2nd World Congress on

Food Safety and Nutrition Science

August 22-23, 2022 | London, Uk

Organizational Representations



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August 22, 2022 **Conference Agenda**

10:00-10:15 Introduction

Keynote Sessions

10:15-10:35 Tittle: Modern healthy nutrition need to be based on omix data and meet 3P medicine expectations
Nadiya Boyko, Uzhhorod National University, Ukraine

10:35-11:00 Tittle: Improving sustainability in the table olive industry by transforming olive kernels into valuable food ingredients
Agostina Galitsopoulou, Eleones Halkidikis S.A., Greece

Group Photo

Food Safety in 21st Century | Food Microbiology and Enzymology | Food Chemistry and Biochemistry | Food Engineering | Food Technology | Nutrition Science

Speaker Sessions

11:00-11:20 Tittle: The organic nGMO soybeans as a raw material in soy milk innovation production.
Ewa Zary Sikorska, Bydgoszcz University of Science and Technology, Poland

11:20-11:40 Tittle: Pulsed Electric Field (PEF) as innovative process for the olive oil extraction process.
Antonio Berardi, University of Bari, Italy

11:40-12:00 Title: Novel preparation of Betalain extract from waste for intelligent packaging film application
Lakshmishri Roy, Techno Main Salt Lake, India

12:00-12:20 Title: Moringa (Moringa oleifera Lam.) and Jujube (Ziziphus Lotus Linn.) leaf extracts effect on processed corn oil under frying conditions.
Madiha Dhibi, University of Monastir, Tunisia

Break 12:20-12:30

12:30-12:50 Title: Transforming our food system to enhance food safety and sustainability – perspectives from Finnish Lapland
Dele Raheem, University of lapland, Finland

13:30 - 14:00 Title: Plant-Based Curing Methods Alternative to Nitrite in Fermented Meat Products
Tahir Yilmaz, Selcuk University, Turkey

01:10-01:30 Title: The unusual pattern of bacterial evolution: Genomes of Clostridium botulinum and some other bacterial species carry eukaryotic genetic loci involved in coding for 18S and 28S ribosomal subunits.
Mamuka Kotetishvili, University of Georgia, Georgia

Lunch & Networking 01:30-02:30

02:30-02:50 Title: Separation and identification of iron-chelating peptides from mung bean protein hydrolysates by MALDI-TOF-MS..
Zohreh Karami, Chulalongkorn University, Thailand

02:50-03:10	**Title: The Effect of Frozen Storage on The Quality of Atlantic Salmon** Wesam Al Jeddawi, Clemson University, USA
03:10-03:30	**Title: Place of sheep and camel meat in Algerian consumption** Mohamed Sadoud, H.Benbouali University of Chlef, Algeria
03:30-03:50	**Title: How to guarantee food safety throughout the supply chain** Vera Mónica Dias Botelho, Twinings Ovo, UK
03:50-04:20	**Title: Innovations and applications of 3D printing in food sector-A review** Akriti Taneja, Shoolini University, India

Panel Discussions

Closing Ceremony

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Supporting Journal

Supporting Journal

Journal of Nutraceuticals and Food Science

Food Congress 2022

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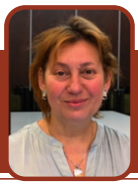
Keynote Forum



Nadiya Boyko
Uzhhorod National University, Ukraine

Modern healthy nutrition need to be based on omix data and meet 3P medicine expectations

Modern nutrition is a multidisciplinary and complex subject combining the approaches of the epidemiology, biochemistry, chemistry, behavioral science, biology, food science and medicine. Thus we need to use all the available complementary data in order to construct "next generation functional foods".

The demands to these foods one might list: 1) be natural of origin, 2) be safe, 3) contains minimal or zero chemical / genetically modified additives, 4) be simple in preparation with minimal cooking efforts, 5) be fermented in order to be rich on biological active compounds and beneficial microbes 6) be prepared from naturally cultivated edible plants, 7) be clearly labeled of all the ingredients and 8) better be recognized by brand or at least by codes of food composition data bases.

Ideally will be to have a data about these products exact influence on human health, based on the results of clinical approbation: 1) of their different components or 2) whole meal / diets. To meet this goal from first glance complicated (bio) technologies should be exploited. Interestingly that the majorities of these requirements are typical for the traditional well-known ethnical dishes that are 1) mostly accepted by nations, 2) can be easily prepared, 3) imagined as food with healthy impact on human health.

The challenges to make these new generation foods widely used are 1) short shelf life, 2) packing and transportation' difficulties, 3) varieties of recipes 4) (bio)technological gaps. Recently we developed a line of such a novel traditional functional modern foods of new generation EdiensTM. These products had been recently created particularly with unique microbial starters which are sequenced and preliminary selected / investigated in numerous in vitro, in vivo, ex vivo models.

These products had been recently created particularly with unique microbial starters which are sequenced and preliminary selected / investigated in numerous in vitro, in vivo, ex vivo models.

In addition the synergetic properties of these strains of different phylogenetic groups with most popularly used plant originated biological active compounds isolated from local edible plants and berries had been carefully detected.

Person-specific efficacy to regulate human gut microbiome had been detected for individually prescribed foods via limited controlling diet studies. In order to promote the implementation of newly developed functional foods relevant databases and AL for the calculation of personalised nutrition needs had been established.

Key words: modern nutrition, food composition data bases, functional food, individual nutrition, human microbiome

Biography

Boyko Nadiya is: 1) Head of the Department of Clinical and Laboratory Diagnostics and Pharmacology, 2) Director of the RDE Centre of Molecular Microbiology and Mucosal Immunology at Uzhhorod National University, Ukraine. She took a PhD degree in 1994 and D.Sc. degree in 2010, both Degree work were devoted to Microbiology. The total work experience within Uzhhorod National University is 31 years. From 2000 to 2006 she studied at the Doctoral Degree program at Uzhhorod National University, Ukraine and in the same time was working on sabbatical position as a visiting professor at the University of Pennsylvania, USA. She is the author of about 300 scientific works, including 100 papers in professional scientific journals, more than 50 publications in the pier revived journals, and Chapter in Elsevier press, index H=11.

Her research field particularly is personalised nutrition in regulation of human [gut] microbiota for prevention of noncommunicable diseases. She is also the high quality specialist in other Health and Agro-Food relevant scientific fields, knowledge transfer expert with academic background, establisher of Ukrainian and Slovak Technology Platforms “Agro-Food”; experienced stakeholder manager with links to industry, academia and researchers in Europe. Specialist with expertise in life sciences, participated in international projects like BaSeFood, JSO-ERA EU – FP7, CAPINFOOD (SEE), BacFoodNet (COST), ODiN (FP7), FoodWARD (Erasmus) and H2020 (SKIN) projects. She is actively and systematically participating in national and international symposiums, conferences, seminars; often as invited speaker.

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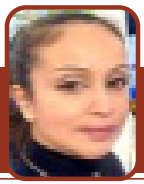

Agostina Galitsopoulou *Msc*

Head of Research and Development department,Eleones Halkidikis S.A. ., Greece

Improving sustainability in the table olive industry by transforming olive kernels into valuable food ingredients

This research project has been focused on improving the environmental performance of the table olive industry sector, by transforming the olive kernels into new forms of food ingredients with potential pharmacological and nutritional importance. Experimental results showed that the olive kernels can be suitably processed by mechanical removal of the kernel hull, separation and retrievement of the edible part of the kernel and freeze drying of the final product for removing the excess moisture content. The processed final product is characterized by pleasant organoleptic characteristics and a good shelf-life stability. Regarding the nutritional aspects of the processed by-product, experimental results showed significant values of multiple bioactive compounds, such as polyphenols (7670 tyrosol mg/kg), vitamin E (144 mg/kg), monosaturated fatty acids (41.41 g/100g), oleic acid (40.35 g/100 g), dietary fibre (16.4 g/100 g), plant proteins (15 g /100 g) and essential microelements (K, Ca, Mg, Zn). In conclusion, the results illustrate that the by-products of olive kernels should be reconsidered as a valuable food source with pharmacological, nutritional, environmental and financial importance.

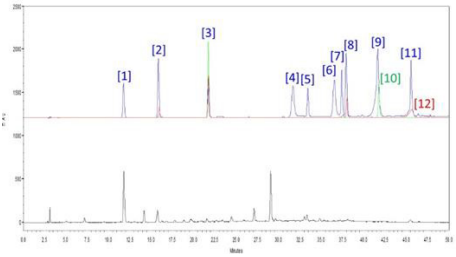

Figure 1:RP-HPLC-DAD chromatogram of the olive kernel sample at 280 nm (black line). The coloured chromatograms (blue, red and green line) correspond to the phenolic compounds according to the EFSA scientific substantiation on polyphenols (EFSA Journal 2011;9(4):2033).

Recent Publications

1. Calvano, C. D., & Tamborrino, A. (2022). Valorization of Olive By-Products: Innovative Strategies for Their Production, Treatment and Characterization. Foods, 11(6), 768.

2. Doménech, P., Duque, A., Higueras, I., Fernández, J. L., & Manzanares, P. (2021). Analytical Characterization of Water-Soluble Constituents in Olive-Derived By-Products. Foods, 10(6), 1299.

Biography

Dr. Agostina Galitsopoulou is a food scientist with a master's degree in food science and nutrition and a PhD in food chemistry. She is currently working as the Head of Research and Development department of the Company Eleones Halkidikis S.A. She is involved in the research area of by-product utilization for the production of innovative, nutritional and healthful foods. Her research work has been awarded in the European Ecotrophelia platform for the promotion of eco-innovation in the food industry. Her current research activities involve the potential utilization of by-products from the table olive industry sector.

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Ewa Żary-Sikorska

Bydgoszcz University of Science and Technology, Poland

The organic nGMO soybeans as a raw material in soy milk innovation production

Statement of the Problem: Soybeans are an excellent source of functional ingredients, such as dietary fiber, high-quality protein and polyphenols, mainly isoflavones. The lipid components disadvantageous to the health of the consumer are not present in soybeans, such as cholesterol, or are severely limited, such as, for example, saturated fatty acids. Soy products can be a health-promoting alternative to food of animal origin. In soybeans, as well as in other seeds of legumes (beans, broad beans, peas), there are inhibitors of enzymes digesting proteins, the so-called trypsin and chymotrypsin inhibitors. These are compounds that hinder the use of proteins. Their unfavorable effect causes disturbances in the digestion of proteins. Due to the fact that they are proteinaceous, they are denatured under the influence of temperature, i.e. they are destroyed by e.g. cooking and earlier soaking. The purpose of this study was to develop a technology for obtaining "soy milk" with improved composition, obtained from two organic nGMO soybeans: expanded and sprouted. It was assumed that the use of certain technological treatments and raw material from organic production (nGMO soybean) will ensure the appropriate quality of the obtained products, including microbiological purity, sensory features and lowering the content of anti-nutritional substances, especially trypsin inhibitors. Methodology & Theoretical Orientation: The technology of obtaining soy milk from nGMO soybeans was developed, the quality of which has been confirmed in microbiological, sensory and anti-nutritional tests. Findings: the production technology used has brought the expected results and the final product (expanded nGMO soy milk) was characterized by very good quality features. Conclusion & Significance: Soy products are a very important component of a vegan and vegetarian diet. The ecological nature of the raw material and the need to replace animal protein sources in the standard diet are valid today. Improving the production technology and introducing raw material innovations, in this case organic nGMO soybean, are in line with the above statements.

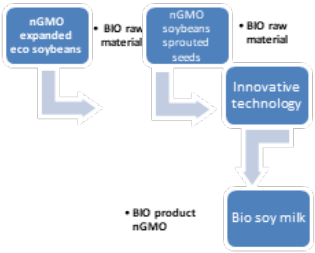

Figure 1: Research scheme using organic soybean nGMO

Recent Publications

1. Dixit AK, Antony J, Sharma NK, Tiwari RK (2011) Soybean constituents and their functional benefits. Research Signpost 1: 367-283.

2. Fukuzumi A, Tokumasu N, Matsuo A, Yano E, Zaima N, Moriyama T (2021) Detection and Characterization of the Soybean Allergen Gly m7 in Soybean and Processed

Soybean Foods. Allergies 1, 233-246.

3. Mateos-Aparicio I, Redondo Cuenca A, Villanueva-Suárez M., Zapata-Revilla MA (2008) Soybean, a promising health source. Nutricion Hospitalaria 23(4):305-312.

4. Qiu L-J, Xing L-L, Guo Y, Wang J, Jackson SA, Chang R-Z (2013) A platform for soybean molecular breeding: the utilization of core collections for food security. Plant Molecular Biology 83, 41-50.

5. Valizadeh M, Alimohammadi F, Azarm A, Pourtaghi Z (2022) Uses of soybean isoflavonoids in dentistry: A literature review. Journal of Dental Sciences, https://doi.org/10.1016/j.jds.2021.11.020

Biography

Ewa Żary-Sikorska has extensive achievements in the field of bioactive food ingredients, especially phenolic extracts and fiber-phenolic preparations obtained from waste materials in the processing of fruit and vegetables. In her scientific activity, she is particularly interested in the metabolism of bioactive ingredients and their impact on health, studied in model experiments. She is also interested in innovative production technologies that improve the pro-health character of food products.

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Antonio Berardi PhD

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Pulsed Electric Fields (PEF) as innovative process for the olive oil extraction process

The olive oil extraction process is done with known production facilities nowadays it is necessary to take further approaches to improve the long term sustainability of this process. Research is working to build and implement more efficient processing lines, integrated with new machines, in order to obtain products of superior quality and yield, guaranteeing efficient and sustainable processes.

In the last years, many researchers and industries have shown particular interest on the application of pulsed electric fields (PEF) technology which is able to have an action on physical characteristics of products, reducing the processing times and increasing the extraction yields in several variety of foods processed.

An industrial pilot plant capable of applying unipolar pulses to the food load with voltages up to 10 kV, currents up to 200 A and maximum average power of 3 kW was implemented and tested on an industrial olive oil plant. The study demonstrated the easy and immediate implementation of the PEF system unit. The tests carried out on homogeneous batches of olive oil, demonstrated an improving in terms of oil extractability and quality since the content of bioactive substances was enhanced. Based on the flexibility and continuous operation of PEF, the technology can be easily integrated into olive oil extraction plant increasing also the process efficiency.

Recent Publications

1. A. Tamborrino, C. Perone, R. Romaniello, B. Bianchi, A. Berardi, A. Leone, Numerical Simulation and Experimental Validation of a Vibrating Screen for the Sieving of Chamomile (matricaria Chamomilla L.), Chemical Engineering Transactions. 87 (2021) 277-282. doi:10.3303/CET2187047..

2. C. Perone, R. Romaniello, A. Leone, A. Berardi, P. Catalano, A. Tamborrino, CFD Analysis of a Tube-in-tube Heat Exchanger to Pre-heat Olive Pastes, Chemical Engineering Transactions. 87 (2021)253-258. doi:10.3303/CET2187043..

3. B. Bianchi, A. Tamborrino, U. Ayr, A. Berardi, P. Catalano, Ambient and Personal Noise Exposure Assessment in a Pasta Factory, Chemical Engineering Transactions. 87 (2021) 403-408. doi:10.3303/CET2187068.

4. Amodio, M.L., Berardi, A., Ricci, I., Babellahi, F. and Colelli, G. (2020). Use of hyperspectral imaging for the discrimination of artichoke by cultivar and harvest time. Acta Hortic. 1284, 165-172 DOI:10.17660/ActaHortic.2020.1284.22 https://doi.org/10.17660/ActaHortic.2020.1284.22.

5. F. Catalano, B. Bianchi, A. Berardi, A. Leone, A. Tamborrino, Experimental Trials and Dynamical Simulation of the Potential Biogas Production in a Frozen Food Industry, Chemical Engineering Transactions. 87 (2021) 295-300. doi:10.3303/CET2187050.

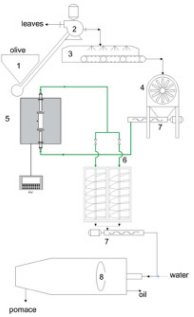
6. R. Romaniello, C. Perone, A. Tamborrino, A. Berardi, A. Leone, A. Di Taranto, M. Iammarino, Additives Individuation in Raw Ham Using Image Analysis,

Chemical Engineering Transactions. 87 (2021) 217-222. doi:10.3303/CET2187037.

7. A. Tamborrino, F. Catalano, A. Berardi, B. Bianchi, New Modelling Approach for the Energy and Steam Consumption Evaluation in a Fresh Pasta Industry, Chemical Engineering Transactions. 87 (2021) 409-414. doi:10.3303/CET2187069.

8. A. Tamborrino, C. Perone, H. Mojaed, R. Romaniello, A. Berardi, P. Catalano, A. Leone, Combined Continuous Machine to Condition Olive Paste: Rheological Characterization of Olive Paste, Chemical Engineering Transactions. 87 (2021) 283-288. doi:10.3303/CET2187048

Figure: Layout of the plant integrated with the PEF equipment:
1) Hopper; 2) Deramifolator; 3) Washing machine; 4) Crusher; 5) PEF; 6) Knead; 7) Single screw pump; 8) Decanter



Biography

Marcela Albuquerque is food microbiologist, PhD in Sciences, and she has been studying the technological and functional aspects of lactic acid bacteria (LAB) during the last 13 years aiming the development of foods with high nutritional and health-added values. She founded the company NEPP – Center for Studies in Probiotics and Prebiotics (RJ, Brazil) where she coordinates scientific consulting projects with private and academic institutions. Her research topics are mainly about the production of B group vitamins and proteolytic activity of LAB to improve nutritional properties of fermented foods as well as the safety aspects of foods exploring natural preservation strategies by using LAB-fermentation. Aiming to summarize her academic and professional career and background contributing to prospect the related LAB topics to the industry and scientific communities, she published the book “Lactic Acid Bacteria: a functional approach” (CRC PRESS, FL, USA) in 2020.

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Bijita Ghatak

Food Technology, Techno Main Salt Lake, West Bengal, India

Novel preparation of Betalain extract from waste for intelligent packaging film application

Natural colour from plant source is being investigated for multifarious ecofriendly sustainable food applications. Among many steps, the pigment extraction is one of the most important steps. Beside conventional extraction methods like Soxhlet extraction, maceration and hydro distillation etc., non-conventional methods like supercritical fluid extraction, pressurized liquid extraction, microwave assisted extraction, ultrasound assisted extraction, pulsed electric field extraction and enzyme assisted extraction are gaining popularity due to the advantages friendliness. Prior to the extraction steps, pretreatment of beetroot waste for stabilization of natural pigments is another important step which must be carefully taken care of. Our aim is to get the maximum yield of betalains from beetroots waste by using green solvents to avoid the harmful effect of organic solvents, as well as to increase the stability of extracted pigments in the microencapsulated forms for application in food formulations and food packaging. Enzymatic mix employed consisted of cellulose, xylanase and pectinase. The enzyme assisted green extraction was coupled with use of Deep Eutectic Solvents, that included magnesium chloride hexahydrate [MgCl2, 6H2O] and urea] [U] proportions (1:1) and (2:1). They performed as extracting and stabilizing agents for red and violet betalains from beetroots. Prepared DES [MgCl2, 6H2O], [U] showed similar properties to eutectic mixtures, such as liquid phase, low melting point and conductivity, thermal stability and variable viscosity. Betalain stability was determined by degradation test. Optimization of pH, temperature and time has also been conducted to increase the productivity and stability of extracted betalains. Microencapsulation is done by freeze drying of mixtures consisting of pigment, maltodextrin + gum Arabic (MD+GA), maltrodextrin + carboxymethyl cellulose (MD+CMC), maltodextrin + carrageenan (MD+C), and maltodextrin (MD) with ration 3:1 and 4:1 (w/v) to the extract. MD+GA coating material indicated highest value of encapsulation efficiency. Betalain sensitivity to pH change is being investigated for development of intelligent packaging film to detect the deterioration of protein rich food products like fish etc.

Recent Publications

1. Hernández-Aguirre, O. A., Muro, C., Hernández-Acosta, E., Alvarado, Y., & Díaz-Nava, M. D. C. (2021). Extraction and Stabilization of Betalains from Beetroot (Beta vulgaris) Wastes Using Deep Eutectic Solvents. Molecules, 26(21), 6342.

2. Singh, A., Ganesapillai, M., & Gnanasundaram, N. (2017, November). Optimizaton of extraction

of betalain pigments from beta vulgaris peels by microwave pretreatment. In IOP Conference Series: Materials Science and Engineering (Vol. 263, No. 3, p. 032004). IOP Publishing.

3. Udonkang, M. I., Inyang, I. J., Ukorebi, A. N., Effiong, F., Akpan, U., & Bassey, I. E. (2018). Spectrophotometry, physiochemical properties, and histological staining potential of aqueous and ethanol extracts of beetroot on various tissues of an albino rat. Biomedicine hub, 3(3), 1-10.

4. Nisa, A., Hina, S., Kalim, I., Saeed, M. K., Ahmad, I., Zahra, N., ... & Shad, R. (2021). Quality assessment and application of red natural dye from beetroot (Beta vulgaris). Pakistan Journal of Agricultural Research, 34(3), 552-558.

5. Farghaly, M. A., Soliman, A. H., & Abdellatif, A. S. Evaluation of Red Pigment Extracted from Beetroot.

Biography

Bijita Ghatak is a Food Technology graduate (B. Tech.) from Techno India, Salt Lake, Kolkata in 2009. Subsequently she has worked in various food and dairy industries and testing laboratories in West Bengal (India) in various capacities. Currently she is in the final semester of her master's degree in Food Technology (M. Tech.) from Techno Main Salt Lake. This poster represents her work on her final year project for her master's degree.

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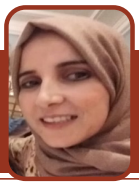

Madiha Dhibi

Research Laboratory - LR12ES05 Lab-NAFS " Nutrition-Functional Food & Vascular Health" at Faculty of Medicine of Monastir - University of Monastir-Tunisia

Moringa (Moringa oleifera Lam.) and Jujube (Ziziphus Lotus Linn.) leaf extracts effect on processed corn oil under frying conditions

Actually, food transition in favor of processed foods is noticeable in Tunisia that has a Mediterranean climate that favors the growth of a great number of medicinal plants as Zizyphus Lotus, also known as Jujube but it is not well exploited in the food industry. However, Moringa oleifera known as magic plant is an introduced plant with worldwide exploited therapeutic and nutritional potential. In the present study, leaf extracts of moringa (ML) and jujube (JL) were compared for their phenolic contents, antioxidant activity and their effects on the thermal stability of corn oil (CO). Refined CO and CO supplemented with 0.5% ML (CO+ML) and JL (CO+JL) were exposed to heating (180°C) for 8 hours. Changes in peroxide value (PV), free fatty acids (FFAs), oxidative stability (OS) and fatty acids (FAs) profiles were monitored. Results showed that JL presented higher phenolic ccontents including phenolic acids and flavonoids than ML.. For antioxidant activities, JL exhibited greater anti-DPPH activity and had higher reducing power than ML. After heating for 8 hours at 180°C, FFA increased by 24%. However, FFAs of enriched oils decreased by 30-40% indicating that JL and ML protected effectively oil from primary oxidation product generation. CO+ML and CO+JL showed lower PV and higher OS than CO. CO+JL was more stable than CO+ML. For FAs profile, a significant increase in saturated and mono-unsaturated FAs percentages and a significant decrease in polyunsaturated FAs were recorded for CO and CO+ML. by 18% and 7%, respectively. No changes in FAs composition were observed for CO+JL demonstrating an excellent resistance of this enriched oil to thermal oxidation. This might be attributed to the presence of polyphenols allowing extended oil thermal resistance. Results confirmed that the protection induced by Jujube leaves is better than that of Moringa leaves in terms of PV, FFAs, OS index and stability of FAs profile

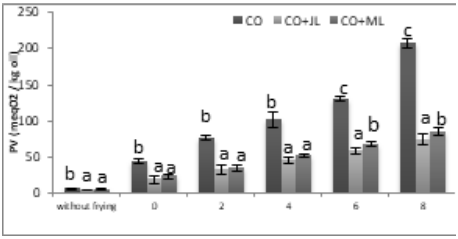

Figure: Changes in peroxide value (PV) of oils during heating at 180 °C for 8h. CO: Corn Oil, CO+JL and CO+ML: Corn Oils enriched respectively with Jujube and Moringa Leaves. Results are expressed as means ± standard deviation (n = 3). Bars (means value ± SD) with different letters after each heating period are significantly different ($p<0.05$).

Recent Publications

1. Bian Y, Wei J, Zhao C, Li G, (2020) Natural polyphenols targeting senescence: a novel prevention and therapy strategy for cancer. Int. J. Mol. Sci. 21

2. Montané X, Kowalczyk O, Reig-Vano B, Bajek A, Roszkowski K, Tomczyk R, Pawliszak W, Giamberini M, Mocek-Płóciniak A, Tylkowski B (2020) Current perspectives of the applications of polyphenols and flavonoids in cancer therapy, Molecules. 25

3. Les F, Arbonés-Mainar J.M, Valero M.S, López V (2018) Pomegranate polyphenols and urolithin A inhibit α-glucosidase, dipeptidyl peptidase-4, lipase, triglyceride accumulation and adipogenesis related genes in 3T3-L1 adipocyte-like cells, J. Ethnopharmacol. 220 67–74

4. Chen J, Mangelinckx S, Adams A, Wang Z.T, Li W.L, De Kimpe N (2015) Natural flavonoids as potential herbal medication for the treatment of diabetes mellitus and its complications, Nat. Prod. Commun. 10 187–200

5. Zemouri-Alioui S, Bachir beyM, Kurt B.Z, Sonmez F, Louaileche H (2019) Optimization of ultrasound-assisted extraction of total phenolic contents and antioxidant activity using response surface methodology from jujube leaves (Ziziphus jujuba) and evaluation of anticholinesterase inhibitory activity, J. Food Meas. Charact. 13 321–329 .

Biography

Associate-professor in food industry with 10 years of teaching experience at Tunisian universities Expert in food sciences and technologies. Distinguished publications in renowned academic journals all over the world in the field of food processing, cardiovascular diseases risk factors. Developed partnership and collaboration between university and food industry companies. Active coordinator in license reinstatement.

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Dele Raheem

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Transforming our food system to enhance food safety and sustainability – perspectives from Finnish Lapland

Statement of the Problem: There is a need to ensure that our foods are safe and an urgent call to transform the food system towards sustainability. Food agriculture and processing have impacts on both individual and planetary health. Our food systems (local and global) need to be more resilient in order to adapt to the consequences of climate change, pandemics and other crises. The link between climate change and food security is a widely discussed topic with an urgent need to mitigate the impacts of climate on food production. Given that food systems are complex but dynamic, it is important to adopt a more holistic approach that incorporates innovative digital solutions in the food value chain from production to consumption. **Methodology & Theoretical Orientation:** A study of different processing methods with considerations on the use of energy and water. An overview of trends of digital solutions that play a significant role on how food products reach consumers in a safe and wholesome form without compromising quality as shown during the COVID era. In the Arctic region context, how our future food system can affect the climate and vice-versa is an important research area that will benefit from collaborative work. Furthermore, the role of digitalization in the overall food system from production to consumption including the disposal of waste is emphasized with perspectives from Finnish Lapland.

Findings: The digital tools have significant role in contributing to safety. The existing infrastructures in the region are important to support digital tools. The uptake of digital tools by food producers is highly dependent on their size. Micro, small and medium enterprises (MSMEs) often need to catch up with large enterprises.

Conclusion & Significance: There is a need to ensure that the value chain for traditional and local food resources that are abundant in the region is developed with innovative technologies. In this presentation, an analysis of the primary steps that are involved in converting raw traditional foods to the final steps of packaged foods and its marketing with digital solutions is carried out. In addition, it is highlighted how digital solutions will help micro, small and medium enterprises (MSMEs) to provide a means to preserve, protect, merchandise and distribute foods within the local economy. When food resources are valorised by MSMEs in the Lapland region - they need to be sustainable, since they are significant economic drivers in the region..

Biography

Dele Raheem holds a doctoral degree in Food Sciences from the department of Food and Environmental Sciences at the University of Helsinki, Finland. He is also an Associate Professor, Food Microbiology (University of Helsinki). He obtained the Post Graduate Certif-icate in Education from the University of Greenwich, London, UK. Dele's research interest is in food bio-processing, preservation and other crosscutting issues related to food security and safety. He has gained extensive research and industrial experience in the last three decades. Currently, he is affiliated to the Arctic Centre at the University of Lapland, Finland as a Senior Researcher

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Plant-Based Curing Methods Alternative to Nitrite in Fermented Meat Products

Fermented meat products are among the foods that are widely produced and consumed worldwide, with their easy preparation, nutritious, and deliciousness. Essentially, they are composed by a meat batter of minced lean meat and fat mixed with other ingredients (sugar, herbs, spices, starter cultures, etc.) and additives (curing salt, antioxidants, etc.) that are stuffed into casings, fermented, and then submitted to drying and maturation process. Recently, due to the attitude of consumers to the additives used in the production of fermented meat products, innovations in their formulation by reducing salt, fat, and curing salts are discussed.

Sodium nitrite is a widely used curing agent in the meat industry. It is known that nitrite prevents the development of Clostridium botulinum in fermented meat products, has an antioxidant effect, protects the red-pink color of the meat, as well as contributes to the formation of the characteristic cured flavor. For this reason, nitrate/nitrite has been widely used as both an additive and a preservative in meat products for a long time. However, nitrate, which can be used in meat products with a long ripening period, needs to be reduced to its more active form, nitrite, for curing reactions to occur in fermented meat products since it is a passive curing agent. Unfortunately, recent studies have revealed that nitrosamines (and consumption of processed meat) formed by the reaction of amine compounds in meat with nitrite are associated with some types of cancer prevalence, certain N-nitroso compounds stimulate gastric cancer, and nitrite has adverse public health effects.

The intense demand of consumers for natural and organic fermented meat products that do not use nitrate and nitrite increases the studies on this subject. For this reason, it is of great importance that the additive to be used as an alternative to nitrate/nitrite provides the typical color of the meat product, guarantees microbial reliability and preserves the sensory properties of the product (such as taste, smell). In order to eliminate the negative point of view arising from the use of nitrate/nitrite in fermented meat products, it has come to the fore to reduce the amount of nitrate/nitrite as much as possible or to use alternative substances. As a result, studies on natural additives and preservatives of plant origin have gained importance. For this reason, if it is desired to produce fermented meat products without adding chemical nitrate/nitrite directly, it is necessary to add natural nitrate sources and microorganisms that will reduce nitrate to nitrite.

In some studies, the effects of nitrite (antioxidant activity, antimicrobial effect, flavor) were tried to be created by using alternative natural ingredients or preservatives in meat products with reduced nitrite content, and no nitrite added. Many leafy vegetables contain significant levels of nitrates. Celery, spinach, radish, lettuce, parsley, and beet are the main vegetables with high nitrate content. It has been observed that the use of different forms of celery as a nitrite substitute in meat products has been widely studied and better results can be obtained than the use of other vegetables. Naturally found in vegetables, nitrate is converted to nitrite by nitrate-reducing microorganisms (Staphylococcus carnosus, Bacillus subtilis, Pseudomonas fluorescens, Escherichia

coli, Micrococcus denitrificans, Enterobacter aerogenes). The conversion of nitrate to nitrite by adding both components to the system is accepted as the most emphasized alternative production method. Different plant and vegetable extracts as nitrite alternatives have been used as a preservative and quality improver in fermented meat products. In addition to these, consumer acceptance is another subject to which attention is desired. The previous sections explain the purpose of nitrate and nitrite applications and the health aspects associated with their use. Reducing nitrate and nitrite seems to be the right approach. However, studies on these components' antioxidant, antimicrobial and antifungal properties should be examined and associated with sensory properties that affect consumer acceptance.

In general, antioxidant and antimicrobial activities of plant extracts have been demonstrated in various studies (Tablo 1). In most cases, the number of microorganisms found in a product prepared with a plant extract was reduced or not detected at all. Moreover, in most cases, adding plant extract to meat products, in combination with a lower quantity (or complete absence) of nitrite, did not cause any adverse effects on the products' sensory qualities (Table 2). Plant extracts used in fermented meat products appear to be a suitable alternative to synthetic nitrate/nitrite.

Table 1: Application of plant extracts as natural compounds affecting the color, taste and smell of fermented meat products with a reduced quantity of nitrite.

COLOR					
Meat Product	**Storage Time [days]**	**Plant/Forms**	**Concentration**	**Nitrite Max. Amount (Control)/ Nitrite Reduced Amount**	**Results**
Ham slices	0, 3, 7, 10, 14, 21, 28, 35	Celery juice/ concentrate	75.6 g, 151.2	100 mg/kg,200 mg/kg/0 mg/kg	b* increase, L* decrease, a* similar to control
Sucuk fermented beef sausage	0, 56, 84	Beetroot (Beta vulgaris)/powder	0.12%, 0.24%, 0.35%	150 mg/kg/100, 50, 0 mg/kg	a* increase, b*,L* decrease
FLAVOUR / ODOR					
Meat Product	**Plant/Forms**	**Flavor**	**Odor**	**Impact/Effect**	
Pork sausage	Cherry (Prunus cerasus L.), blackcurrant (Ribes nigrum L.) /extracts from leaves	Taste similar to sample with nitrite	Odor similar to sample with nitrite	No negative effects of extract addition on product—samples with extract similar to the control sample	
Morta della type sausage	Parsley extract	No differences between samples or and between samples and control	Similar to control	Acceptance product with 2.14 and 4.29 g/kg of extract	

Table 2: Application of plant extracts as natural antioxidants and natural antimicrobials in meat products with a reduced quantity of nitrite.

NATURAL ANTİOXİDANT					
Meat Product	**Storage Time [days]**	**Plant/Forms**	**Concentration**	**Nitrite Max. Amount (Control)/ Nitrite Reduced Amount**	**Results**
Frankfurters	1, 20, 40, 60	Dog rose (R. canina)/extract	180 g (extract from 5 g and 30 g of fruit)	0.1 g/kg / 0 g/kg	Antioxidant properties
Beef sausage	1, 8, 15, 22, 29	pomegranate peel, pistachio green hull/ extract	nitrite:extract [ppm] 100:250, 80:500, 60:750, 40:1000, 0:1250	120 ppm/100, 80, 60, 40, 0 ppm	TBARS reduction, hydroperoxides reduction
NATURAL ANTİMİCROBİALS					
Meat Product	**Storage Time [days]**	**Plant/Forms**	**Concentration**	**Nitrite Max. Amount (Control)/ Nitrite Reduced Amount**	**Results**
Beef fillet	During 30 days of storage	Zataria multiflora Boiss Satureja bachtiarica Bunge, Origanum vulgare L. / essential oils	0.355%, 0.71% v.w-1, 0.275%, 0.55% v.w-1, 0.395%, 0.79% v.w-1	200 mg kg−1, 100 mg kg−1, 0 mg kg−1 in combination with exctarc	Inhibition properties against C. perfringens, C. sporogenes
Pork sausage	14, 28	Cherry (Prunus cerasus L.), blackcurrant (Ribes nigrum L.)/extracts from leaves	0.5 g/100 g, 1.0 g/100 g	1.8 g/100 g of meat/0 g	Strong antimicrobial activity against Pseudomonas

Recent Publications

1. Bakhtiary F, Sayevand HR, Khaneghah AM, Haslberger AG, & Hosseini H (2018) Antibacterial efficacy of essential oils and sodium nitrite in vacuum processed beef fillet. Applied food biotechnology 5(1): 1-10.

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Biography

Tahir YILMAZ is a research assistant and PhD student at Selcuk University, Department of Veterinary Food Hygiene and Technology. In addition to continuing him thesis studies, he carries out studies on meat and meat products, milk and dairy products. In this study, the use of alternative plant-based additives instead of synthetic additives used in fermented meat products, which has a negative view of consumers recently, is discussed.

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The unusual pattern of bacterial evolution: Genomes of Clostridium botulinum and some other bacterial species carry eukaryotic genetic loci involved in coding for 18S and 28S ribosomal subunits

TRecent findings, elucidating genetic recombination between prokaryotic endosymbionts and their eukaryotic hosts, suggest that interdomain gene transfer may appear to be unexpectedly frequent (Woolfit et al., 2009, Mol Biol Evol. Feb;26[2]:367-74.). It has been also suggested that eukaryotic genes horizontally transferred to bacteria can provide new gene functions leading to improved metabolic plasticity and facilitated adaptation to new environments (Li et al. 2019, Nucleic Acids Res. Jul 9;47[12]:6351-6359).

Here, we provide strong evidence for the presence of certain eukaryotic genetic loci in the genome of Clostridium botulinum, the species that has the ability to produce a botulinum neurotoxin leading to the neuroparalytic foodborne disease called botulism. In this study, we also elucidate evidence for the presence of these genetic loci as well across the genomes of some other bacterial species and genera. In the in-silico experiments, we analyzed the genomes of two strains of C. botulinum (MFBjulcb1 and MAP 5) recovered from a retail fish marker in the city of Cochin, India. The strains MFBjulcb1 and MAP 5 were recovered in the summer seasons (June) of 1992 and 2005 respectively. The DNA sequences of the above strains genomes (GenBank IDs: CP027775.1 and CP027781.1 respectively) were available in the GenBank database of the National Center for Biotechnology Information (NCBI) (https://www.ncbi.nlm.nih.gov/). In the genomes of these strains, we screened specifically for the genetic loci that either were involved in coding for hypothetical proteins, or were annotated with the low-probability prediction (i.e., those, prediction for which, was “too short”). The identified genetic loci were then blasted against both the eukaryotic genome (taxid:2759) and the prokaryotic genome (taxid:2) collections (nr/nt), using the Basic Local Alignment Search Tool (BLAST) with the megablast algorithm. The generated BLAST-hits, being in a range of ≥95% of DNA identities, were then selected and analyzed to identify eukaryotic genetic loci that could be highly homologous to the query DNA sequences of the strains MFBjulcb1 and MAP 5. Both the query DNA sequences and their homologs were aligned by ClustalX (version 2.1) for the phylogenetic and genetic recombination analyses. The aligned DNA sequences were analyzed to determine genetic relatedness of the above genetic loci using the neighbor-joining (NJ) algorithm implemented in the SplitsTree program (version 4.14.4). The splits decomposition method and the Phi (Pairwise Homoplasy Index) test, both implemented in the same program, were applied to detect events of genetic recombination of these selected genetic loci between the BLAST query and subject organisms. Bootstrap values ≥ 95 (from 10000 replicates) for nodes of each parallelogram, and fit values ≥ 95 for each splits network, were considered to be statistically significant in the splits decomposition analyses. SplitsTree-identified HGT

events were further reexamined using RDP, GENECONV, BootScan, MaxChi, Chimaera, SiScan, Phylpro, and 3Seq, implemented in the RDP4 software package (Beta 4.96).

The BLAST analysis of the selected genetic loci of the C. botulinum strain MFBjulcb1 allowed us to identify in its genome the 1775-bp region (chromosomal coordinates: 3994448-3996222) sharing 99.94% of the DNA identity with a genetic locus of Sorghum bicolor (XR_002448966.1). In the NCBI GenBank database, a coded-protein product of the above region of this bacterial strain is annotated as a hypothetical protein (followed by the miscellaneous feature, noting that “possible 23S ribosomal RNA but 16S or 23S rRNA prediction is too short”). In addition, using BLAST, we could also identify the 1553-bp region

(chromosomal coordinates: 3984802-3986354) in the genome of the C. botulinum strain MAP 5, which shared 97.04 % of the DNA identity with certain chromosomal regions of Glycine soja (XR_003665115.1) and Glycine max (XR_003264373.1). In the C. botulinum strain MAP 5 genome, the above chromosomal region is distinguished by an unknown fiction, with the GenBank annotation note pinpointing that "possible 23S ribosomal RNA but 16S or 23S rRNA prediction is too short".

The BLAST analyses-generated closest hits of the above loci of the C. botulinum strains MFBjulcb1 and MAP 5 in the eukaryotic genomes (taxid:2759), their statistics (reflecting DNA identity%, query coverage %, and E-values), as well as their genetic relationships, are shown in Fig. 1.

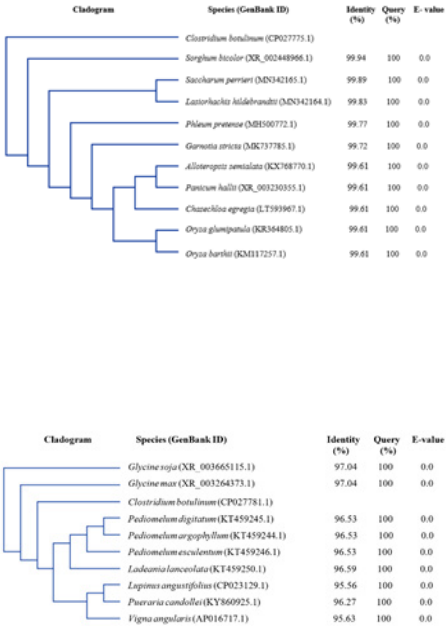

Fig. 1. The NJ cladograms, with the BLAST-generated closest hits in the NCBI Eukaryotic database, and their DNA identity statistics for the chromosomal 1775-bp and 1553-bp regions of the C. botulinum strains MFBjulcb1 and MAP 5, displaying collectively their genetic relationships.

a) The NJ cladogram, based on the DNA sequence analysis of the 1775-bp region, displaying genetic relationships of the BLAST-generated closest hits of the C. botulinum strain MFBjulcb1, and their DNA identity statistics. b) The NJ cladogram, based on the DNA sequence analysis of the 1553-bp region, displaying genetic relationships of the BLAST-generated closest hits of the C. botulinum strain MAP 5, and their DNA identity statistics.

In the above eukaryotic organisms, the 1775-bp region and the 1553-bp region appear to be involved in coding for 18S ribosomal RNA and 28S ribosomal RNA respectively. When blasted against the NCBI prokaryotic database (taxid:2), the closest DNA matches of the 1775-bp region of the C. botulinum strain MFBjulcb1 (DNA identities ≤ 99.49 %; Query coverage: ≤ 100 %; E-value: 0.0) were resulted only in a single or two strains representing collectively an extremely limited spectrum of bacterial species. More specifically, exhibiting the DNA identity values being 99.49%-80.60% (with ≥ 50% of query coverage and E-value: 0.0 - 4e-111), these species were the following: Acinetobacter baumannii, Klebsiella pneumoniae, Stenotrophomonas maltophilia, Clostridium tetani, Clostridium botulinum, Vibrio anguillarum, Azotobacter vinelandii, and Caldora penicillate (including the unidentified species of Pseudomonas, Halomonas, Enterobacter, and Hydrogenophaga). For the above locus of these organisms, the DNA sequence annotation was either missing, or was referred to as a hypothetical protein, frequently accompanied by the miscellaneous feature with the note "possible 16S ribosomal RNA but 16S or 23S rRNA prediction is too short". It is important to indicate that the BLAST-generated closest hits, for the 1775-bp region of the strain MFBjulcb1, appeared to be A. baumannii (CP050525.1) (with 99.49% of the DNA identity; 98% of the query coverage; and E-value: 0.0) and K. pneumoniae (LR596809.1) (96.0% of the DNA identity; 100% of the query coverage; E-value: 0.0). Similarly, when blasted against the NCBI prokaryotic database (taxid:2), the closest DNA matches of the 1553-bp region of the C. botulinum strain MAP 5 resulted in the same limited spectrum of bacterial species represented by a single or two isolates (with the DNA identities ≤ 94.28 %; the query coverage ≤ 50 %; E-value: 0.0 – 2e-178). Interestingly, the same K. pneumoniae strain (LR596809)

(with the DNA identity of 94.28%; the query coverage - 100; E-value 0.0) and the other A. baumannii strain (CP050529.1) (with the DNA identity of 92.19%; the query coverage of 57%; E-value: 0.0) appeared to be the closest hits, generated by BLAST, within this subset of the prokaryotic organisms. Importantly, when trying to align the 1775-bp region of the C. botulinum strain MFBjulcb1 and the 1553-bp region of the C. botulinum strain MAP 5, we found no overlap between these regions. Using the method of splits decomposition, the SplitsTree analysis of the 1775-bp region, for a subset of the organisms from Fig 1a, generated four parallelograms with the bootstrap values varying from 51.4 to 67.2. One of these SplitsTree-constructed parallelograms involved a node shared by C. botulinum and S. bicolor. The Phi test, for the same subset, resulted in values being ≥ 0.09. The RDP4 analyses could not identify recombination evens of the above region among these organisms. No strong evidence was found for genetic recombination of the targeted regions when A. baumannii (CP050525.1) and K. pneumoniae (LR596809.1) were included in the recombination analyses. Using the method of splits decomposition, we could identify three parallelograms predominantly with the strong bootstrap values (fit: 100) in the analysis of the 1553-bp region for the subset of the organisms shown in Fig. 1b, including as well the closest BLAST-generated hits (K. pneumoniae and A. baumannii) from the prokaryotic organisms. Importantly, the node of one of these parallelograms (with the bootstrap value 99.9 derived from 10000 replicates) was found to be shared between the C. botulinum strain MAP 5 and Glycine max (XR_003264373.1). Besides, when examining the 1553-bp region, the RDP4 analysis could determine C. botulinum strain MAP 5 as a recombinant strain, and Glycine max (XR_003264373.1) as a major donor of the above chromosomal region. The recombination beginning and end breakpoints (99% CI) could be identified by RDP4 at the 530rd -757th (p=4.476 E-05) and 196th-484th (p = 4.476 E-05) nucleotide positions respectively in the alignment of the 1553-bp region (with the region [MC corrected] p being 4.476 E-05). In these analyses, the use of the RDP4 algorithms, MaxChi, Chimaera, and 3Seq, resulted in the confirmatory P-values being 4.476 X 10 -05, 6.390 X 10 -04, and 2.521 X 10 -04 respectively.

It was previously shown that certain evolutionary groups of C. botulinum exhibit a high recombination rate (Giordani et al., 2015, Infect Genet Evol. Dec; 36:62-71) predominantly on an intra-species level (Carter et al., 2009, BMC Genomics, 19;10:115; Hill at al. 2007, J Bacteriol., Feb;189[3]:818-32). Here, it is shown that specific strains of this species can carry in their genomes the eukaryotic genetic loci involved in coding for 18S and 28S ribosomal subunits. While the genetic recombination tests of the DNA sequences of 1775-bp region resulted in the weak or no recombinational signals, considering the extremely strong BLAST-generated statistics, it can be strongly suggested still that at least certain strains of C. botulinum, K. pneumoniae, A. baumannii and some other bacterial species have the abilities to acquire and carry in their genomes the eukaryotic genetic loci playing a role in coding for the 18S ribosomal RNA. Besides, it is entirely safe to suggest that the C. botulinum strain MFBjulcb1 acquired the above genetic locus from S. bicolor, sorghum being a major drought-tolerant cereal crop grown mainly in the semi-arid regions of the world. This scenario can be easily plausible if we consider the fact that C. botulinum and S. bicolor can share some common environments including a sorghum silage, where the presence of C. botulinum sometimes may even lead subsequently to botulism in cattle (Driehuis et al. 2018, J Dairy Sci. 101[5]:4093-4110). Besides, the BLAST-produced statistics, accompanied by the very robust recombination analyses outcomes, provided strong evidence for genetic recombination event of the eukaryotic chromosomal region, involved in coding for the 28S ribosomal subunit, between C. botulinum and G. max. Specifically, it can be suggested that the C. botulinum strain MAP 5 could acquire the above chromosomal region from Glycine max, soybean being widely used as human food and animal feed globally. It is important to note that C. botulinum was recovered from fermented soybeans (Halpin et al. 2019, Microbiol Resour Announc., 8 [5]: e01216-18), as well as from the home-prepared fermented tofu (soybean curd) (Centers for Disease Control and Prevention, 2007. MMWR Morb Mortal Wkly Rep. 9;56[5]:96-7) during the foodborne botulism investigations previously. Thus, in summary, it can be strongly suggested that the C. botulinum strains MFBjulcb1and MAP 5 could acquire the above eukaryotic genetic loci from S. bicolor and G. max most likely via transformation when sharing common environments. The carriage of these chromosomal regions across the genomes of certain strains of several more bacterial species may appear beneficial to these organisms. Hence, further in-depth studies are needed to determine whether these eukaryotic genetic loci are adopted as functional units by the above bacterial species, and subsequently

play any role in their virulence, pathogenicity, and/or persistence across specific environments.

Recent Publications

1. Gabashvili E, Kobakhidze S, Koulouris S, Robinson T, Kotetishvili M. Bi- and Multi-directional Gene Transfer in the Natural Populations of Polyvalent Bacteriophages, and Their Host Species Spectrum Representing Foodborne Versus Other Human and/or Animal Pathogens. Food Environ Virol. 2021 Jun;13(2):179-202.

2. Gabashvili E, Kobakhidze S, Chkhikvishvili T, Tabatadze L, Tsiklauri R, Dadiani K, Koulouris S, Kotetishvili M. Metagenomic and Recombination Analyses of Antimicrobial Resistance Genes from Recreational Waters of Black Sea Coastal Areas and Other Marine Environments Unveil Extensive Evidence for Their both Intrageneric and Intergeneric Transmission across Genetically Very Diverse Microbial Communities. Mar Genomics. 2022 Feb;61:100916.

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5. Harris AD, Kotetishvili M, Shurland S, Johnson JA, Morris JG, Nemoy LL, Johnson JK. How important is patient-to-patient transmission in extended-spectrum beta-lactamase Escherichia coli acquisition. Am J Infect Control. 2007 Mar;35(2):97-101

Biography

Mamuka Kotetishvili's main expertise lies in the areas of molecular epidemiology and evolution of infectious agents including foodborne and zoonotic pathogens. He has been studying molecular genetic mechanisms underlying the evolution of natural populations of various human and animal infectious agents. Mamuka Kotetishvili has pioneered his research with the focus on the molecular typing of some important foodborne and other pathogens, including, but not limited to, Salmonella enteritidis, Listeria monocytogenes, Vibrio Cholerae, and the species of Yersinia. His most recent studies have provided some important insights into the evolution of bacteriophages and antimicrobial resistance. Mamuka Kotetishvili has served as an Editorial Board Member and/or an Ad-hoc Reviewer for various internationally well-respected scientific journals including Journal of Clinical Microbiology, Journal of Bacteriology, and Journal of Virology.

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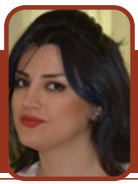

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Separation and identification of iron-chelating peptides from mung bean protein hydrolysates by MALDI-TOF-MS

TIron insufficiency is a frequent nutritional problem around the world. Because of its superiority in terms of enhancing solubility, bioavailability, absorption, and stability, peptides generated from protein hydrolysates have lately received interest as new iron chelators. In this study, mung bean protein concentrate was hydrolyzed using Alcalase and Flavourzyme, Mung bean protein hydrolysates (MBHA and MBHF) had increasing Fe2+ chelating activity (6.2-66.6 µM EDTA) as concentration rose from 0.1 to 2 mg/mL. It can be shown that the Fe2+ chelating activity of Alcalase and Flavourzyme hydrolysates differs, most likely due to changes in amino acid sequence and peptide chain length. The resulting hydrolysates fractionated by size exclusion – high performance liquid chromatography. Fraction 4 of MBHA had the most active chelating activity (98.69±0.2%), and further identified by MALDI-TOF-MS. In our investigation, KLLPLKL, LLKKTV, KPLLPPN, and VKGTTDK were discovered as significant iron-chelating peptides in MBHA. Results indicated that MBPHs-4 has a great potential as natural iron chelator materials for supplement.

Keywords: mung bean protein hydrolysates, iron chelating activity, Alcalase, Flavourzyme, peptide sequence

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The Effect of Frozen Storage on The Quality of Atlantic Salmon

The purpose of this research was to determine the quality changes in Atlantic Salmon stored at different freezer temperatures over 12 months. Salmon fillets were sliced into ~60g to 65g individual samples (length = 7.3 cm, diameter = 4 cm, thickness = 2 cm), packaged under vacuum and stored in the refrigerator (3 hours) prior to freezing and pre-frozen samples were also tested. The fresh and pre-frozen salmon were placed randomly at different freezers (freezer 1 = - 7°C, freezer 2 = -12°C, freezer 3 = -18°C, freezer 4 = -29°C and freezer 5 = -77°C for 12 months and sampled monthly. Quality measurements included freeze loss, thaw loss, weight loss, lightness (L*), thiobarbituric acid reactive substances (TBARS), volatile flavor composition (hexanal) (GC-MS), firmness, water holding capacity (WHC), scanning electron microscopy (SEM) analyses (surface pore numbers and size), moisture content, ash, and sensory evaluation. In general, quality was retained to a greater extent in salmon held at -29°C and -77°C during the one-year storage compared to other storage temperatures. The shelf-life prediction was calculated for each quality indicators by the application of a zero-order reaction model. The quality limit of each quality indicator (weight loss and TBARS) was established according to their correlation with the results of sensory evaluation tests. The shelf-life was defined as the earliest date when each characteristics criteria reached to its limit. The predicted shelf life of freshly frozen Atlantic Salmon was 250.60 days-7°C; 274.58 days-12°C; 368.30 days-18°C; 509.61 days-29°C, and 452.99 days-77°C. While the shelf life of pre-frozen Atlantic Salmon was 244.71 days- 7°C; 289.77 days-12°C; 349.00 days-18°C; 410.85 days-29°C; and 402.98 days-77°C. Based on several quality parameters having minimal variation between 4 to 9 months at home freezer temperatures, energy savings could be realized by use of higher freezer temperatures for storage of salmon.

Biography

Wesam Al-Jeddawi is currently working as an executive director of laboratory services at Core Catalyst Food Sciences in the United States. He is responsible for the overall operation and administration of the laboratory, including the employment of competent personnel, equipment, safety, laboratory policies, quality assurance and test reports. His career niche at the interface of academia and food industries from 2008 to the present. He is a PhD candidate in food technology at Clemson University. He received a master's degree in food science from Clemson University, USA in 2014 (Latin Honor: Cum Laude). He has many publications in international journals. He has participated with several posters and presentations in many conferences in the U.S. and abroad. He is a member of the editorial board in the journal of food research (The Canadian Center of Science and Education) and Advances in Science, Technology and Engineering Systems Journal (ASTESJ), United States.

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Place of goat meat in human consumption in the Chlef region of Algeria

Summary

In Algeria, goat farming is one of the most traditional agricultural activities, always associated with sheep farming. In 2017, Algeria has about 5 million goat heads and produces 7,500 tons of goat meat.

This study aims to analyze and determine the perception of goat meat by consumers in the Chlef region. The latter is an important determinant of the consumption of this type of meat.

Our survey took place in 2019 with a sample of 200 consumers. We have developed a questionnaire that addresses the relative aspects of goat meat perception, consumer expectations, determinants of consumption, perceptions of quality, consumption preferences and places of purchase. Local consumption patterns are the main determinants of goat meat consumption in the study area. Consumer preferences are very complex and heterogeneous and depend not only on the sensory properties of meat, but also on psychological and sociodemographic factors. Consumption varies from one category to another according to sex, age and income. They prefer the thigh part and the odds. The majority of consumers give importance to the price when buying meat. Thus, they look for freshness considered as a factor of appreciation of the quality of a meat and for this, they pay great attention to the color of the meat, which is used as an indicator of the age of the animal. They also consider juiciness and taste as very important criteria in the choice of meat

Biography

The author is a doctor of the National Agronomical School of Algiers (Algeria) in Rural Economics and Sociology. He is a research professor at the University of Chlef in Algeria. He has several publications in international journals and several papers in international congresses. He taught 17 subjects and supervised several engineering and master's theses and currently supervises a doctoral student. He is a member of the scientific committee in two journals and scientific committees of congresses. He is a member of a bioresource research laboratory)

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How to guarantee food safety throughout the supply chain

Statement of the problem:

We cannot guarantee the food safety and quality of our finished product without knowing beforehand the origin and processes our raw materials have gone through.Understanding and knowing the supply chain and assessing the risks at each stage is fundamental to ensure that safe and quality food is produced. Methodology & Theoretical Orientation: Supplier approval, mapping and risk assess each supplier chain and the raw materials.

Findings: Mapping the supply chain can be challenging, however all parties should actively participate in this process in order to inform as much of it as possible. This way we can understand exactly what could pose a risk to our raw materials. Good relationships and communication with suppliers are crucial for this task to be successful. The mapping should start from the field, and should cover growers, transport, warehouses, packers, manufacturers, and for each one of them should assess the activities performed and the risks these activities can bring to our raw material.The type of raw materials, their characteristics and state, should also be considered in order to identify whether they are more susceptible to these risks.

Conclusion & Significance: Mapping and risk assess the supplier chain can become more challenging depending on the complexity, length of the supplier chain and raw material type. This exercise allows for the implementation of strategies, controls and measures to mitigate the risks identified.

Figure 1: Example of a food supply chain

Biography

Vera Botelho is a Senior Quality and Food Safety Technologist at TwiningsOvo, responsible for. She received her MSc degree in Food Technology from The Algarve University. She has over 10 years of experience in the food industry and broad knowledge of area of Quality and Food Safety Management.

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Innovations and applications of 3D printing in food sector-A review

Background: 3-D printing is a neoteric technology that can make existing food value chains client-desirable and sustainable by providing on-demand food production, enabling automated food personalization, and minimizing food wastage. However, its applicability is currently limited, and many researchers are investigating the technique' utility.

Scope and Research: This review paper provides a holistic outlook of the technology beginning with the various techniques utilized for 3-D printing and printers commercially available in the market. Substantial raw ingredients used for printing and the components which could be used soon are discussed. The pros and cons of this technology along with its potential applications and future perspectives of 3-D food printing are also evaluated. The aim of the review is to draw more attention to 3-D printing among researchers in order to improve the printing process and to provide some valuable knowledge for future research.

Key Findings and conclusion: Food printing has a huge impact on food processing

methods, allowing designers/users to change forms and materials with remarkable capability. It can address hunger issues in countries where affordable and fresh ingredients are inaccessible by integrating nutrient-rich substrates, probiotics, bioactive compounds, and functional ingredients into complex fabricated foods. More research is needed to identify alternative materials that could be manufactured using this process. Furthermore, dissemination of information and knowledge about the rise of 3-D printing in food should be well organized and corroborated by relevant and logical scientific findings that will improve consumers or users understanding and acceptance of the technology....

Recent Publications

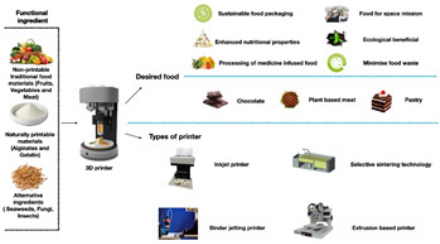
1.Varvara, R., Szabo, K., & Vodnar, D. (2021). 3D Food Printing: Principles of Obtaining Digitally-Designed Nourishment. Nutrients, 13(10), 3617. https://doi.org/10.3390/

2.Escalante-Aburto, A., Trujillo-de Santiago, G., Álvarez, M., & Chuck-Hernández, C. (2021). Advances and prospective applications of 3D food printing for health improvement and personalized nutrition. Comprehensive Reviews In Food Science And Food Safety, 20(6), 5722-5741. https://doi.org/10.1111/1541-4337.12849

Carvajal-Mena, N., Tabilo-Munizaga, G., Pérez-Won, M., & Lemus-Mondaca, R. (2022).

Valorization of salmon industry by-products: Evaluation of salmon skin gelatin as a biomaterial suitable for 3D food printing. LWT, 155, 112931. https://doi.org/10.1016/j.lwt.2021.112931

Watkins, P., Logan, A., & Bhandari, B. (2022). Three-dimensional (3D) food printing—an overview. Food Engineering Innovations Across The Food Supply Chain, 261-276. https://doi.org/10.1016/b978-0-12-821292-9.00003-0



Biography

Akriti Taneja is a 3rd year Btech food technology student at Shoolini university, Solan, H.P, India. She is a highly pragmatic, methodological and hard working person who aim to bring revolution in food Industry through innovation and creativity. She is the executive member of Student outreach program under NSS (National Social Service)-Bapu Dham colony, Sec-26 Chandigarh, has an experience of organizing many cultural programs and food drive for the residents, as this colony is espoused by her school. She is the Class Representative of her batch and a volunteer at YOUWECAN, which is a non-profit organization established by Indian cricketer and cancer survivor Yuvraj Singh and its mission is to empower people to fight cancer through awareness, prevention, early detection, patient support and survivor empowerment.

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