of the Extracellular Vesicles and Mass Spectrometry (EVs-MS) research group at the Institute of Biosciences and Bio-Resources of the National Research Council (CNR) in Naples, Italy. She is author of more than 90 publications in international journals and 3 patent applications, h-index 22 (web of sci). Dr. Pocsfalvi has started her research carrier as a theoretical and computational chemist at the University of Debrecen in Hungary. As a post. doc she moved to CNR (Italy) where she was employed on European Community grants related to "High sensitivity-high mass Spectrometry in the Structural Studies of Biomolecules" Large-scale Installation Plan (CNR/CEE ERB GE1 CT 92-0045) and "Mass Spectrometry in the structural and quantitative analysis of biopolymers and other molecules of biological and environmental interest" (CNR/CEE ERB FMGE CT 95-0061) projects. She was involved in the R&T activities "Training and mobility of Researchers - Access to Large-scale Facilities" programme herby building her own research network in which 28 international research groups participated. During the last five years, activity of Dr. Pocsfalvi focuses on extracellular vesicles. Her team has developed.) a sucrose/D_2O double cushion ultracentrifugation method for the isolation of urinary exosomes (patented) and plant-derived nanostructures, ii.) a multiplex quantitative proteomics strategy for the identification of potential protein biomarkers in urinary EVs and its use to ADPKD, citrus-derived vesicles, and clinical nanomedicine, iii.) chromatography-based purifications and MS-based analysis of EVs. In this topic, Dr Pocsfalvi has published 12 papers, 2 book chapters and 1 national patent application. She is a member of the board of directors of EVIta, ISEV and the steering committee as well WP leader of VES4US H2020 FETOpen project and supervisor of nano-TOM H2020 MSCA project.

Evaluating Aged Meat Quality using Raman Spectroscopy

Carolina Santos[1], Xiuping Dong[2], Jinhui Zhao[3], Steven M. Lonergan[4] and Chenxu Yu[2,4]*

[1]Insituto Federal de Santa Catarina, Brazil

[2]Dalian Polytechnic University, China

[3]Jiangxi Agricultural University, China

[4]International Space University, USA

Abstract

Physical measurements to predict meat quality in general do not yield satisfactory correlation to panel evaluations, and their applications in meat industry are limited. In this study, Raman spectroscopy (RS) was utilized to evaluate meat quality. Eight hundred pork loins, from 4 different plants, were removed from the carcass at 24 h post-mortem and selected, based on colour and marbling, by USMARC personnel. The ventral side of each loin was scanned with the RS for 6 seconds. After onsite measurements, the loins were transported to USMARC and held for 14 days at 0°C. The aged loins were cut into 2.54 cm chops for Raman, slice shear force (SSF) and sensory analysis. For the sensory analysis only 75 loins from each plant were chosen, based on colour and marbling. One chop for RS measurements and two for sensory were vacuum

packed and transported to ISU Labs. At 14 d post-mortem, the chops (cross section) were scanned under same conditions. SSF on 800 samples was determined. 300 pork loin samples were divided into groups according to the percentile (25%) of values of sensory tenderness or SSF. Sensory tenderness was evaluated by a trained sensory panel (n=10). A weak correlation (R2=0.20) between SSF and sensory tenderness was obtained using a least square regression (LSR) model. The prediction accuracies for day 15 post-mortem samples are significantly higher than that for day 1 post-mortem samples, both for tenderness scores and SSF values. These observations strongly suggest that aging of the meat samples from day 1 to day 15 has significantly affected their chemical properties, which are directly correlated to their tenderness. For day 15 post-mortem samples however, a substantial improvement in classification accuracies for the four quality grade groups was observed. In general, pork samples that belong to the medium quality category are more difficult to predict based on their Raman spectroscopic characteristics. Raman spectroscopy, in combination with performance-enhancing data processing and multivariate statistical discriminant modelling, has the potential to become a rapid on-line screening tool for the pork producers to quickly select meats with superior quality and/or poor quality to better serve customers.

Biography

Chenxu Yu is an associate professor of biological engineering at Iowa State University, with a primary appointment in the Department of Agricultural and Biosystems Engineering, where his research includes: biosensors utilizing nanomaterials for pathogen detection and disease diagnosis; spectroscopic imaging for characterization of biological systems; and bio-nanotechnology for biomass processing. He received a BS degree in Physics and Astronomy from Nanjing University in 1993, an MS degree in Biochemical Engineering from Dalian Institute of Light Industry in 1998, and a Ph.D in Biosystems Engineering from the University of Wisconsin-Madison in 2003. He has published 40+ papers in peer-reviewed journals.

Production of Phosphopeptides from Phosvitin and the Structural Characterization of the Phosphopeptides using Tandem Mass Spectrometry

Xi Huang[1], Sunhee Moon[2], Jaehoon Lee[3], Hyundong Paik[3], Eun Joo Lee[4], Byungrok Min[5] and Dong U. Ahn[2*]

[1]Huazhong Agricultural University, China

[2]Iowa State University, USA

[3]Konkuk University, Korea

[4]University of Wisconsin-Stout, USA

[5]University of Maryland Eastern Shore, USA

Abstract

Phospho-peptides are known to have various bioactivities, including increased bioavailability of metal ions in the guts, antimicrobial and antioxidant activities, cellular differentiation, anti-inflammatory, and anticancer effects. Phosvitin is the best-known substrate to produce phosphor-peptides, but it is not used to produce phosphor-peptides because it is very difficult to hydrolyse Phosvitin. The effect of pasteurised heat pre-treatment heat (121 °C at 1.5 atm for 60 min) on the enzymatic hydrolysis of Phosvitin and the structural characteristics of the phosphor-peptides produced were analyzed using tandem mass spectrometry. Pressurized heat pretreatment hydrolysed phosvitin at random sites and helped the subsequent enzyme hydrolysis of the peptides produced. With the pressurized-heat pre-treatment alone, 154 peptides were produced while the use of trypsin, Protex 6L, and Multifect 14L in combination with pressurized-heat pre-treatment produced 252, 280 and 164 peptides, respectively. Use of two enzyme combinations (Trypsin+Protex 6L and trypsin+Multifect 14L) helped the hydrolysis further. The number of phosphopeptides produced increased more when the modifications within the same amino acid sequences were considered. This study indicated that PHP was an excellent method to improve the hydrolysis of phosvitin and enabled the easy production of phosvitin phosphor-peptides that can be used as bioactive agents for various applications in the future.

Keywords: phosvitin, pre-treatment, phosphor-peptides, hydrolysis, structural characteristics, tandem mass spectrometry

Biography

Dong Uk Ahn is an Professor of Animal Science Department, College of Agriculture, Iowa State University, Ames, Iowa and SNU-WCU Professor, Department of Agricultural Biotechnology, Major in Biomodulation, Seoul National University, Seoul, Korea. He served as Visiting Professor of the Korean Federation of Science and Technology Society, Seoul National University in 2006. He was Honorary Research Scientist Abroad, Korea Livestock Research Institute, Korea. He served as Lecturer, Animal Science Department, University of Alberta, Canada in 1993. He received Ph.D in Poultry Science, and Meat & Animal Science from University of Wisconsin-Madison, WI in 1988. He received a MS and a BS in Animal Science from Seoul National University, Korea in 1983 and 1978, respectively. He received American Egg Board Research Award

from Poultry Science Association, and Animal Industry Report Award and Award for Achievement by an Organizational Team at Iowa State University. He is serving as an Editorial Board member of Food Science and Biotechnology Journal and Korean Society for Food Science and Animal Resources, and an organizing committee member of 2010 ICoMST conference. He has published 176 referred journal articles and 11 book chapters.

Citrus Peel as Sources of Bioactive Compounds for the Production of Nutraceutical Olive Oils

Monica Macaluso*, Isabella Taglieri, Chiara Sanmartin, Cristina Sgherri, Roberta Ascrizzi, Guido Flamini, Mike Frank Quartacci, Luisa Pistelli, Francesca Venturi and Angela Zinnai

University of Pisa, Italy

Abstract

The aim of this research was to produce and characterize from a chemical and sensory point of view two citrus-flavoured olive oils (COOs) in comparison with an unflavoured EVOO. The presence of functional compounds such as carotenoids, naringenin and minor phenolics classifies these COOs as nutraceuticals with the potential to develop enriched foods able to promote healthy diet. Indeed, the carotenoids are thought to provide health benefits in decreasing the risk of illness, particularly certain cancers and eye disease; naringin and its aglycone naringenin were found to show strong anti-inflammatory and antioxidant activities. Several lines of investigation propose that naringin supplementation is beneficial for the treatment of obesity, diabetes, hypertension, and metabolic syndrome. Moreover, the increased presence of tyrosol and hydroxityrosol, compared to the unflavoured oil, further highlights the nutritional value to the two COOs being these phenolic compounds recognized as good possible therapeutic candidates for the inhibition of neurodegenerative diseases as the Parkinson's disease. In this perspective, the citrus peelings, rich in bioactive compounds, have been valued transforming their waste nature in an innovative resource.

Influence of Epiphytic Fluorescent Pseudomonas on the Shelf Life & Physiochemical Properties of Mango (Mangifera Indicia) Fruit Stored at Ambient Temperature

Habiba*, Rubina Noreen, Viqar Sultana, Jehan Ara and Syed Ehteshamul-Haque

University of Karachi, Pakistan

Abstract

An assessment was done on the impact of postharvest biocontrol agents on shelf life and quality of fruit 'Safaid Chaunsa' mango with a prospect of improving its storage period with least effect on its quality. Temperature was 28±3°C and relative humidity (63-67%) during study period. Mango fruit used for current study was at the ripen stage (stage 4). The concentration of 107 CFU/mL with water suspension of selected epiphytic fluorescent Pseudomonas isolates (HAB-10, HAB-15, and HAB-25) were used as treatment on fruits. Fruits treated with 1 % potassium sorbate (K-sorbate) worked as positive control. Fruits not treated with bacteria worked as control set. Fruits were stored at 30±3°C with relative humidity of 63-67% after treatment with bacterial suspension for ten days. During study, samples were noted on every fifth day and tested for chemical and physical changes (total soluble solids (TSS), physiological loss in weight (PLW), pH, firmness, total titratable acidity, polyphenol content and decay percent). Results recommended that after nine days of storage, PLW was lower, firmness was higher, TSS was lower and decay percent was least in fluorescent Pseudomonas isolates treated fruits as compared to non-treated mango fruit (control set). Other quality parameters polyphenol content was higher in HAB-15 treated fruits followed by HAB-25 and HAB-10 on the tenth day of study. Epiphytic fluorescent Pseudomonas isolates successfully delayed the ripening process and slows down the rate of metabolic processes thus retaining better quality as compared to untreated fruits during ten days of storage at ambient conditions.

Keywords: Decay, epiphytes, fluorescent Pseudomonas, physiochemical properties, Mango

Biography

Dr. Habiba is a young scientist. Currently, she is serving as an Assistant professor at the School of Public health of Dow University of Health Sciences, Karachi, Pakistan where she researches and teaches. She received her Ph.D degree in Food Science and Technology, from the University of Karachi (UOK), Pakistan in 2017. Her research area revolves around postharvest Biology and technology of fresh produce with a major focus to losses and food insecurities. She served as a panelist and speakers in table talk discussions at institutional and national level.

Honeybee Pollen: Potential use as a Functional Ingredient

Raquel Bridi*

Pontificia Universidad Católica de Chile, Chile

Abstract

Honeybee pollen loads result from the agglutination of pollen grains and salivary secretions of the collecting bees. The chemical composition depends, among other things, on the phenolic content, which is related to the botanical characteristics and the geographical origin of the species that produce the pollen. Interest in bee pollen has grown increasingly in recent decades for its properties, both therapeutic and anti-inflammatory, immunomodulatory, and cardioprotective, among others, and also for its potential use as a functional food given its nutritional properties. Studies indicate that phenolic compounds are largely responsible for the biological activities of bee pollen, including its antioxidant and antimicrobial potential. However, the effectiveness of these compounds depends on their stability and bioactivity. In this study a new nano-capsular system for the incorporation of phenolic compounds from bee pollen of Chilean species was developed. Ethanolic extracts from Chilean bee pollen showed antioxidant and antibacterial capacity, specifically inhibiting *Streptococcus pyogenes* bacterial growth. Thirteen major phenolic compounds were identified and quantified in the samples. The quercetin and myricetin flavonoids were found at high concentrations in all bee pollen samples analyzed. These compounds can be considered potential indicators of Chilean pollen. Chitosan-based nano-capsules to encapsulate bee pollen extracts have been designed successfully. The incorporation of the extract was higher than 80% and did not produce changes in the physical-chemical properties of the systems, which have a stability of at least 2 months under storage conditions (4°C) and 6 hours under physiological conditions.

Biography

Raquel Bridi did her Post doctorate in the Faculty of Chemistry and Biology of the University of Santiago, Chile (2009); Doctorate in Biochemistry specializing on Neurochemistry (2005) and Master of Pharmaceutical Sciences specializing on Phytochemistry (1999), both from the Federal University of Rio Grande do Sul, Brazil. Her postgraduate studies focused on free radicals, antioxidant enzymes and oxidative stress. Currently her area of interest is the research of natural products with biological activities, mainly those rich in polyphenols. Her research projects include the study of the chemical composition of natural products and the antioxidant activity of native plants and Chilean beekeeping products such as honey, bee pollen and propolis. Lately her focus has been on the development of formulations based on polyphenol-rich matrices using different encapsulation processes to improve the stability and efficacy of active molecules.

Deflamin, an Edible Anti-Inflammatory Protein Isolated from Legume Seeds

Joana Mota[1*], Renata Hartmann[2], Norma Marroni[2], Anabela Raymundo[1], Ricardo Ferreira[1] and Ana Lima[1]

[1]Universidade de Lisboa, Portugal

[2]Universidade Federal do Rio Grande do Sul (UFRGS), Brazil

Abstract

A subgroup of matrix metalloproteinases (MMPs) called gelatinases (MMP-2 and MMP-9) have been strongly implicated in colorectal cancer and in inflammation (1). Similarly, to what happens in the oncological disease (2), MMP-9 inhibitors (MMPIs) have been demonstrated to effectively inhibit colitis and other inflammatory bowel diseases (IBDs) (3). However, finding efficient MMPIs has been hampered by low specificity and overall severe secondary effects (4). Studies strongly relate MMP-9 inhibition to clinical reduction of Inflammatory Bowel Diseases (IBDs) and suggest that ingestion of MMP-9 inhibitors (MMPIs) can decrease their incidence. Hence, the resource to suitable MMP-9 inhibitor functional foods will have an important social and economic impact for health and inflammatory diseases in near future. Since IBDs are also related to pre-cancer and metastatic stages, this strategy may also be a valid, easy and cost-effective alternative to prevent cancer incidence. However, targeting MMP-9 through food has been difficult, mostly because of lack of specificity and lack of resistance to the digestion process.

We have recently identified deflamin, a promising small protein isolated from the seeds of lupine, with an outstanding MMP-9 inhibitory capacity. To understand if deflamin could be used as nutraceutical/functional food ingredient for gut inflammation and colon cancer we set off to establish a clean extraction method of isolation (food-compatible and allowing scaling-up). Using the isolated deflamin, we tested dose-response MMPI activities in cultured HT29 colon cancer cells, using standard wound healing and cell proliferation assays, as well as zymographic techniques. We then produced food products (cookies) containing enough bioactive protein to exert the desired beneficial effects in dietary intakes, assessed their digestibility and tested their efficacy in in vivo models of inflammatory colitis. In these animal models the expression of several inflammatory and oxidative stress-related biomarkers was evaluated as well as the colon expression of MMP-9. Our results showed that deflamin significantly reduced cancer cell invasion in a dose-dependent manner and without exerting any apparent cytotoxicity. Furthermore, deflamin and deflamin-containing cookies reduced colitis in in vivo models whilst presenting a high anti-inflammatory, antioxidant

and MMPI activity which was maintained even after baking and after the digestion process. Given the important link between inflammation and cancer, particularly in the gastrointestinal tract, our results suggest a strong potential of deflamin to be used as a nutraceutical or as a functional food ingredient in the treatment or prevention of IBDs and colorectal cancer.

Keywords: Lupine, bioactive protein, anti-inflammatory, anticancer, antioxidant

Biography

Joana, of 26 years old doing her Ph.D. She did her degree at the Instituto Superior de Agronomia, Lisbon University in Biology. Her master's degree was held at the Faculty of Medical Sciences in Biochemistry for Health. Her work was based on the discovery of a lupine bioactive protein, deflamine. This protein has been shown to be anti-inflammatory in *in vitro* models with various colon cancer cell lines as well as *in vivo* models of acute and chronic disease. At this moment, She found herself doing a Ph.D in Biology at the Instituto Superior de Agronomia and I am continuing the work done in the Master.

Genome Mining, an Answer to Listeria-Free Meat

Lucilla Iacumin*[1], Francesco Salini[1], Leon M.T. Dicks[2] and Giuseppe Comi[1]

[1]University of Udine, Italy

[2]Stellenbosch University, South Africa

Abstract

Increasing reports of food-associated bacteria developing resistance to broad-spectrum antibiotics are alarming. This is partly due to the incorporation of antibiotics in animal feed, registered as "growth promoters". The challenge to find alternatives to antibiotics, both in the animal feed industry and treatment of infections, has led to the search for alternatives to antibiotics. Lactic acid bacteria (LAB) are known to produce antimicrobial peptides, of which some have bactericidal activity against a broad spectrum of food spoilage and pathogenic bacteria. Our focus was to evaluate 121 Lactobacillus casei/paracasei strains for their ability to produce bacteriocins. Fourteen strains inhibited the growth of Listeria monocytogenes. Sequencing of the genomic DNA of these strains revealed a number of genes encoding bacteriocins with novel structures and possibly unique modes of action. One of these bacteriocins, produced by a strain of L. paracasei, led to a drastic reduction in cell numbers of L. monocytogenes in cured ham, suggesting that the strain may be used as a bio-protective starter culture in meat fermentations. This finding has vast industrial implications, as meat exported to the USA and other counties need to be certified free from L. monocytogenes.

Biography

Lucilla Iacumin obtained the Ph.D Degree in Food Science at Udine University in 2005. She is Associate Professor in General and Wine Microbiology (Food Science and Technology and Viticulture and Oenology Bachelor Degree Courses) at University of Udine, Department of Agricultural, Food, Environmental and Animal Science (Di4A). She is member of the Ph.D Program committee of the Research Doctorate (Ph.D) in Food and Human Health, University of Udine. She has long experience in studying microbial ecology of food and wine fermentations, using traditional and molecular methods, and bio-preservation. She develops molecular methods and biosensors to detect and characterize microbial starters, food-pathogens and -spoilers, without the need of traditional isolation. She was visiting scientist at the Institute for Wine Biotechnology – Stellenbosh University – SA in 2012; at the Institut Ruder Boskovic – Laboratory for ichtyopatology – Laboratory for biological materials, Zagreb - HR in 2013; and at the Wine Research Centre, Faculty of Land and Food Systems, University of British Columbia, Vancouver, B.C. Canada in 2014. She has been and is active in tutoring of undergraduate/graduate students (97). She is co-author of more than 250 publications including posters and oral communications at national and International Scientific meetings (75) and papers on National (64) and peer-reviewed International Journals (113, Scopus database) and national and international book chapters (13).

Different Distribution of Emerging Contaminants in Mussels and Clams from Different Areas and their Role for Food Safety

Luca Maria Chiesa*, Maria Nobile, Renato Malandra, Davide Pessina, Sara Panseri and Francesco Arioli

University of Milan, Italy

Abstract

Marine ecosystems are subjected to continuous pollution events because of increasing anthropogenic activities and the releasing of various sources of contaminants (Van De Vijver et al. 2003). Bivalve molluscs are considered good environmental contamination indicators because their tissues accumulate contaminants with little metabolic transformations (Roesijadi et al. 1984; Sericano 1993). Reviewing the presence of contaminant residues is important both for food safety and monitoring of environmental pollution. Here, the occurrence of 6 polychlorinated

biphenyls (PCBs), 15 organochlorine pesticides (OCPs), 7 polybrominated diphenyl ethers (PBDEs), 4 polycyclic aromatic hydrocarbons (PAHs) and 17 perfluoroalkyl substances (PFASs) was evaluated in mussels and clams. Multiple species were selected: *Mytillus Galloprovincialis, Mytillus Edulis* and *Mytillus Chilensis* for mussels, and *Venerupis philippinarum, Perna Canaliculus, Tapes decussatus, Tapes Semidecussatus, Meretrix Meretrix* and *Meretrix lyrata* for clams. A liquid chromatography-high resolution mass spectrometry (HPLC-HRMS) and an innovative QuEChERS extraction followed by gas chromatography-tandem mass spectrometry (GC-MS/MS) methods were developed, validated and applied. We demonstrate good linearity, repeatability and accuracy of these methods, confirming that these methods are suitable for the analyses of mollusc samples. The prevalence of PCBs, OCPs and PAHs was higher in mussels than clams. For PFASs, the contamination was higher in clams than in mussels. The samples were all compliant with the regulations and, for the compounds without limit, a risk assessment confirmed that the values were lower than the tolerable intake suggested by EFSA.

Biography

Prof. Luca Chiesa works as a professor in a Department of Veterinary Sciences for Health, Animal Production and Food Safety, Milan, Italy. Primarily research interests toward food inspection: relations between production and processing for the development of healthier foods of animal origin according to European legislations; traceability of food of animal origin; shelf-life and sensory properties; food packaging; quantitative microbial risk assessment; analytical chemistry instrumentation, method validation, quality control through the food chain of foods of animal origin (milk and dairy products, meat, fish, honey and bee products); He is an author of 107 publications indexed in Scopus.

Innovative Techniques for Functional Meat Production in Russia

Irina Chernukha*, Ekaterina Vasilevskaya, Lilia Fedulova and Elena Kotenkova

Gorbatov Federal Research Center for Food Systems of Russian Academy of Sciences (FNCPS), Russia

Abstract

Activities in the field of healthy nutrition are intensified in the Russian food industry. The market share of functional products does not exceed 5% in the RF, although the request for such products is growing among the consumers, who are aware of the close tie between food and metabolic or functional disorders. Innovative technologies help to create a food product with specified characteristics, extract biologically active substances (BAS) and save them in the product for the entire period of use. Tissue-specific BAS from thymus, spleen and mesenteric lymph nodes, which are involved in innate immunity formation, primary and secondary defense response has been selectively extracted with deuterium depleted water (D / H = 50 ppm). The meat product made of pig hearts and aorta contained specific lipid-binding peptides. In experiments on Wistar rats with alimentary hyperlipidemia a modification of lipid metabolism showed a change in the serum lipid profile. Reduction in inflammation related to atherosclerosis, 50% decrease in triglycerides and cholesterol low-density lipoproteins, two- fold decrease in the atherogenic index were noted after 42 days. Product proteomic profile is maintained for 24 months. So does the hypo-lipidemic effect. This work was supported by RSF projects 15-16-00008 and 16-16-10073.

Keywords: functional food, meat, tissue specific, biologically active substances

Biography

Irina M.Chernukha – D.Sci (2009), professor (2010), corresponding member to Russian Academy of sciences (2016). Present position – Gorbatov Federal Research Center for Food Systems (Moscow, Russia), Experimental-clinical research laboratory of bioactive substances of animal origin, chief researcher. Field of scientific interests: meat and meat product's quality, safety and risk assessment, meat health-promoting properties, bioactive peptides, in vivo modification of meat composition/characteristics. Member of 4 editorial boards (Russia, Serbia, USA). 14 doctoral and master thesis completed under her main supervision during 2009-2019. Over 250 publications and patents.

Enhancing Value - with Thermostable Probiotics

Shrilakshmi Desiraju* and Irfanulla Sharieff

Triphase Pharmaceuticals Pvt. Ltd., India

Abstract

Probiotics are vital bacteria that colonize the intestine and modify its microflora with benefits for the host. Development of foods with adequate doses of probiotics is a challenge even now as, several factors during processing and storage affect the viability of probiotics. The food and beverage market is still beset by issues of strain stability, low product shelf life, and challenges in the development of probiotic application technology. Major emphasis has been given to protect the microorganisms with the help of encapsulation technique, by addition of different protectants, and by alteration of processing and storage conditions, which in turn increases the cost of the product.

Triphase's Thermostable natural gut Probiotic strains have the inherent ability to withstand harsh manufacturing process upto 200°C ++ (depending upon strain), especially in Food, Beverage,

Bakery and or Pharma industries Industry.

The TSP strains so develop open a window of opportunity for the Industry where following USP can be applied: -

a) Withstand High temperatures upto 200+°C. – thereby Cold chain eliminated.

b) pH stable towards acidic stomach conditions.

c) These are non-encapsulated / No enteric Coated.

e) Multiple industry applications apart from Diary.

Our probiotics are designed to fortify food and beverages and are being further developed as prescription pharmaceutical products to ameliorate the side effects of drug treatments for infectious disease, oral health, cancer, and diabetes immunity therapeutic area also.

The platform technology for making them temperature stable Lactobacillus species is US patented. (US Patent no.# 100,58577B2).

Biography

Dr. Shrilakshmi Desiraju, Co-founder, CEO, Triphase Pharmaceuticals Pvt. Ltd. After relocating from Canada to India, Shrilakshmi Desiraju started Triphase Pharmaceuticals initially as a Services company in 2009. She started her jouney of innovation with Triphase in the field of Probiotics in 2011. The first big challenge that Triphase solved was in eliminating the cold chain from the Probiotics industry. It filed a patent for a new technology by which Probiotics could withstand temperatures of up to 250 degrees. In one single stroke the company had eliminated any need for cold storage.

Desiraju has been involved in the strategic planning and implementation of growth for her current organization. A state of art research and development wing for probiotic research at Mysore, INDIA since 2009.

Desiraju has a MBA degree in Technology Commercialization from University of Alberta, Canada, a Ph.D degree in Medicinal Chemistry from the Vikram University INDIA, and post- doctoral experience from the Indian Institute of Science, INDIA. She has a strong publication record in both scientific and business publications and is recipient of several international awards. With a patented technology to its credit, Shrilakshmi Desiraju's Triphase pharma has made a significant dent in the food industry dominated by large corporations.

Awards and Recognition

• March 2019 - FKCCI - Women Achiever Award, India • November 2018 - Conferred with Bio-Excellence Emerging Company Award 2018 by Government of Karnataka, India. • October 2018 - Certificate of Achievement awarded to Dr Shrilakshmi Desiraju, founder and Director (Business Development), M/s Triphase Pharmaceuticals at the International Conference on Probiotics and Prebiotics held at San Francisco, USA. • August 2018- US Patent Awarded in August 2018 • December 2017 - Featured in Bio spectrum as part of 40 Women achievers of India . • November 2017 - Nominated for India 5000 best MSME award• January -2016 Winner of Economic Times-Power Of Ideas, India. • 2015- Innovation excellence award from federation of Karnataka chambers of Commerce, India. • 2014 - Indias Small Giant award for the most promising small and medium size company, India. • 2014 - Business women of the year awarded by EMERG, India

Antibiotics in Food of Animal Origin: Their Role and Distribution among Food Chain and Relevance of Analytical Controls for Food Inspection

Sara Panseri*, Maria Nobile, Francesco Arioli and Luca Maria Chiesa

University of Milan, Italy

Abstract

Antibiotics play an important role in ensuring the health and welfare of poultry and are commonly administered to treat and prevent respiratory diseases and other microbial infections, but are often illicitly used in poultry breeding, via the drinking water or feed.

Widespread antibiotic use and the antimicrobial resistance phenomenon demand new analytical methods and the use of non-conventional matrices increasingly necessary for safe food control. We present a method developed to detect six common antibiotics used in poultry breeding, in the unconventional matrix, feathers, compared to muscle and liver. The analysis for the presence of two β-lactams (penicillin V, amoxicillin), two fluoroquinolones (enrofloxacin, ciprofloxacin), one phenicol (thiamphenicol) and one macrolide (tylosin) was validated and achieved by HPLC–HRMS, with the ultimate aim to identify untargeted metabolites in broilers subjected to different therapeutic protocols. All the validated method parameters met the regulatory requirements. Muscle and liver were not effective matrices when the withdrawal periods were largely respected. Conversely, feathers proved a promising matrix for the detection of all the studied antibiotics, in the range of 8.72–1885.32 ng g^{-1}, except penicillin V. Like other nonconventional matrices, such as teeth, the antibiotics detected in feathers existed in their unmetabolised form.

Biography

Dr. Sara Panseri Ph.D works as a researcher in a Department of Veterinary Sciences for Health, Animal Production and Food Safety, Milan, Italy. Primarily research interests toward food inspection: relations between production and processing for the development of healthier foods of animal origin according to European legislations; traceability of food of animal origin; shelf-life and sensory properties; food packaging; quantitative microbial risk assessment; quality control through the food chain of foods of animal origin (milk and dairy products, meat, fish, honey and bee products); food nutritional quality; food authenticity. She is an author of 97 Scopus indexed publications.

The Role of Phytochemicals in the Modulation of Inflammatory Immune Responses

Jurgen Bruck*

University Hospital Heidelberg, Germany

Abstract

Research on phytochemicals and their impact on immune function have increased significantly during the past two decades. Our understanding of the immunological impact of a few of these dietary constituents has increased concomitantly. In vitro data strongly suggest that some nonessential components of human diets, including several phytochemicals, have a significant immunomodulating potential.

Typical representatives of this group, which are also in diets and therapeutics for the treatment of various diseases, are Curcumin, Sulforaphane and Fumaric acid esters. Sulforaphane (SFN), an isothiocyanate and Curcumin (diferuloylmethane) are parts of an important group of naturally occurring small molecules with anti-inflammatory properties. Curcumin is traditionally used in inflammatory disorders in some regions of Asia.

However, the underlying mechanisms of these phytochemicals that could explain its beneficial activity during inflammation are not fully understood.

In our studies we analyzed whether naturally occurring small molecules are able to modify immune responses *in vitro* and *in vivo*

New ways to Analyze Undefined Mesophilic Starter Culture Composition Based on Amplicon Sequencing of Selected Genes and New ways of Analyzing Phage Development

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Abstract

Undefined mesophilic starters consist of dairy derived cultures originating from spontaneous milk fermentations. These cultures have been propagated for years either at dairy productions facilities or at starter culture companies. Common to them are them are that they have never separated into individual lineages/strains but have been propagated as a community.

We are developing amplicon sequencing methods to follow the lineage/strain composition of mesophilic starter cultures in order to obtain new ways of analyzing lineages/strain composition and stability of starter cultures batches. The methods have been developed for genes that vary between lineages/strains within mesophilic starters (*Lactococcus lactis* and *Leuconostoc*).

We will describe how starter cultures vary over time using a mother culture system. We will also describe how different starter cultures vary in lineage/strain composition according to bulk starter production temperature.

In addition, we have developed new metavirome sequence-based methods for analyzing phage development in dairies using undefined starter cultures.

Biography

Finn K. Vogensen, Associate Professor at Department of Food Science, University of Copenhagen. He had more than 40 years' experience working with Lactic Acid Bacteria food fermentations, including studies on influence of bacteriophage on food fermentations. He has 115 peer reviewed papers, 4 book chapters and 4 patents or patent applications. H-index (WoS) 34. ORCID: 0000-0003-2151-7802

Influence of Variety and Maturity Stage on Sterolic Composition of Virgin Olive Oil from Central-Western Sicily

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Abstract

Olive oil is one of the most important food products throughout the Mediterranean Basin due to its high nutritional and dietetic value. In recent years, there has been increased interest in the sterols of olive oil for their health benefits and their importance to virgin olive oil quality regulation. The impact of sterols on the human health is proved by several studies, showing that a sufficient quantity of β-sitosterol inhibits the intestinal absorption of LDL-cholesterol.

In olive oil the phytosterol concentration ranges from 800 to 2600 mg kg-1. Sterol esters evaluation has been proposed as useful parameter in studies related to varietal and geographical discrimination. Cultivar and maturity stage are considered among the main factors affecting sterolic composition.

In this study, the sterol content of oils extracted from different Sicilian varieties growing in two different ambient of Sicily and during different stages of maturity, were analyzed. The total sterol contents results were similar to other Mediterranean varieties and Italian oils, however some samples showed a sterol content above the minimum limit (1000 mg/kg) established by the International Olive Oil Council (IOOC) for Virgin Olive Oil. All oils have a high quality, taking into account the main parameters required by the IOOC, including those with sterol values below the limit. Therefore, the results obtained suggested that the olive oils discriminated only for a sterol below legal limit should be re-evaluated, as these values were only caused by particular variety and environmental conditions.

Keywords: Virgin olive oil, Sterol, maturity stage, Central-Western Sicily

The Production of a Fortified Sourdough Bread with Increased Nutraceutical Properties by the Addition of Flaxseed Cake

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Abstract

In recent years flaxseed has been studied as a functional food thanks to the potential health benefits of its components, including the prevention of chronic diseases. This research is aimed at developing new bakery products by the fortification of a sourdough bread with different proportion of flaxseed cake, so to combine all the benefits connected with the use of sourdough with the positive effects of bioactive compounds deriving from flaxseed cake.

The chemical composition of raw materials, dough and final fortified breads was evaluated together with changes in nutraceutical properties of the products and sensory profile of fortified breads. All the results were compared with those obtained from the analysis of a white sourdough bread produced in the same operative conditions.

Compared to the traditional one, bread retained a significant level of phenols and showed a higher antioxidant activity. Moreover, the maximum percentage of flaxseed cake which does not compromise the sensory profile of the fortified bread was determined. The preliminary results indicate that the addition of flaxseed cake deeply influences nutritional and chemical characteristics of bread, suggesting that the use of this by-product could represent a viable alternative for the preparation of bread with potential health benefits and increased shelf life.

Biography

Isabella had Graduated in Chemistry at the University of Rome with 110/110, after an experience in Indoor Risk Chemical Assessment and Forensic Toxicology, she has been working in the laboratory of Food Technology at the Department of Agriculture, Food and Environment of the

University of Pisa for five years where she is completing her Ph.D in a project on "Innovative technologies for the production and preservation of natural leavening products with high nutraceutical content". She has practice in chemical, microbiological and sensory analysis of food matrices and she is currently engaged in various research projects, with particular reference to Food Technology.

Mediterranean Food Pattern: Association with Body Mass Index and Waist Circumference

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Abstract

Background: The Mediterranean Food Pattern (MFP) is a cultural model with its own characteristics, which favours the consumption of vegetable products, seasonal and local. Scientific evidence suggest the association between adherence to the MFP and the protection against all-cause mortality, especially its protective role in the development of chronic diseases.

Aim: To evalúate the association between adherence to the MFP and Body Mass Index (BMI), as well as the waist circumference (WC).

Methods: PREDIMED questionnaire was used and anthropometric data were collected with a bioimpedance scale and a tape measure. SPSS Statistics was used to perform the statistical treatment.

Results: About 52% of the participants (50 members of a gymnasium) had 18.5≥BMI<24.9 and 38% were overweight. Was observed that individuals who were 25.0≥BMI<29.9, 68.4% had normal WC, and 31.6% increased WC. Individuals presenting 30.0≥BMI<34.9, 60% had WC increased and 40% a greatly increased WC. Regarding adherence to MFP, 50% of the participants with normal BMI had good adherence and 78.9% with overweight had low adherence to MFP.

Conclusion: Regardless of age individuals with lower adherence to the MFP have a higher BMI and with increasing age individuals tend to abandon MFP. Promoting MFP adherence should be a concern.

Keywords: Mediterranean food pattern; Waist circumference; Health promotion; BMI

Biography

Sónia Fialho graduated in Dietetics at the Escola Superior de Technologia da Saúde de Lisboa in 2000. She developed her professional career specially in the area of Food Safety in a catering company. Currently, collaborates as a professor of Dietetics and Nutrition Degree in Coimbra Health School.

Poster Presentations

The Influence of the Structure of various Isoxazole Derivatives on Photosynthetic Apparatus of Sensitive Edible Plant

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Abstract

We have conducted studies on the influence of isoxazole derivatives with very different structures on the PSII and PSI photosynthetic apparatus of greenhouse and field tomatoes in various stages of their growth. The results were compared with the results of measurements of pure plants grown under the same conditions and with the results of measurements of plants sprayed with three fungicides of very different structures. The conducted research shows that isoxazole derivatives in most cases do not exert destructive effects on the tomato PSII and PSI photosynthetic apparatus as well as symptoms of plant stress were not observed. Some minor differences compared to the control plants were observed only for isoxazole derivatives with very extensive linear or cyclic hydrocarbon fragments (saturated rings). This may be related to the disturbance of gas or water exchange in the plant. These groups of derivatives showed little activity of growth inhibition of the pathogenic fungus. The lack of reaction of the PSII photosynthetic apparatus of a sensitive crop and food plant that is tomato to isoxazole derivatives indicates that it is an environmentally safe group of compounds. It is important that these compounds act on c-DNA and m-RNA of pathogenic fungi and do not damage the plant PSII photosynthetic apparatus on which these pathogens parasite. If the PSII photosynthetic apparatus of the sensitive plant does not react, it is likely that PSII of other less sensitive plants in the environment will not react also. In pathogenic fungi due to the damage of their DNA and RNA, one should not expect that they acquire immunity, thanks to which it will be possible to use the tested isoxazole derivatives for many seasons. Tomatoes tolerated very well isoxazole derivatives of aromatic and heteroaromatic amide type containing a high number of halogen atoms in the molecule - F, Cl, Br. It is a group of the most active antifungal isoxazoles. The presence of a tertiary nitrogen atom in the heteroaromatic ring of the amide portion of the isoxazole derivative makes it possible to convert them into the water-soluble salts of organic acids present in the plant. As a result, they can easily migrate to all parts of the plant or be expelled from the plant. The studied group of isoxazole compounds is characterized by the selectivity of action on pathogenic fungi and safety for host plants. These works made it possible to set the direction in search of new active fungicides.

Impact of Salinity on Nutritional Properties of Date Palm (*Phoenix Dactylifera L.*)

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Zayed University, United Arab Emirates

Abstract

Increased water and land salinity due to seawater intrusion of aquifers, overuse of groundwater, low rainfall and high temperature poses a serious threat to the agriculture sector in the United Arab Emirates (UAE). About 34% of the UAE land is affected by different levels of salinity that are not suitable to grow normal crops. Date palm is considered the most salt-tolerant among all plant crops. However, its adaptability to salinity varies between different cultivars and varieties of date palm trees. A long-term experiment was launched in 2001-2002 by the International Center of Biosaline Agriculture (ICBA) to explore the salt tolerance ranges of 18 elite date varieties that are common to the UAE. The data collected were limited to impact of salinity on growth and productivity. Results of an experiment that explored the long-term impact of salinity on the nutritional properties of these date varieties exposed to different salinity levels will be reported and discussed.

Biography

Dr. Dghaim has an interdisciplinary research activity in the areas of organometallic catalysis, environmental and analytical chemistry and public Health.

Her Ph.D dissertation focused on the development of a novel sequential insertion of imine/CO into late metal-carbon bonds as a novel route towards the synthesis of polypeptides and other biologically relevant molecules. During her academic tenure at Zayed University, Dr. Dghaim participated in several international presentations and research publications related to the fields of chemistry, and environmental and public health. She participated in a research program that collected data on the health status and various environmental exposures of adolescents and children residing in the United Arab Emirates. Her current research is focused on environmental pollution, in particular, examining the chemical and microbial quality of water, soil, plants and sediments.

Compositions and Sensory Characterization of Olive Oils from Central-Western Sicily

Luciano Cinquanta[1], Diego Planeta[1], Pasquale Marino[2] and Onofrio Corona[1]*

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Abstract

In Sicily, olive has been cultivated since ancient times and its germplasm is characterized by a wide genetic diversity that could be related to its domestication and spread in ancient times, and to some reproductive biological peculiarities as self-incompatibility.

In this research, EVOO of Sicilian heritage such as *Nocellara del Belice, Biancolilla, Biancolilla centinara* and *Passulunara,* was been investigated. The assessment regards main chemical-physical parameters and sensory profiles, based on the olfactory and gustatory characteristics. Samples were obtained from Bona Furtuna farm (Corleone, C-W Sicily), equipped with a continuous two and half phases cold extraction system.

Results showed that the total polyphenols fraction were between 174 and 645 mg/kg: *Nocellara del Belice* EVOO showed higher values: ranging between 523 and 645 mg/kg: *Passulunara* and *Biancolilla* between 313 and 401 mg/kg and *Biancolilla centinara* between 174 and 268 mg/kg. Thus, twenty-one volatile compounds, belonging to the chemical class of acids, alcohols, aldehydes, esters, hydrocarbons, ketones and phenols, were identified and quantified in the Sicilian EVOO. The sensory profiles were very different among the analyzed varieties. *Nocellara del Belice* had a higher content of aldehydes, responsible for the fruity, herbaceous and aromatic notes, showing a greater perception of fresh grass, tomato, almond and artichoke. *Biancolilla centinara EVOO* was characterized by a greater perception of descriptors of herbs, hay, bitter and astringency, compared to the Biancolilla EVOO. These results highlighted how the in-depth knowledge of the varietal characteristic could be important and useful in the production and promotion of typical EVOO in western Sicily, which has a great tradition in this production.

Keywords: Virgin olive oil, Phenols, Volatile compounds, Sensorial proprieties

nanoTOM a European Project to Exploit Tomato Nanovesicles

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Abstract

The interest in mammalian extracellular vesicles (EVs) is rapidly growing due to the important role of EVs in intercellular communication. Recently, it has been demonstratedthat plants also secrete EV-like structures similar to those of mammalian-derived exosomes. nanoTOM is a European project that aims to develop a novel drug delivery system for nutraceuticals based on nano-sized biomembrane-enclosed vesicles isolated from tomato (*Solarium lycopersicum*). We have selected tomato because it important in Mediterranean plant crop with fare aching food industrial prospective. Especially, in this study, we have chosen two tomato variants Red setter and MicroTOM to produce micro (MVs) and nanovesicles (NVs). NVsand MVs were isolated from different plant organs: fruit, root (exudate) and leaf (apoplastic washing fluid) using differential ultracentrifugation and solubilisation method commonly applied in EV-research. Further separation into different vesicle classes were obtained by gradient ultracentrifugation. Transmission electron microscopy (TEM) and dynamic light scattering (DLS) experiments confirmed the vesicle characters of the samples. Concentrations of isolated vesicles were determined by BCA-nanodrop method; SDS-PAGE analysis was performed to obtain protein profiles, and shot-gun proteomics to identify biocargo. The presentation will summarize the results have obtained by nanoTOM in the characterization of different types of vesicles in tomato.

Keywords: Extracellular vesicles, Nutraceuticals, Solarium lycopersicum, Drug delivery systems

Natural Sources Derived Nanovesicles in Food Sciences: Unlocking the Potential

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Abstract

Cell-derived vesicles are membrane-enclosed organelles found within or outside the plasma membrane. They transport proteins, lipids, nucleic acids and other small molecules such as metabolites.[1] The role of mammalian extracellular vesicles (EVs) in intercellular communication is well documented, and the role of plant-derived vesicles in inter-kingdom communication has also been proposed. Here we present the isolation of nanovesicles from Fragaria ananassa. Strawberry (Fragaria species) is one of the most popular fruit that is consumed in large quantities all around the world for its delicious taste. They have high content of antioxidants, vitamin C and represent a valuable aid in reducing low density lipoproteins like cholesterol. The nanovesicles (NVs) enriched fraction was isolated using differential ultracentrifugation. These were further separated into different vesicle populations based on their densities using sucrose/D2O double cushion ultracentrifugation and differential solubilisation method.[2] The protein contents of vesicles with different densities were quantified by micro BCA and the protein profiles were obtained by SDS-PAGE. The Z-average of the NVs present in the fraction with similar density to mammalian exosomes, was 164.4 nm with standard deviation 42.73 nm as determined by Zetasizer. Protein cargo of the different NV fractions were analyzed by LC- MS/MS-based shotgun proteomics to identify enzymes and other possible players that can account for biological activities.

Keywords: Vesicles, Strawberry, Ultracentrifugation, Mass Spectrometry, Proteomics

Biography

Christopher Stanly is a Post-Doctoral Research Fellow at the Institute of Biosciences and BioResources, National Research Council of Italy, Naples, Italy. He is part of VES4US, a project funded by the FET-Open call of the Horizon2020 programme of the European commission. He completed his Ph.D in Nephrology from the Second University of Naples, Italy. He graduated from the University of Madras, Chennai, India, with master's degree in Biotechnology and bachelor's degree in Plant Biology and Plant Biotechnology. He is currently working on developing a new platform for the production of extracellular vesicles from natural resources.

Effect of Different Dietary Patterns on Hepatic Inflammatory Cytokines in NAFLD Rats

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Abstract

To test the changes of inflammatory factors IL-1β, IL-18, NLRP3, Caspase-1 of serum and liver of NAFLD rats, in order to investigate the influence of dietary factors on the pathogenesis of NAFLD. 12 normal rats as the control group, and 48 NAFLD model rats which were fed with high-fat diet for 8 weeks and were divided into four groups randomly: high-fat diet group, high-protein diet group, high-carbohydrate diet group and normal diet group. These rats were randomly selected to be killed after feeding for 4 and 8 weeks. The expression level of serum IL-1β, IL-18 was tested by ELISA. The level of IL-1β, IL-18, NLRP3, Caspase-1 mRNA of liver was assayed by qRT-PCR. The method of Western blot was used to detect the protein level of NLRP3 and Caspase-1 of liver. The level of serum inflammatory cytokines IL-18, IL-1β and the transcriptional level of IL-1β, IL-18, NLRP3, Caspase-1 mRNA and the expression of protein of NLRP3, Caspase-1 in high-fat diet group, high-protein diet group and high-carbohydrate diet group were increased. It presented that IL-1β, IL-18, NLRP3, Caspase-1 participated in chronic inflammation in the course of the development of NAFLD. Irrational structure of dietary can aggravate the development of NAFLD, and high-fat, high-protein and high-carbohydrate diet are the risk factors of NAFLD.

Biography

Prof. Jiang Jian-hua graduated from Anhui Medical University, is currently Director of Clinical Nutrition, the First Affiliated Hospital of Anhui Medical University, the famous clinical nutrition specialist. Long been engaged in metabolic disease research, she presided over a number of research projects and published dozens of papers.

Electrochemical Analysis of Caffeine

Zehra Yazan* and Alper Fitoz

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Abstract

Caffeine is an alkaloid and found in commercial food and pharmaceutical products. Although caffeine is widely used in pharmaceutical and food preparations, it shows toxic effect at higher concentration and causes cardiovascular disease, depression and hyperactivity [1,2]. For this reason, the development of new methods for the analysis of caffeine is very important task in terms of food industry and human healthy. In this study, electrochemical methods were developed for the quantitation of caffeine in different commercial food products. Adsorptive stripping square wave voltammetry (AdsSWV) and differential plus voltammetry (AdsDPV) are based on the oxidation of caffeine on the disposable modified pencil graphite electrode. Some main electrochemical parameters such as supporting electrolytes, accumulation potential, accumulation time and pH were tested to find the optimal voltammetric conditions. Under the optimal experimental conditions, the AdsSWV and AdsDPV methods were validated by analyzing the independent test samples.

Biography

Zehra Yazan is a professor doctor at Ankara University, Faculty of Science, Department of Chemistry, Ankara, Turkey. She got her BS degree from Ankara University, Department of Chemistry, Ankara, Turkey. She received her MSc and Ph.D degrees from Ankara University, Analytical chemistry in 1993 and 1998, respectively. She was visiting Prof. Lo Gorton at the department of Chemistry in Lund University via EU educational programmes Office in 2009. Her research interests include electrochemistry, electrochemical sensors, the construction of electrochemical sensors and their pharmaceutical and food application.

Aromatic Herbs: Uses and Health Benefits

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Abstract

Background: Now-a-days, the use of aromatic herbs (AH) is increasing at a high pace in Europe, which can be explained due to the growing preoccupation with health and well-being. The AH are plants usually of small dimensions that present several proprieties and uses in the Portuguese cuisine. They are often characterized by their specific smell which provides a different aroma to the dishes, enhancing their flavour and colour.

Aim: To specify the several benefits of the use of AH in the confection of daily meals.

Methods: It was conducted a review process, recurring to scientific databases using the terms: "aromatic herbs", "bioactive compounds", "benefits", "confection" and "nutrition values".

Results: AH are mainly constituted by proteins, fibre, sugars, essential oils, and minerals. Besides those components they also have high concentrations of bioactive compounds such as phenolic acids, flavonoids, sterols and cumarins. Another benefit is the reduction of the amount of salt added to the dishes. However when we focus on the proprieties of the AH the literature showed that they are influenced by many aspects, such as: physical processes (chopping, drying or grinding) and cuisine technics associated to their confection.

Conclusion: The use of AH can have a strongly positive influence on the reduction of salt consumption in our diet and also add beneficial properties to it.

Keywords: Aromatic herbs, bioactive compounds, benefits, confection and nutrition values.

Biography

Sónia Fialho graduated in Dietetics at the Escola Superior de Tecnologia da Saúde de Lisboa in 2000. She developed her professional career specially in the area of Food Safety in a catering company. Currently, collaborates as a professor of Dietetics and Nutrition Degree in Coimbra Health School.

Preliminary Evaluation of Various Types of Wheat Flour for the Production of Wafers and Waffles: Functional and Structural Properties

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[2]Universitat Politècnica de València, Spain

Abstract

Wafers and waffles products have a high demand due to their wide variety of texture and flavors. Wheat flour is the main ingredient in the formulation of these food products. The technological properties of the flour have a significant influence on the effectiveness of the process, the formation of adequate structural and rheological characteristics of semi-finished products and the final product texture. Wheat flour with weak gluten and lower water holding capacity is required to provide fluid batter for waffles production. In the production of some types of soft waffles with a foamy batter structure, the flour foaming ability is also important. In turn, wheat variety, the milling process, the flour yield, etc influence the functional and technological properties of the flour. The obtained results will help to propose recommendations for their appropriate use rationalizing the production of highquality wafers and waffles without using inorganic improvers.

The aim of this study was to compare some functional and structural properties of refined and whole grain flour sources from new varieties of wheat Belyava and Chernobrova. Particle size distribution (laser diffraction method), microstructural observations (Field emission scanning electron microscope), water holding capacity, foam capacity and foam stability have been evaluated. Given the characteristics of black wheat flour, it can be used in waffle production. Due to its lower WHC and higher foam capacity as compared to the other flour samples, white wheat Belyava variety (both refined and whole grain flours) can be suggested to be used for wafer and waffle production.

Biography

Anastasia Fateeva is studying under a postgraduate program for getting Ph.D, specialty "181 Food Technologies" at Odessa National Academy of Food Technologies. The scientific interest lies in the field of the various wafer and waffle texture production based on new types of wheat and oilseeds and cereals by-products. According to research results: conference Proceedings – 15, patent for utility model – 5.

Awarded a scholarship funded by the European Commission within the Erasmus+ Program, to undertake an Ph.D mobility for a period of 5 months in The Universitat Politècnica de València, Spain.

ResearchGate: https://www.researchgate.net/profile/Anastasia_Fateeva2