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GSFST2023

2nd Global Summit on Food Science and Technology

March 23-25, 2023 **Rome, Italy**

The Scientistt
Bangalore, Karnataka, India
Contact: +91 8977940575
Email: contact@thescientistt.com

FOREWORD

Dear Colleagues,

It is a great pleasure to announce that The Scientistt will host the 2nd Global Summit on Food Science and Technology (GSFST2023) will be held in Rome, Italy during March 23-25, 2023.

GSFST2023 aims to bring together the renowned researchers, scientists and scholars to exchange ideas, to present sophisticated research works and to discuss hot topics in the field and share their experiences on all aspects of Food Science and Technology.

The GSFST2023 will be a 3 days event that means to gather the key players of the Food Science and Technology community and related sectors. This event is launched with the aims to become an established event, attracting global participants, intent on sharing, exchanging and exploring new avenues of Food Science and Technology-related scientific and commercial developments.

A wide-ranging scientific program consisting of plenary lectures, keynote lectures, Invited lectures, parallel sessions, as well as poster sessions for young scientists covering all topics in Food Science and Technology will be scheduled. This conference provides a wonderful opportunity for you to enhance your knowledge about the newest interdisciplinary approaches in Food Science and Technology.

Moreover, the conference offers a valuable platform to create new contacts in the field of Food Science and Technology, by providing valuable networking time for you to meet great personnel in the field.

We look forward to seeing you at GSFST2023 in Rome, Italy.

COMMITTEES

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Plenary Forum
Day-1

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I.M.P.L.V.O.Ferreira[1],
I.M.P.L.V.O.Ferreira[1] Z. Martins[1], M. Silva[1], M. Ribeiro[1], H. Ramos[1], A.M. Araújo[1], A. Melo[1], O. Viegas[1,2], M.A. Faria[1],

[1]LAQV/REQUIMTE, Laboratório de Bromatologia e Hidrologia, Faculdade de Farmácia da Universidade do Porto, 4050-313 Porto, Portugal.
[2]Faculdade de Ciências da Nutrição e Alimentação da Universidade do Porto, 4150-180 Porto, Portugal.

Unveiling Food Contaminants Exposome From Different Dietary Patterns Based on Scientific Data Mining and Mathematical Modelling

Abstract
Food safety regulations and control in the EU are very strict. Even so, through diet, humans are continuously exposed to different mixtures of potentially hazardous food- chain contaminants, whose combined health risks may be greater than those from single compounds. Despite that, the current nutritional guidelines do not consider this potential hazardous exposure, and literature on the topic is scarce and disperse. To tackle this gap, our goal is to implement a systematic organization of existing knowledge concerning food contaminants in most consumed foods and establish associations between different dietary patterns and its content in these toxicants using predictive modelling and machine learning (ML) techniques. Literature mining was accomplished using FoodMine's code [1], with some modifications. Eighty foods were selected according to its relevance in FAOstat database and named according to FoodEx2. PubMed Advanced Search Builder was used to determine the best terms and search strategies. A total of 96 food contaminants were searched, including, heavy metals (mercury, lead, cadmium, arsenic), persistent organic pollutants (dioxins and dioxin-like PCBs, PAHs), pesticide residues, disinfection by-products, food processing contaminants (heterocyclic amines, PAHs) and natural toxins (mycotoxins). This whole process is not feasible manually as a PubMed search using the selected terms would return 1,929,618 entries. Using our approach, the initial number of papers after FoodMine code was 26,697, the number of articles selected by ML to review was 1,887. Finally, 438 articles were effectively used to extract data, covering the period 2000-2022, to build a database of contaminants content worldwide and estimate their prevalence. To predict citizens exposure to contaminants, mathematical modeling was performed based on data from Europe and North America. A healthy diet based on the Mediterranean pattern was used as a reference to estimate combined exposure to contaminants, at different levels (quantile 25% and 75%). The impact of the dietary shift from animal to plant-based protein, by removing meat and fish foods, was also estimated by means of our model.

Keywords
FoodMine's code, food contaminants, mathematical modelling, Mediterranean diet

References

1. F. Hooton, G. Menichetti, A.L. Barabási, Scientific Reports,10 (2020) 16191

Biography

Isabel M.P.L.V.O. Ferreira, is Associate Professor at University of Porto - Faculty of Pharmacy and coordinator of FOODInteract research team at LAQV/REQUIMTE

focused in food science from different perspectives: quality/authenticity, chemical contaminants, impact of beneficial and harmful compounds in whole diet pattern and sustainable foods. Distinguished in the World's Top 2% Scientists list, in 2021 and 2022 by University of Stanford that ranks career-long scientific impact of researchers from around the globe, holds a H-Index 44. Published 217 articles and 9 book chapters. Coordinated/participated in 30 research projects (FP7, H2020, FCT, QREN) (https://orcid.org/0000-0001-8424-1431).

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Tamara Popovic
Institute for medical Research University of Belgrade, Serbia

Different Type of Different Long Term Diets on Fatty Acids Profiles in Different Animal Model

Abstract
Different diets could have effects on fatty acids (FA) phospholipids metabolism. We followed FA changes in liver and plasma in three animals models: model of aging in Wistar rats, model of different gender responce and model of police dogs (intensive exercise).
Identification of FA phospholipids esters was by GC chromatography. All other analisys (lipid peroxidation) were done spectrofotometrically. with methods and kits which are meant for that. The inversed correlation has been found between lifespan and n6/n3 ratio in membrane phospholipids. N-6/N3 ratio become higher with aging, lipid peroxidation was more compromised with aging. Aging itself is risk factor and leads to higher saturation in tissue phospholipids.
Gender responce was specific after fish-based diet in liver fatty acids phospholipids. While in female rats fish based diet decreased concentration of arachidonic acid (AA, n6) and incresed levels of eicosapentanoic (EPA) and docosahexanoic acid (DHA), in male rats diet elevated only DHA concentrations. Initial gender differences could be significantly modulated by the type of diet and modulatory effects seems to be sex-specific.
Feeding well-trained dogs exposed to rigorous exercise with fish oil based food resulted in incorporation in plasma and erytrocites phospholipids resulting in improvment of cardiovascular health and improving oxidative status.
We examined different animal models and its response to diet intake changes. Dietary intake influence changes in FA profiles in liver, which plays central role in its metabolism, TG sythesis and energy homeostsis. Changing food intake in diet directly influence FA changes in plasma and erytricites in dogs exposed to intensive exercise.

Keywords
Fatty acids phospholilids, diets, experimental models

Biography
Dr Tamara B. Popović is a Research Associate Proffesor at the Institute for Medical Research University of Belgrade (2000-present). She mentored in two PhD thesis several master theses and BSc studies and published more than 100 articles. She has given over 20invited/keynote presentations through the world. She is member of several national and international societies concerning her research area. She is owner of patent in the research field of food in her country which is great achieve. She is member of some Editorial boards in scientific journals. During the career she participate in 5 national and several International projects and lead several working packeges. Professor Popović field of interest are lipids, metabolism and fatty acids of membrane phospholipids in plasma and tissues. She investigated with her team effect of bioactive supstances in animal models, human interventional studies, and analize bioactive supstances and its effects on lipid metabolism and redox status. Professor Popović colaborate with clinics, laboratories and pharmaceutical companies in her country.

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A. Cifuentes
A. Valdés, G. Alvarez, J.A. Mendiola, M. Herrero, E. Ibáñez, A. Cifuentes*

Laboratory of Foodomics, Institute of Food Science Research, CIAL, CSIC, Madrid, Spain.
a.cifuentes@csic.es

Foodomics Study of Natural Compounds against Alzheimer

Abstract
Around 50 million people suffer dementia worldwide, with nearly 10 million new cases every year. Alzheimer's disease (AD) is the most common form of dementia and it may contribute to 60–70% of these cases. This multifactorial pathophysiology has been widely characterized by neuroinflammation, extensive oxidative damage, synaptic loss and neuronal cell death. However, only a few drugs have been approved for the treatment of some AD symptoms, although it is well-known that not cure has been found so far. As a result, new strategies are urgently required, and among them,several studies have suggested that diet and/or food components can prevent or delay the onset and progression of AD.
In this work, many natural sources of potential bioactive compoundshave been investigated, and based on several green extraction processesand in-vitroapproaches, we found an olive leaves extract enriched in triterpenoids, a carotenoids-enriched extract from Dunaliella salina microalgae and anextract from orange juice industry by-productsenriched in monoterpenes, sesquiterpenes and triterpenes have a high neuroprotective potential. In addition, the neuroprotective activity of these extracts is confirmed in a neuronal cell culture model. Moreover, these extracts show very good neuroprotective activityin-vivo using a transgenic Caenorhabditis elegans as AD model. Lipidomics (using CSH-QTOF MS/MS), combined with transcriptomics (using NGS methods) and metabolomics (using HILIC-QTOF MS/MS and GC-QTOF-MS/MS) are applied following a Foodomics approach to investigate the effect of the best neuroprotective candidates on the transgenic Caenorhabditis elegans. This work is a first step in the study of the role that food compounds can play in AD onset and progression.

Acknowledgments
This research was funded by the Ministry of Science and Innovation (MCI), Spain, PID2020-113050RB-I00project.

Biography
Alejandro Cifuentes is a Full Research Professor at the National Research Council of Spain (CSIC) in Madrid, Head of the Laboratory of Foodomics and Director of the Metabolomics Platform (International Excellence Campus CSIC + University Autonoma of Madrid). He has been Founding Director of the Institute of Food Science Research and Deputy Director of the Institute of Industrial Fermentations, both belonging to CSIC. Alejandro's activity includes advanced analytical methods development for Foodomics (including transcriptomics, proteomics, lipidomics and metabolomics), food quality and safety, as well as isolation and characterization of natural bioactive compounds and their effect on human health. He holds different national and international awards, is member of the Editorial Board of 17 international journals (including Journal of Chromatography A, Journal of Separation Science, Food Analytical Methods, International Journal of Molecular Sciences, Heliyon, Journal of Pharmaceutical Analysis, etc.), Editor of TrAC-Trends in Analytical Chemistry and Electrophoresis, Editor-in-Chief of Open Life Sciences and Specialty Chief Editor of Frontiers in Nutrition (Nutrition and Food Science Technology). He has published more than 300 SCI papers (plus 30 books and

book chapters and 9 patents) that have received more than 20000 citations. Alejandro has given more than 200 invited lectures in different meetings in Europe, Asia, Africa, America and Oceania. He has defined for the first time in a SCI journal the new discipline of Foodomics.

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Y.Kuzyakov
Y.Kuzyakov[1], N.Ling[2], and T.Wang[2]

[1]Soil Science, University of Göttingen, Göttingen 37077, Germany.
[2]Nanjing Agricultural University, Nanjing 210095, China.
*ykuzyakov@yandex.com

Rhizosphere microbiome: from Structure to Functions

Abstract
Microbial composition and functions in the rhizosphere – an important microbial hotspot – are among the most fascinating yet elusive topics in microbial ecology. Based on the similarity of rhizosphere properties with respect to carbon availability and nutrient depletion, we hypothesized that (i) rhizobacterial populations are recruited from the bulk soil, but are preselected by excess released root carbon, so that bacterial diversity is lower in the rhizosphere and bacterial networks are less stable, (ii) the rhizosphere is home to more abundant copiotrophic bacteria than the bulk soil, and iii) the functional capacity involved in the carbon and nitrogen transformation would be greater in the rhizosphere.

We used 557 pairs of published 16S rDNA amplicon sequences from the bulk soils and rhizosphere in natural and agricultural ecosystems (forests, grasslands, croplands) around the world to generalize bacterial characteristics with respect to community diversity, composition, and functions.

The rhizosphere selects microorganisms from bulk soil to function as a seed bank, reducing microbial diversity. The rhizosphere is enriched in Bacteroidetes, Proteobacteria, and other copiotrophs. Highly modular but unstable bacterial networks in the rhizosphere (common for r-strategists) reflect the interactions and adaptations of microorganisms to dynamic conditions. Dormancy strategies in the rhizosphere are dominated by toxin–antitoxin systems, while sporulation is common in bulk soils. Functional predictions showed that genes involved in organic compound conversion, nitrogen fixation, and denitrification were strongly enriched in the rhizosphere (11–182%), while genes involved in nitrification were strongly depleted. Thus, rhizosphere is the most powerful factor shaping the composition, structure and functions of the soil microbiome and of biogenic element's cycling.

Keywords
Plant nutrition, Carbon mineralization, Global change, Microbial growth and respiration, Fertilization

References
[1] N. Ling, T. Wang, Y. Kuzyakov, Nature Communications 13, 836,(2022).

Biography
Prof. Yakov Kuzyakov University of Hohenheim 1990 PhD, Dr.rer.nat. Moscow Agricultural Academy, Russia 1986 Dipl.Agr.Ing., Martin-Luther-University, Halle/Soil, Germany Awards 2019 Visiting Professor, Chengdu Uni of Technology 2018 Changjiang (Yangtze River) Scholar Award 2017 Visiting Professor, IESDA Beijing Chinese Academy of Agricultural Sciences 2017 Tianjin's 1000-Talents Short-Term Experts 2016 EGU Outstanding Editor Award 2015 John Waid Award for the best Review paper in Soil Biology & Biochemistry 2015 High-end Foreign Experts Program ISA Changsha CAS, China 2015 Chair Professor, Huazhong Agricultural University, Wuhan Hubei, China 2013 Visiting Professor, ISA Changsha Chinese Academy of Sciences 2011 Sir Allan Sewell

Visiting Fellowship, Griffith University, Brisbane, Australia 2010 Visiting Professor, IGSNRR Beijing Chinese Academy of Sciences 2002-2005 Heisenberg Fellowship, DFG 1999-2002 Habilitation Fellowship, DFG

Luca Cocolin

University of Turin, Department of Agriculture, Forest and Food Sciences, Largo Braccini 2, 10095 Grugliasco, Torino, Italy. E-mail: lucasimone.cocolin@unito.it

Microbiome in the Food System: Challenges and Opportunities

The food system is facing a number of challenges, which should be properly addressed by using the most appropriate strategies, based on strong scientific evidences. Increase of the world population, malnutrition and non-communicable diseases in under-developed and industrialized countries, respectively, climate change, water scarcity and land desertification are just some of the main challenges that human beings have to address in the near future. Sustainability has become a must, and modern food production systems have to be designed in order to take this into consideration. In 2015, the World Health Organization identified 17 sustainable development goals (SDGs) to be addressed and reached by 2030 and food production can be identified as one of the main drivers to reach the objectives identified by several of them.

There is urgency in contributing to the advancement of the scientific knowledge in the context of the food system. More specifically, there is a strong evidence that current food production systems, especially those related to protein sources, are not sustainable. Food production is the largest cause of global environmental change. Agriculture occupies about 40% of global land, and food production is responsible of up to 30% of global greenhouse-gas emissions and 70% of freshwater use.In this scenario, microbiome, defined as the group of microorganisms present in a specific ecosystem, including also their functional characteristics (i.e metabolic pathways), have been identified as tools to exploit to find solutions to the above-mentioned challenges.

In this presentation, few examples will be showcased on how microbiome plays a role in gut health in productive animals (i.e chickens),in the modulation of human gut microbiome based on the diet consumed and in the production of fermented foods.

Biography

Luca Cocolin, full professor of food microbiology, Department of Agricultural, Forest and Food Sciences, University of Torino, Italy. He is the author of more than 300 publications that relate to the microbiology of food, most of them (ca. 250) in international journals. Executive Board Member of the International Committee on Food Microbiology and Hygiene (ICFMH) part of the International Union of Microbiological Societies (IUMS) (http://www.icfmh.org/). Member of the Leadership Team of the European Technology Platform Food for Life (http://etp.fooddrinkeurope.eu/). Scientific responsible and master contact for the University of Torino in the EIT Food (https://eit.europa.eu/eit-community/eit-food). Editor in Chief of International Journal of Food Microbiology. Expert in: (i) Development, optimization and application of molecular methods for the detection, quantification and characterization of foodborne pathogens; (ii) MIcrobiome exploitation in food and human health; (iii) Bioprotection: molecular characterization of bacteriocin production and its study in vitro and in situ.

Keynote Forum
Day-1

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Ron Porat[1]

Ron Porat[1],*Abiola Owoyemi[1,3], Amnon Lichter[1], Adi Doron-Faigenboim[1], Omri Jovani[2], Noam Koenigstein[2], Yael Salzer[1]

[1]ARO, the Volcani Institute, Israel
[2]Tel Aviv University, Israel
[3]The Hebrew University of Jerusalem, Israel
* rporat@volcani.agri.gov.il

High-Throughput Phenotyping of Postharvest Storage Performance of Navel Oranges for Implementation of an Intelligent Logistic Management System

Abstract
Fruit and vegetables are usually stored according to the First In First Out (FIFO) method, so that marketing decisions are based on storage duration alone. The objective of the current study was to examine the effects of various pre-harvest and postharvest factors on the quality of late-season 'Rustenburg' navel oranges anddevelop shelf-life prediction models that may allow the implementation of the more efficient First Expired First Out (FEFO) logistic method, that is based on the potential shelf life of each particular batch of produce. The experiments were conducted with 12,000 navel oranges (~4 tons) harvested from six different orchards and treated in a commercial citrus packinghouse. The pre-harvest factors included different harvesting periods and yields, and the postharvest factors included different storage temperatures, storage humidity's and storage durations. Fruit quality evaluations were conducted at harvest and at weekly intervals during a 20 week prolong storage period, and included measurements of fruit weight loss, firmness, color, decay, peel damage, TSS, acidity, vitamin C, flavor acceptance, ethanol accumulation, and overall acceptance scores.The achieved results served as a large database for development of shelf-life prediction models. In the future, we intend to adopt these models in order to develop a novel marketing decision support system for intelligent logistic management of oranges.

Keywords
Citrus, Oranges, Logistics, Postharvest, Food waste

Biography
Dr. Ron Porat is a researcher at the Dept. of Postharvest Science, ARO, The Volcani Institute, Israel. He previously served as Head of the Dept. of Postharvest Science, and is currently serving as the Head of the Institute of Postharvest and Food Sciences, ARO, the Volcani Institute. Dr. Ron Porat is an expert on postharvest physiology and quality of fruit and vegetables, and his main research interest is in improving quality and reducing postharvest losses of fruit and vegetables. Dr. Ron Porat published more than100 research articles in international refereed journals, and is currently serving as an Associate Editor in Postharvest Biology and Technology (PBT).

Hagai Cohen[a]
Gal Nomberga[b] and Hagai Cohen[a]

[a]Department of Vegetable and Field Crops, Institute of Plant Sciences, Agricultural Research Organization (ARO), Volcani Center, RishonLeZion 7505101, Israel
[b]Department of Plant Pathology and Microbiology, The Robert H. Smith Faculty of Agriculture, Food and Environment, The Hebrew University of Jerusalem, Rehovot 7610001, Israel

Cucumber Fruit Skin Reticulation affects Post-Harvest Traits

Abstract
Fruit skin reticulation is accompanied by the formation of a wound-periderm tissue made of suberized cells. The regulatory networks overseeing skin reticulation during fruit development were extensively studied, yet how reticulation affects post-harvest traits remains unknown. We addressed this notion using the common Cucumis sativus and the skin-cracked Sikkim (Cucumis sativus var. sikkimensis) cucumbers. Light and electron microscopy in consort with gas chromatography-mass spectrometry revealed that sativus fruit skin is made of the typical cutin polymer, while the skin of sikkimensis fruit comprised of the aromatic suberin polymer. Comparative post-harvest experiments with different storage temperatures revealed that sikkimensis fruit are more resilient to chilling injuries arise during cold storage, exhibiting lower rates of weight losses, ethylene and CO2, electrolyte leakage and lipid peroxidation. We further demonstrate that different storage temperatures affect the contents of skin polymers cutin and suberin in a differential manner.

Biography
Dr. Hagai Cohen obtained his Ph.D. in Plant Molecular Biology in the Faculty of Biology at the Technion – Israel Institute of Technology, Israel, investigating the regulatory metabolic pathways involved in amino acid biosynthesis in plant seeds. It is then where he started to focus on metabolism in plants. During his Postdoctoral Fellowship at the Weizmann Institute of Science, Israel, he investigated the metabolic pathways leading to the formation of lipophilic barriers in plants such as epicuticular waxes, cutin, suberin and lignin. In early 2020, he opened his independent laboratory as a Principal Investigator in the Department of Vegetable and Field Crops, the Institute of Plant science at the Agricultural Research Organization (ARO), Volcani Center, Israel. His group is interested in elucidating various aspects of interactions between plant surfaces and pathogens, with a particular focus on metabolic networks operating on the course of pathogenic attack and invasion.

Houjiu Wu
Southwest University, Chongqing, 400712, China
Email:wuhoujiu@outlook.com

Current Situation and Prospects of China's Fruit Processing Industry

Abstract

For recent years, China's fruit planting area and output have ranked the first in world. In 2021, China's fruit planting area reached 16.962 million hectares, with an output of 296.11 million tons, accounting for 32.5% and 19.6% of the world, respectively. Fruit consumption is dominated for fresh and less than 5% of fruit is used to make products such as juice, canned fruitsjam and fruit candy. Apple juice, canned mandarin are mainly exported, and citrus juice is mainly imported. With the development of China's economy, the demand for processed fruit products is increasing. In the next ten years, fruit processing, especially the processing of citrus juice, will have a great development. Mainly reflected in: 1. Enlargement of planting bases for special processing varieties; 2. Resource utilization of whole fruit; 3. Promotion of advanced processing technology and equipment; 4. Large-scale, standardized and intelligent management of processing enterprises; 5. Product quality is improved, the cost is reduced, and the products suitable for different consumers are diversified.

Biography

Senior Professor of Citrus Research Institute of Southwest University in China, Deputy Director of National Citrus Engineering Technology Research Center; Executive Director of China Beverage Industry Association, Deputy Director of Technical Committee, Vice President of Fruit and Vegetable Juice Branch; Chairman of China Citrus Society Seedling Branch; Engaged in Fruit processing and utilization for more than 40 years; published more than 100 papers and 10 professional books.

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A.M. Descalzo

A.M. Descalzo[1*], A. Bordoni[1], S.A. Rizzo[1], C.D. Pérez[1], C. Dhuique-Mayer[2], A. Servent[2], L. Rossetti[1].

[1]Instituto de Ciencia y Tecnología de Sistemas Alimentarios Sustentables (ICyTeSAS) INTA-CONICET, Nicolas Repetto y de los Reseros s/n (1686) Hurlingham Buenos Aires, Argentina
[2]CIRAD, UMR QualiSud, 34398 Montpellier, France
*Email corresponding author: descalzo.adriana@inta.gob.ar

Targeting Natural Antioxidants and Functional Properties in Traditional Fermented Foods

Abstract

Table 1: Antioxidant indicators in different experiments

Antioxidant	*EXP1*		*EXP2*		*EXP3*	
(mg/kg)	*before*	*after*	*before*	*after*	*before*	*after*
β+δ-tocopherol	**2.39b**	**5.21a**	**2.20b**	**2.79a**	**0.2a**	**0.2a**
γ-tocopherol	**5.39b**	**7.89a**	**3.21b**	**3.81a**	**3.5b**	**4.4a**
α-tocopherol	**nd**	**nd**	**2.21b**	**3.04a**	**2.0a**	**1.1b**
Lutein	**0.54a**	**0.48a**	**0.31b**	**0.39a**	**0.1b**	**0.2a**
Zeaxanthin	**0.41a**	**0.33a**	**0.14b**	**0.32a**	**nd**	**nd**
β-carotene	**0.03a**	**0.02a**	**1.74a**	**1.72a**	**nd**	**nd**
β-cryptoxanthin	**0.04a**	**0.03a**	**3.71a**	**3.72a**	**nd**	**nd**
Lycopene	**nd**	**nd**	**8.01b**	**10.3a**	**nd**	**nd**
FRAP (μM)	**282.1b**	**474.7a**	**-**	**-**	**289.8b**	**429.8a**
Tot.phenol(GA/L)	**-**	**-**	**-**	**-**	**22.9b**	**25.9a**

Rows: different letter indicate significance (P<0.05) within experiment

Fermentation improves antioxidant activity primarily as a result of a microbial hydrolysis reaction. Phenolic compounds can act as free radical terminators, metal chelators, singlet oxygen quenchers, or hydrogen donors to radicals. Therefore, the elaboration of functional traditional foods with bioactive compounds, constitutes a technological challenge [1] from the product design; formulation; processing and stability of the bioactive compounds. This work shows results of separated experiments before and after fermentation ofcereals, added with phytosterols and fruit extracts as bioactive compounds. In the first experiment (table 1), maize fermented with L. casei showed enhanced antioxidant capacityafter fermentation and storage of the product (4°C 15 days).When a papaya extract was added to the preparation (exp. 2), carotenoids behaveddifferent, depending on their concentration. Total antioxidant activity (FRAP) correlated positively with γ-tocopherol.These results were similar using L. casei, L. plantarum or commercial kefir as starters. In exp.3, a quinoa product was fermented with kefir producing an increase on total antioxidant activity.Not only had the phenolic compounds increased during fermentation but also tocopherols and carotenoids under different circumstances. Fermentation preserved food, not only due to pH lowering but also by releasing natural antioxidants from the food matrix.

Keywords
Cereals, Lactic Acid Bacteria (LAB), Antioxidants, Tocopherols, Carotenoids

Reference
[1]Lingua, M.S., Gies, M., Descalzo, A.M, et al.Food Chem., 370, art. 130993 (2022)

Biography
Dr. Adriana M. Descalzo, PhD at the University of Buenos Aires, presently Senior Scientist of CONICET and coordinator of the National Program of Agroindustry at INTA, Argentina.

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Gabriel Acién
Silvia Villaró[1,2], Endri Taragjini[3], Evan Musari[3], Tomas Lafarga[1,2], José María Fernández-Sevilla[1,2], Gabriel Acién[1,2]

[1]Department of Chemical Engineering, University of Almeria, 04120, Almeria, Spain
[2]CIESOL Solar Energy Research Centre, Joint Centre University of Almeria-CIEMAT, 04120, Almeria, Spain
[3]Department of Agriculture, Food and Environmental Sciences, Polytechnic University of Marche, Ancona, Italy

Microalgae: Novel Sustainable Ingredients for the Functional Foods Industry

Abstract
Microalgae are a sustainable, safe, and nutritious ingredient with the potential for being used in the development of functional foods, nutraceuticals, and other high-end products. Their utilization as food is now a reality with the number of products containing microalgae launched into the market increasing every year. Arthrospira platensis, commercially known as Spirulina, is particularly interesting because of its high protein content which is around 60%. The present study aimed at producing A. platensis using demo scale raceway reactors and developing a method to recover high-quality food-grade proteins for industrial use. The latter led to a recovery of 80% of the proteins contained in Spirulina obtaining extracts with a purity higher than 90%. The isolated proteins contained all the essential amino acids, with the content of histidine, valine and lysine being especially high (8.4, 6.6, and 6.2%, respectively).The functionality of the protein isolate was comparable to that of plant or animal proteins. The maximum foaming and emulsifying capacity of the isolated proteins were 182.3 and 80.6%, higher than those of soybean proteins (71.5 and 77.2%, respectively). Moreover, an in silicostudy revealed that a large number of bioactive peptides were contained inside the isolated proteins. This same study suggested ficin and papain as the ideal enzymes to generate hydrolysates with a large number of known bioactive peptides. Four enzymes namely papain, ficin, pepsin, and Alcalase®were used to produce enzymatic hydrolysates with different degrees of hydrolysis. The generated hydrolysates showed an improved in vitro antioxidant capacity and potential for being used in the prevention of the appearance of different disorders including diabetes and hypertension. Overall, Spirulina showed potential for being used not only as a techno-functional ingredient to develop innovative products but also functional foods with health benefits that go beyond basic nutrition. The bioactivity of the generated hydrolysates was assessedin vitro and further in vivo trials are necessary to confirm these findings.

Biography
Prof. Francisco Gabriel Acien Fernandez graduated by the University of Granada in 1992, and Ph.D. at the University of Almería (Spain) in 1996. Professor at the Department of Chemical Engineering of the University of Almería from 2012 onwards. Prof. Acién has participated in 15 European projects in addition to 40 National projects and contracts with companies. Regarding publications, he published more than 150 papers in international journals and 20 book chapters, in addition to 10 patents. He is member of International Society for Applied Phycology and Latino American Society for Algal and

Environmental Biotechnology, and editor of Algal Research and RELABIAA journals, in addition to reviewer of international journals. Major contributions on Biotechnology of microalgae field are related with the improvement of photobioreactors design, scale-up of production systems, and economic analysis of production processes. (orcid.org/0000-0002-8434-0365, Scopus ID: 55385950700).

Invited Forum
Day-1

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Ruperto Bermejo[1]

Ruperto Bermejo[1], María del Carmen Murillo[1], Raquel Carmona[1], Mariela Chova[2], José María Fernández-Sevilla[3], Gabriel Acién[3]

[1]Department of Physical and Analytical Chemistry, High Engineering Polytechnic School of Linares, University of Jaén, 23700, Jaén, Spain
[2]Cortijo de la Loma S.L. (Castillo de Canena Olive Juice), 23440, Jaén, Spain
[3]Department of Chemical Engineering, University of Almeria, 04120, Almeria, Spain

Functional Foods Based on Extra Virgin Olive Oil Enriched with Carotenoids

Abstract

Nowadays the consumption of essential carotenoids is reduced due to the lower intake of fruits and vegetables, being humans not capable of synthesizing these molecules. On the other hand, vegetable oils are prone to oxidative processes which lead to quality and nutritional losses. Its prevention or delay could be obtained by the addition of antioxidants. β-carotene and lutein are two of the most important carotenoids possessing health-promoting effects such as, among others: anti-oxidation, anti-inflammation and anti-cancer properties. In the present work, β-carotene and lutein from different sources (microalgae, fungi and flowers) were added to extra virgin olive oils searching for a double effect: protect oils from degradation and enhance the consumption of these bioactive compounds.

To achieve the proposed goal, quality and physical parameters were evaluated in oils with and without carotenoids added. Furthermore, this study reflects the effect of different heating procedures and light exposure times on physical and chemical properties. Many oils have been testedfrom different fruit varieties and with different ripening rates. In general terms, degradation processes did not promote the occurrence of hydrolysis in the samples since no important changes in free acidity values were found. Carotenoid extracts brought changes in olive oils color, turning them orange-reddish. The quality of olive oils was improved since peroxidation was inhibited. Olive oils fatty acids and tocopherols weren't affected. Lutein and β-carotene contents increase considerably, as well as oxidative stability, improving olive oils shelf-life and nutritional value.

For all these reasons, the use of natural antioxidants such as β-carotene and lutein could be an effective way for improving olive oil shelf-life, nutritional value and stability against degradation processes.

Biography

Degree in Chemistry (1992) and PhD in Physical Chemistry (1997) University of Granada. Research fellowship (FPI) of the Spanish Ministry of Education and Science (1992-1996). In 1996 he joined the Universito of Jaén (UJA) as Assistant Professor in the Department of Physical and Analytical Chemistry, performing his teaching and research duties at the Higher Polytechnic School of Linares (EPSL). Since 2003 he is Associate Professor. He has carried out research stays at the Universities of Padua (Italy, Dr. Fontana's group), Almería (Dr. Molina's group) and Granada (Dr. Alvarez's group). In addition, he has completed training and teaching stays at Keen University (USA), Padua University (Italy) and Al Jouf University (Saudi Arabian Kingdom). He has received the First Prize for

Olive Oil Research “Luis Vañó” for his contribution to the study of olive oils (2013) and has received twice the Entrepreneurs Award from the University of Jaén for projects related to the industrial sector of food additives (2008 and 2013).

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A. De Leonardis
Department of Agricultural, Environmental and Food Sciences (DiAAA), University of Molise, Via De Sanctis, 86100 Campobasso, Italy

antomac@unimol.it

Innovative Approaches to Recycling and Valorizing Olive Oil Mill By-Products

Abstract

From ancient time, the Mediterranean populations consume the oil extracted from olive fruits (Olea europaea L.) through physical processing. Both the processes of olive tree cultivation and industrial oil extraction generate enormous quantities of three different categories of olive by-products (O-BP), which are: (i) olive leaves; (ii) solid wastes at different degrees of humidity; (iii) dark wastewaters. Generally, only a minimal part of O-BP is recycled, while, in the worst case, these wastes are dispersed in nature creating major environmental problems, due to their high COD (chemical oxygen demand) and BOD (biological oxygen demand) values.

One of the principal management approaches for the treatment of O-BP is depollution, followed by the utilization in renewable energy, animal feed and composting. Actually, O-BP contain considerable amounts of valuable substances, such as carbohydrates, organic acids, minerals, fats, fibers, and mainly phenolic compounds which exhibit a wide and well known array of biological activities. Consequently, numerous studies have carried out to demonstrate the potential use of O-BP in foods, i.e. as ingredients, natural food antioxidant, antimicrobial and antifungal additives, oxidative stabilizers, and others.

In this lecture, production, composition and possible utilization of O-BP is preliminarily discussed. Thus, results of some investigations concerning innovative utilization of O-BP are exposed. Specifically, antioxidant extracts, beverages and vinegars obtained from different O-BP are illustrated. Antioxidant extracts were obtained from olive-oil mill wastewaters or olive leaves following different procedures. All extracts contained a significant content of hydroxytyrosol and its derivatives. Applying controlled and forced oxidation methods, antioxidant effects of the O-BP extracts on different edible oil and fats were more times demonstrated.

Potential functional beverages were obtained from fresh two-phase pomace by using a rapid, easy and low-cost procedure. Both 6% citric acid and water were revealed to be profitable liquid ingredients. Total phenol content of beverages was about 600 mg/L (as caffeic acid equivalent) on 300 g/L of raw pomace. Produced beverages appeared to be just limpid after a simple filtration, but the citric acid beverage was reddish, while water ones were brownish.

Finally, different vinegars were obtained by using independently olive-oil mill wastewaters or olive leaves. Both vinegars were characterized by a significant content of phenolic compounds of different kinds with proven functional and antioxidant properties. O-BP vinegars were also assayed as innovative ingredients in the formulation of oil/vinegar emulsion dressing, enclose a like-mayonnaise sauce. A higher oxidative stability emerged in the O-BO vinegar/emulsion formulations in comparison to the relative control samples.

In conclusion, proposed innovative approaches resulted to be suitable to recycle and valorize olive oil mill by-products. Indeed, food application of O-BP represents a promising approach to promote the olive-oil industry competitiveness, by expanding the products range and implementing the circular

economy practice which aim at “zero waste” industrial process. Finally, obtained products are fit to meet the pressing consumer, farms and industry demand for sustainable and healthy food products.

Keywords
Olive oil by-products - Food applications - Phenol extracts - Antioxidants - Circular economy – Beverages - Olive vinegars

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Biography
Antonella De Leonardis is associate professor in Food Sciences and Technology at Department of Agriculture, Environment and Food Science, University of Molise, Campobasso (Italy). Her research focus on the following topics: edible oils/fats; virgin olive oil; natural phenolic substances; functional and antioxidant compounds; food enzymes; food processing. She produced more than 100 scientific products (Author Scopus ID 7003954812 - ORCID 0000-0002-5027-8137) including original researches, reviews, book chapters; student and PhD thesis. She has been editor-in-chief of the book ‘Virgin olive oil: production, composition, uses and benefits for Man’ (Nova Science Pub Inc, Hauppauge, NY, USA 2014). Today, she is an Editorial Board Member of ‘Foods’ (MDPI’s journal).

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A. Mbawala[1]
A. Mbawala[1*], H. Mouafo Tene[1,2], G.F. Tchakouani Yamagueu[1]

[1]Department FoodSciencesandNutrition,NationalSchoolof Agro-IndustrialSciences,UniversityofNgaoundere, Cameroon.
[2]Centre for Research on Food and Nutrition, Institute of Medical Research and Medicinal Plants Studies, P.O. Box 6163 Yaounde, Cameroon.
*Corresponding author e-mail: mbawalaa@yahoo.fr

Biovalorization Of FourMain Traditional Food Products And By-products Produced In The Adamaoua Region (Cameroon)

Abstract
Nowadays, the demand of traditional foodstuffs and by-products (Bio character) including traditional fermented milks by consumers, is increased because of their numerous health benefits, important nutritional values and original organoleptic properties. A great diversity of indigenous food products that have potential functional properties is manufactured worldwide. The aim of the present work is to describethemain indigenous foodstuffs and by-productshighly produced and consumed in the Adamaoua Region of Cameroon and to evocate their interesting potential functional properties, their utilizationsand some related challenges. In the Adamaoua Region of Cameroon, the traditional foodstuffs produced abundantly and highly consumed are represented by three types: fermented milks (Pendidam and Kindirmou), a sun dry meat product (Kilishi) and honey bee. Pendidam and Kindirmou are dairy products produced by fermentation of raw fresh milk from cow origin. Kilishiis produced from a highly appreciated local zebu race “Goudali” meat after muscle meat cutting and emining, sun drying, spicing and roasting operation steps successively. Honey bee are produced by exploiting local plants that confer its original taste and other organoleptic properties. All these foodstuffs are used mainly either for feeding and/or therapeutic purposes. Thereby, the fermented milks produced in the AdamaouaRegion of Cameroonare indigenous foodstuffs that cannot act only as nutrient sources but can also have potential health benefits like disease preventing or curing role. These dairy fermented products contain lactic acid bacteria that produce a wide range of bio-actives molecules such as biosurfactants that possess interesting multiple functional properties. One of the main challenges of the present study isto exploit the biosurfactants propertiesin fighting against diseases due to enveloped viruses (Covid-19, AIDS, Influenza, Hepatitis B and C viruses, etc.) and cardio and cerebro-vascular accidents.

Keywords
Adamaoua Region; Kilishi; Honey bee; Laits fermentés; Utilizations; Challenges.

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Biography

Dr MBAWALA Augustin studied and obtained his Bachelor degree in 1981 at the University of Yaounde and received his PhD degree in 1990 at the University of Nancy 1. Now, he is the Head of the Laboratory of Food Microbiology and Biotechnology of ENSAI at the University of Ngaoundere. He has published at least 33 papers in Journals with DOI and high impact factor and a book on Challenges of Indigenous Fermented Milks from Cameroon and Chad. His research team is working actually on a project concerning the potential utilizations of Bioemulsifiers/Biosurfactants in health care.

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G.Kostov[1]
R. Denkova-Kostova[1], V. Shopska[2], and G.Kostov[1*]

[1]Department "Technology of wine and beer", University of Food Technologies, 26, Maritza boulevard, 4002, Plovdiv, Bulgaria.
[2]Department "Biochemistry and molecular biology", University of Food Technologies, 26, Maritza boulevard, 4002, Plovdiv, Bulgaria.
*george_kostov2@abv.bg

Tailor-made Concept for Food Production–Sustainable Way for Development of New Foods

Abstract
Tailor-made foods are products that meet specific characteristics and are developed for specific target groups of consumers, and most often they have different functional characteristics. Tailor-made food development includes the following phases:

- identification of the chemical, physical, nutritional, microbiological and functional characteristics of the target product to be developed/modified;
- creation/modeling of a database of the main ingredients and their influence on the characteristics of the tailor-made product;
- modeling and optimizing the conditions for food production, including the selection of system components so as to ensure its functionality.

Ensuring the sustainable development of such food systems is related to the knowledge of various elements of their production. The definition of the elements of sustainability can be sought in the following directions:

- determination of the mechanisms of biological activity of biomolecules and microorganisms in the production of new tailor-made foods;
- combining production methods in order to ensure sustainable production and ensure high production safety, including ensuring minimal food processing in order to maintain high biological activity;
- development of systems of methods for analysis of the biological activity of tailor-made foods.

The aim of the present paper was to examine the possibilities for the production of tailor-made foods, considering both their production methods and the possibility of ensuring sustainable production.

Keywords
Tailor-made food, sustainability, modeling, biological activity

Acknowledgements
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Biography

Georgi Kostov, DSc is a full professor in food technology at the University of Food Technology - Plovdiv, Bulgaria. He is a lecturer at the Department of Wine and Beer Technology and his main research interests are related to the application of immobilized cell systems in the production of beer and wine. The second major research area of his work is the development of new tailor-made type foods by studying the importance of various components and by including probiotic microorganisms. He has supervised five doctoral students, four of whom have successfully defended their PhD theses. In his career he has mentored a number of students during the development of their bachelor's and master's theses. Since 2020 he has been the head of the project "Strengthening the research excellence and innovation capacity of the University of Food Technologies - Plovdiv through the sustainable development of tailor-made food systems with programmable properties".

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Evgeni Eltzov
Manpreet Kaur[a, b], and Evgeni Eltzov[a,c*]
Agricultural Research Organization - the Volcani Institute, Israel

Development of a LAMP Paper-Based Biosensor for the Prediction of Food Shelf Life

Abstract

The problem of postharvest food losses is a major issue, having been estimated at 40% to 50% of harvested crops worldwide, mostly due to rots caused by fungi. After penetrating the unripe fruit, C. gloeosporioides (e.i., pathogenic fungi) remain quiescent ("sleeping") until the fruit ripens. The quiescent infections are microscopic and cannot be visually detected during packaging or subsequent transport. Thus, there is a need to design assays that allow the identification of the fungi at an initial quiescent stage of infection to prevent potential fruit decay during the supply chain and consumer storage. A rapid and easy-to-use paper-based LAMP assay was designed for detecting the enoyl CoA hydratase quiescent marker of C. gloeosporioides. The developed method requires a cheap cellulose membrane and heat block, enabling this method to be employed in resource-limited settings (Figure 1).

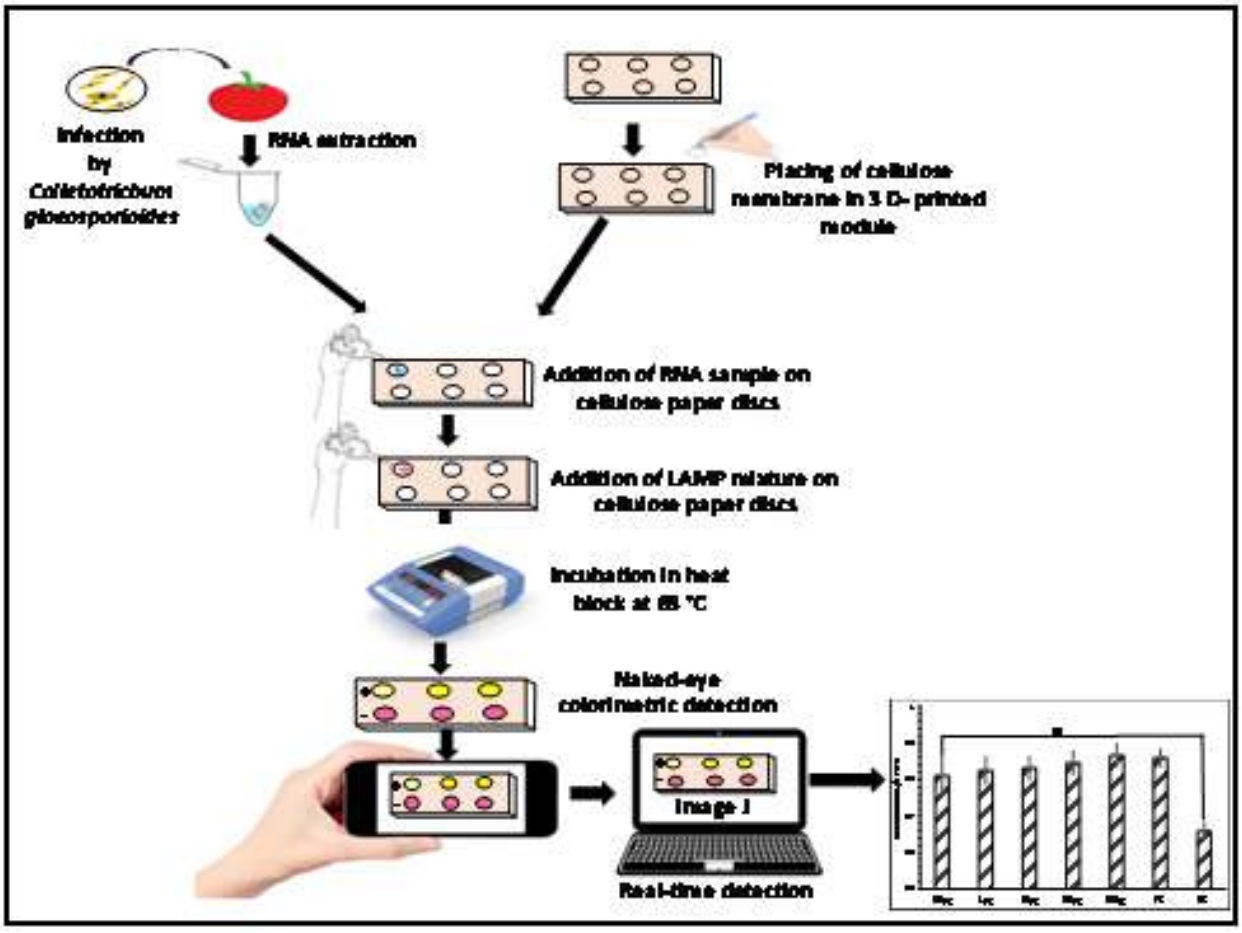

Figure 1: Schematic presentation of the assay measuring principles.

The paper-based LAMP assay evinces superior specificity as it effectively prevented the formation of spurious products during amplification. The assay was found highly specific for the quiescent stage of C. gloeosporioides with an analytical sensitivity of 0.5 pg of total extracted RNA (Figure 2).

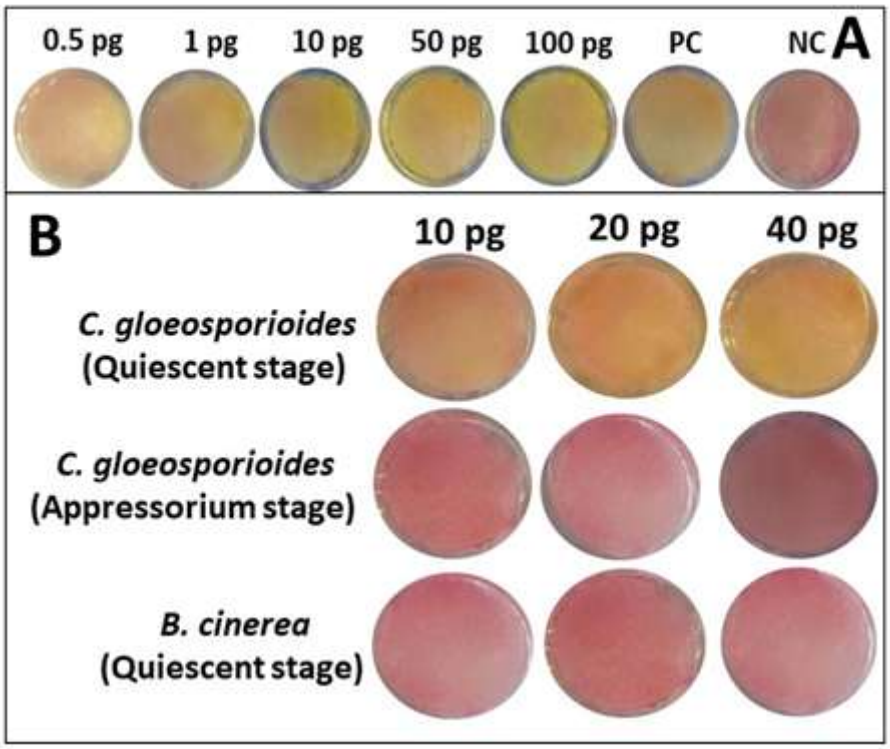

Figure 2: Sensitivity (A) and specificity (B) of the paper-based RT-LAMP assay.

The developed assay generated the results within 40 min and hence can be efficiently employed for identifying C. gloeosporioides presence and pathogenicity states in resource-limited settings. The unique ability of the proposed system to detect and recognize the fungus during the quiescent (latent) stage will decrease food losses by allowing improved postharvest management. For example, fruit with a high inoculum rate will be sold to the local market or as processed food, whereas fruit with low inoculum rates can be stored for long periods or exported.

Biography

Evgeni Eltzov is the researcher in the Department of Postharvest and Food Sciences, Volcani Center, Israel. He completed his Ph.D. in the Environmental Engineering department at Ben-Gurion University. Dr. Eltzov's research interests are bioluminescent bacterial panels for toxicity detection, the point of care devices for healthcare, environmental, and agriculture fields, nano-based biosensors, and real-time monitoring systems. Previously he has engineered several new bacterial strains to use in biosensor applications. Duringthe last four years, he has developed sensors for real-time monitoring pathogen's presence in post-harvest produce,novel biosensor concepts based on the lateral flow methodologies, and methods for determining food shelf life. He has more than 15 years of experience in the biosensor field and is the author of over 50 peer-reviewed scientific publications, conference papers, and patents.

Pasquale Crupi
University Aldo Moro Bari, Italy

Possible Correlation Between Chemical Composition and Anti-Inflammatory Activity of Polyphenols in Extra Virgin Olive Oil extracts.

Abstract
Extra virgin olive oil (EVOO) represents one of the most important health-promotingfoods whose antioxidant and anti-inflammatory activities are mainly associated with its polyphenolscontent. To date, there are few studies exploring the effect of EVOO polyphenols on dendritic cells (DCs), actingas crosstalk between the innate and the adaptive immune response. Therefore, this work aimed at determining the ability of three EVOO extracts (cv. Coratina, Cima di Mola/Coratina, and Casaliva),characterized by different polyphenols amounts, to regulate DCs maturation in resting conditions orafter an inflammatory stimulus. Cima di Mola/Coratina and Casaliva extracts were demonstrated tobe the most effective in modulating DCs toward an anti-inflammatory profile by reduction of TNFand IL-6 secretion and CD86 expression, along with a down-modulation of Il-1β and iNOS expression.From factorial analysis results, 9 polyphenols were tentatively established to play a synergistic rolein modulating DCs inflammatory ability, thus reducing the risk of chronic inflammation.

Biography
Pasquale Crupi is researcher in Food Science and Technology at University Aldo Moro Bari. His current research interests are mainly focused on Metabolomics analyses of food products. In particular, he deals with metabolic fingerprinting and metabolite profiling analyses by high resolution and high-throughput technologies (GC-MS, HPLC-MSn, HPLC-MS/MS, NMR) of primary and secondary metabolites (sugars, amino acids, organic acids, polyphenols, carotenoids, aromatic compounds, vitamins, etc.) present in fruit and vegetables (such as grape, cherry, artichoke, carob, olive etc.) and bio-transformed products (such as juice, oil and wine).

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G. Álvarez-Rivera
J. D. Sánchez-Martínez, Z. J. Suárez-Montenegro E. Ibáñez, A. Cifuentes, and G. Álvarez-Rivera*

Laboratory of Foodomics, Institute of Food Science Research, CIAL, UAM-CSIC, Nicolas Cabrera 9, 28049 Madrid, Spain.
*Gerardo.alvarez@csic.es

Characterization of Neuro Protective Ingredients from Agri-Food by-Products: from Waste to Brain.

Abstract
Agricultural and food industries generate tons of wastes that represent a large burden for environment and economic governance. However, these residues can be considered as a renewable and low-cost source of bioactive compounds [1]. Among these bioactive molecules, terpenoids and phenolic compounds have been described as potential neuroprotective molecules due to their anticholinergic, antioxidant and anti-inflammatory capacities [2,3].
The main objective of this conference is to present the latest results obtained in our group regarding the chemical and functional characterization of several extracts from agri-food by-products (e.g., olive oil and orange juice industries) obtained by green extraction techniques. Target extracts were chemically characterized by gas and liquid chromatography coupled to mass high-resolution spectrometry (GC/LC - HRMS), and theirin vitro neuroprotective capacity was also evaluated through a set of bioactivity assays related to neurological disorders such as Alzheimer's Disease. In parallel, central nervous system accessibility was evaluated making use of an in-vitro model of parallel artificial membrane permeability assay for the blood–brain barrier (PAMPA-BBB) [4] and BBB cell-based model based on the monolayers of immortalized human brain microvascular endothelial cells (HBMEC) [5].Advanced and sensitive analytical tools (GC/LC-qTOF-MS) were also employed to detect compounds that can cross the BBB.

Keywords
Neuroprotection, terpenoids, green extraction, high-resolution mass spectrometry, phytochemical profiling, agri-food by-products.

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Biography

Gerardo Á lvarez is a Postdoctoral Researcher at the National Research Council of Spain (CSIC) in Madrid, Spain. He received a Ph.D. Degree in Analytical Chemistry from University of Santiago de Compostela (July 2015) and, since then, his research activity has further developed in several international research centers in Germany (KIT and BfG), the Czech Republic (UCT-Prague), and the United Kingdom (Queen's University Belfast). Gerardo's activity is focused on researching new bioactive compounds from food and natural products, using state-of-the-art HRMS-based Foodomics approaches. He is an author of a total of 61 publications, including 8 book chapters in prestigious international publishers and 50 SCI articles. He is a member of the editorial board of several SCI journals (i.e., Open Life Science, Frontiers in Analytical Science, Frontiers in Nutrition) and is Guest Editor of the journal Agronomy.

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A. Fazio
C.La Torre[1], P.Caputo[2], E. Cione[1] and A. Fazio[1,*]
[1]Department of Pharmacy, Health and Nutritional Sciences, University of Calabria, Edificio Polifunzionale, 87036 Rende, CS, Italy.
[2]Department of Chemistry and Chemical Technologies, University of Calabria, 87036 Rende, CS, Italy..
*a.fazio@unical.it

Isolation and Characterization of Exopolysaccharides from Fermented Milks

Abstract
Kefiran is an exopolysaccharide produced by the microflora of kefir grains during the milk fermentation process.The health-promoting and physicochemical properties of kefiran led to its exploration for a range of applications, mainly in the food industry and biomedical fields [1]. The physicochemical and biological properties of naturalexopolysaccharide vary according to both the raw material and extraction method [2]. Cow, buffalo, goat, camel, donkey and sheep milks were used as raw materials for fermentation.Aiming to establish the most appropriate kefiran extraction protocol, three different processes were evaluated,which differ in the temperature and in the presence (or not) of ultrasound.kefiran biopolymerswere characterized by Fourier Transform-Infrared Spectroscopy (FT-IR), Scanning Electron Microscopy (SEM),Differential Scanning Calorimetry (DSC)and rheological measurements. The samples showed differences in yield, thermal properties,and morphological features depending on both the typeof the milk and the extraction method. The results indicated that extraction protocol with heating and constant agitation was able to provide the best thermal resistance, and the highest yieldwith the greatest recovery for the cow kefiran (4.79%).The kefiran samples were very thermally stable, having atemperature of degradation (Td) in the range from 264 to 354 °C. Regarding the rheological properties, kefiran solutions showed a pseudoplastic behaviour. The resulting morphological andthermal differences could lead to different practical applications of kefirans in the fields of nutritionand pharmacology.

Keywords
fermentation,kefir, kefiran,extraction yield, morphological properties

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Biography
Alessia Fazio currently occupies a position as Assistant Professor in Food Chemistry at the Department of Pharmacy, Health and Nutritional Sciences (University of Calabria, Italy). She studied chemistry and after obtaining the title of PhD in Chemical Sciences (Organic Chemistry) she received a research fellow at the University of Calabria and she worked on the new synthesis of compounds of pharmaceutical and nutraceutical interest. She held visiting Postdoctoral position at Iowa State University (Ames, Iowa, USA). Her current research activity focusses on food chemistry,

and in particular on the recovery of bioactive compounds, including prebiotics and bioactive lipids from local plants and agri-food wastes. Specifically, she performs research works aimed at the design and formulation and biochemical studies of functional foods, including fermented foods. She is involved in different teaching courses and the supervision of students from BSc to PhD level.

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Mario Pérez-Wona

Mario Pérez-Wona*, Anais Palma-Acevedoa, Luis González-Cavieresa, GipsyTabilo-Munizagaa, Roberto Lemus-Mondacab

[a]Engineering Department, Universidad del BíoBío, Av. Andrés Bello 720,Chillán, Chile
[b]Department of Food Sciences and Technology, Universidad de Chile, Av. Dr. Carlos Lorca 964, Santiago, Chile
*Corresponding Author: mperez@ubiobio.cl.

Characteristics and Quality of Chilean Abalone Undergoing Different Drying Emerging Technologies

Abstract

The Chilean abalone (ConcholepasConcholepas) is a gastropod mollusk; it has a high commercial value due to the qualities of its meat, especially hardness, as a critical acceptance parameter. However, its main problem is its short shelf-life which is usually extended using traditional technologies with high energy consumption. Therefore, it is necessary to apply different technologies for both the pre-treatment and drying process. In this research, pulsed electric field (PEF) was used as a pre-treatment for vacuum microwave drying (VMD), freeze-drying (FD), and hot-air drying (HAD). Drying conditions and characteristics were set according to previous experiments. After the application of experiments, drying samples were analyzed in terms of physical quality (color, texture, microstructure, and rehydration capacity), protein quality (degree of hydrolysis and computer protein efficiency ratio), and energy parameters. Regarding quality, the treatment that obtained lower harness was PEF+FD (195 N ± 10), the lowest change of color was for treatment PEF+VMD (ΔE: 17 ± 1.5), and the best rehydration capacity was for treatment PEF+VMD (1.2 h for equilibrium). For protein quality, the highest Computer-Protein Efficiency Ratio was the sample 2.0 kV/ cm of PEF (index of 4.18 ± 0.26 at the end of the digestion). And about energetic consumption, results show that VMD decreases the drying process by 97% whether PEF was used or not. Consequently, it is possible to conclude that using PEF as a pretreatment for VMD and FD treatments has advantages that must be used in accordance with the consumer's needs or preferences.

// The authors also gratefully acknowledge the financial support provided by CONICYT-FONDECYT N° 1201075 projects.//

Biography

Mario Osvaldo Perez Won is an academic from the University of Bío-Bío, Chillán, Chile. He is a Food Engineer with a master's degree in Fishery Sciences from the University of Kagoshima, Japan, and a Ph.D. in Agriculture from the same university. Dr. Perez-Won works in the food area with emerging technologies such as pulsed electric fields and high-pressure processing; additionally, in seafood process engineering, food rheology, food process engineering development, biotechnology, and functional properties of proteins. Dr. Pérez-Won has been awarded nearly 15 research projects and is currently director of a FONDECYT REGULAR project, among various participations in other research. All this is not close to summarizing a career with a hundred scientific publications, one of the last published in Trends in Food Science & Technology Journal.

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M. Tujmer
M. Tujmer*, L. Travaš and A. Pilipović

University of Zagreb, Faculty of Mechanical Engineering and Naval Architecture, Ivana Lučića 5, 10000 Zagreb, Croatia
*mislav.tujmer@fsb.hr

Influence of Processing Parameters on Food Snack Printability in Fused deposition Modeling

Abstract
Additive manufacturing, especially the fused deposition modeling process, is increasingly used in the production of food and snacks. Capabilitiy of additive manufacturing in creating customized snacks at home is a great advantage for people with special dietary needs. In these cases sometimes the appearance and not the taste of the snack can attract a person. Additive manufacturing plays a big role in this because it can create complicated but appealing geometries since the production is based on stacking layer on layer. As the processing parameters are not the same as already widely researched materials such as polymers and metals, the adjustment of parameters for printing food inks with unique rheological properties can be challenging. In this work a dough based on wheat bran, barley and oat flour and pea proteins was printed in a syringe-based 3D printer and using the Design Expert software, a statistical analysis was made of how the processing parameters, layer height and extrusion width affect the snack's printability. The analysis showed that the extrusion width has a significant influence, while the layer height, which is one of the most important parameters in additive manufacturing, did not show an influence on food printability.

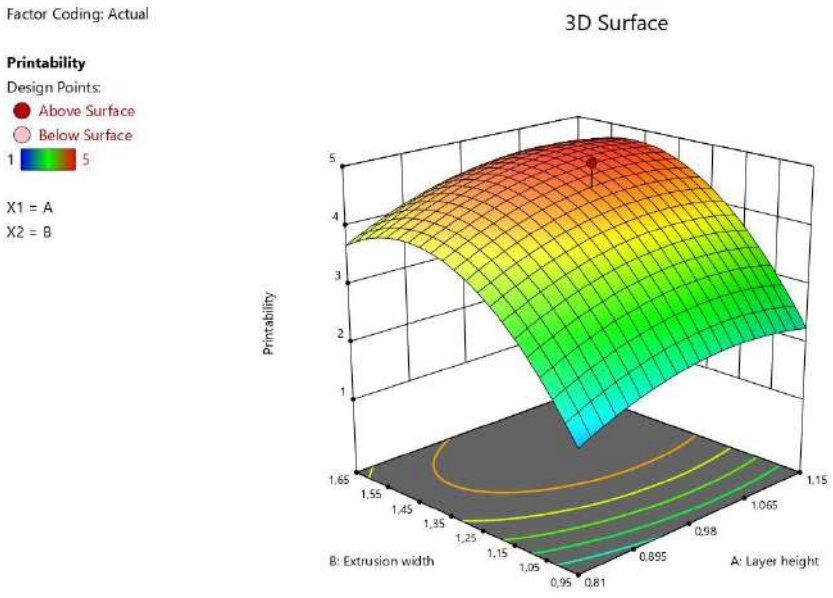

Figure1. Dependence of the layer height and extrusion width on the printability

Keywords
Printing, food, fused deposition modeling, printability

Biography

Mislav Tujmer, born in 1991, finished his Master studies at the Faculty of mechanical engineering and naval architecture in Zagreb, Croatia in 2021. Since then, he is working as an assistant in teaching and research at the Chair of polymer processing at the Faculty of mechanical engineering and naval architecture. He started his PhD study in 2021 focusing on polymer composite materials. Other scientific interests include additive manufacturing, bioplastics and polymer manufacturing methods.

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A. Manthei
A. Manthei[1], P. Elez-Martínez[1], O. Martín-Belloso[1], P. Murciano-Martínez[2], R. Soliva-Fortuny[1]

[1]Department of Food Technology, University of Lleida/Agrotecnio-CeRCA Center, Av. Alcalde Rovira Roure, 191, 25198, Lleida, Spain
[2]Sociéte des Produits Nestlé SA, Rte du Jorat 57, 1000 Lausanne, Switzerland

Enzymatic Hydrolysis of an Apple Juice Enriched with Apple Bagasse to Enhance its Hypoglycemic and Holesterolemic Effect

Background Juice extraction produces about 5.5 million metric tonnes of residues per year which present a high risk for the environment when they are discarded, decompose in landfills, and contribute to greenhouse gas emissions. These residues, particularly from fruits, are a valuable source of dietary fiber (DF) and antioxidants. However, their high insoluble dietary fiber (IDF) contents jeopardize the incorporation into foods, as they can negatively impact texture and organoleptic properties. Different technologies are under study to increase the proportion of soluble DF (SDF) in not-utilized fractions from fruits. Among them, enzymatic hydrolysis (EH) is an efficient method to increase solubility which might be associated with improved techno-functional and health-related properties.

Methods: Enzymatic hydrolysis (EH) was conducted on apple bagasse with a cellulase-pectinase mixture applying different hydrolysis times of 2, 6 and 24 h. The impact of the treatment was analyzed in terms of physico-chemical properties, such as DF (IDF/SDF), mono- and oligosaccharide composition, and cholesterol-lowering properties, such as pancreatic lipase inhibition, cholesterol and bile acid binding capacities (CAC/BAC) at pH 7. In addition, different concentrations (1.5-4.5%) of apple bagasse was added to an apple juice and the DF-enriched juices were enzymatically hydrolyzed applying the same treatment times. Analysis of the juices included particle size, viscosity, pH, galacturonic acid (GalA) and total phenolic content and kinetics of glucose diffusion during digestion.
Results: EH enhanced the SDF content of apple bagasse increasing with longer hydrolysis time, which is indicated by the release of glucose/xylose, cellobiose, cellotriose and pectin derived oligosaccharides. The altered DF microstructure was associated with a high increase of CAC and BAC at pH 7 and pancreatic lipase inhibition. Highest improvements of CAC (16.10 mg/g) and inhibition (26.84 %) were reached after 6 h whereas BAC increased continuously and reached its maximum after 24 h (2.75 mg/g). When the bagasse was added to a juice, EH decreased the particle size, pH and viscosity of the juices while increasing GalA content. Glucose diffusion, simulating the rise of blood glucose when the juice is consumed, of the DF-enriched juices was decelerated significantly dependent on the viscosity of the juice but limited by the higher glucose content which was added with higher concentrations of apple bagasse and longer hydrolysis times.
Conclusions: This study demonstrates the high efficiency of the selected cellulase-pectinase mixture in increasing SDF content and improving the cholesterol-lowering effect of apple bagasse. Added to a fruit juice, it can enable the incorporation of a higher concentration of bagasse thus conferring to the end product a high cholesterol- and glucose-lowering effect and high antioxidant content.

Biography

Alina is from Germany, Berlin. She holds a BSc in Nutrition Science and MSc in Food Technology. She had some experience abroad in her internships at the University of Alberta (Canada) in food microbiology and at the R&D department of a Chilean company developing novel and vegan food products.

Invited Forum
Day-2

S.Fabroni
Council for Agricultural Research and Economics (CREA), Research Centre for Olive, Fruit and Citrus Crops,
Corso Savoia, 190
95024 Acireale
Italy
Email address: simona.fabroni@crea.gov.it

Recent Advances of New Mild Technologies for Sustainable, Safe and Nutritious Foods with Fresh-like Quality

Abstract
Fresh-like foods, of animal or vegetable origin, are increasingly sought after by consumers who are strongly convinced that the conventional stabilization techniques traditionally employed for food preservation can be detrimental to the nutritional quality of foods.
New mild technologies have the aim of stabilizing foods, making them fresh-like, safe and pleasant to taste, without causing a loss of the organoleptic and nutritional qualities. Moreover, a specific challenge of these technologies is associated with their ability to preserve foods in a sustainable way, by avoiding high investment costs and energy expenditure. These innovative technologies might include mechanical processes, electromagnetic technologies, acoustic technologies, innovative chemical processing technologies and others such as membrane filtration and dense phase CO2. An up-to-date review on the recent advances of new mild technologies for sustainable, safe and nutritious foods with fresh-like quality will be presented focusing attention to the application of pulsed electric fields for the cold pasteurization of fruit juices and the high pressure carbon dioxide cold pasteurization of fruit juices and ready to eat fruits and vegetables.

Keywords
mild technologies, fruit, vegetables, pulsed electric fields, high pressure carbon dioxide

Biography
Dr. Simona Fabroni, is a permanent researcher in food science and technology at the Council for Agricultural Research and Economics (CREA) - Research Center for Olive, Fruit and Citrus Crops (2010-present). In 2009 she has completed her PhD in Food Science and Technology, University of Catania, Italy. From 2005 she has been working studying on quality and biological properties of fresh fruits and processed products focusing the attention on the investigation of the main bioactive constituents (anthocyanins, flavonoids, hydroxycinnamic acids, vitamins) and promoting the development of new technologies for the processing industry. She has conducted studies on the nutritional and nutraceutical quality of organic fruits and on traceability studies for the valorisation of food products protected by European designations (Organic, PDO, PGI). She has published more than 50 papers, (including 37 indexed in Scopus peer-reviewed papers). H-index: 15 (778Citations by 715 documents).

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Ana Novo Barros
Irene Gouvinhas,[1] Rui Costa,[1] Ana Abraão,[1] Joana Campos,[2] Mónica Serra,[2] Hugo Almeida,[2] Javier Fidalgo,[2] Raquel Fernandes,[2] Ana Casas,[2] Ana Novo Barros[1,2*]

[1]Centre for the Research and Technology of Agro-Environmental and Biological Sciences, Institute for Innovation, Capacity Building and Sustainability of Agri-food Production (Inov4Agro), University of Trás-os-Montes and Alto Douro (CITAB-UTAD), 5000-801 Vila Real, Portugal.
[2]Mesosystem S.A, Oporto, Portugal
* abarros@utad.pt; pca@mesosystem.com

New Analytical Approaches for the Traceability of Food Matrices

Some chromatographic and spectroscopical techniques have been extensively explored in the last years for the assessment of contents of different food matrices. Among these, vibrational techniques, such as Infrared (IR), generally Fourier Transform-IR (FTIR), and Raman spectroscopy, have emerged as analytical methodologies widely used for food analysis.1 Actually, the conventional measurements employed in the assessment of the functional and nutritional composition of foods, such as phenolic composition, peroxide values, fatty acids, and volatile compounds, are time consuming and require large amounts of reagents and solvents, which can compromise the environmental impact and are very expensive. Furthermore, they require the pre-treatment of sample, leading to its destruction. On the other hand, spectroscopical means, such as FTIR— particularly when used in conjunction with Attenuated Total Reflectance (ATR), dismiss any kind of sample preparation, avoiding the occurrence of chemical transformations, such as oxidation.2,3 These vibrational spectroscopic methods provide information about the chemical composition of several foods and biological materials, and molecular structure. In fact, FTIR has been recently developed for an increasing number of matrices, resorting to multivariate analysis approaches, which allow to correlate the spectra with chemical data, thus retrieving analytical calibrations.4 In the last few years, our research group is focused on the implementation of IR spectroscopy, coupled to chemometric data analysis methods, for the authentication and traceability of food matrices, supplying the use of classical methodologies.

Funding: This work is supported by National Funds by FCT - Portuguese Foundation for Science and Technology, under the project UIDB/04033/2020, and by Mesosystem S.A.

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Biography

Ana Isabel Novo de BarrosI is an Assistant Professor with Habilitation from the University of Trá-os-Montes and Alto Douro. I have been the Director of the Centre for the Research and Technology

of Agro-Environmental and Biological Sciences (CITAB) for 5 years (May 2017-July 2022) and of Institute for Innovation, Capacity building and Sustainability of Agri-Food production (Inov4Agro) for one year and half (January 2021-July 2022). I am responsible for the Phytochemicals Laboratory, and Coordinator of the Agri-Food Quality Group. My research targets are mainly in the identification, separation and recovery of functional molecules from different natural products, as well as their implementation as ingredients and bioactive compounds in food, with an ultimate goal to extract high added-value molecules and re-use them in the food chain (from agriculture to the consumer). In the last years, I was awarded with several prizes and distinction. I have published more than 100 scientific documents, including research articles, reviews and editorials, within the highest impact factor journals in the Food Science and Technology field (25 h-index, SCOPUS, August 2022). I was editor of 2 books and have written several book chapters. I have registered 8 national patents. I am editorial member of Antioxidants and Frontiers and have Special Issues in Molecules and Antioxidants journals. At the moment, I am also guest editor of several special issues in MDPI and IntechOpen. I have international collaborations and I am PI and member of several FINANCED RESEARCH PROJECTS with different typologies (last 5 years). I'm the coordinator from the European project WATELESS|TOPIC ID: HORIZON-CL6-2022-FARM2FORK-01-08.My scientific work has raised interest and has led to the SUPERVISION of Post-doc (3 concluded, 1 ongoing), PhD (9 concluded and 5 ongoing), Master (40 concluded and 7 ongoing) and Bachelor (46 concluded) students, as also more than 30 national and international PhD students visitors in CITAB. I have been member of organizing committees of scientific conferences, presented invited lectures in international and national conferences, and have >400 oral/poster communications, including papers in conference proceedings. I have been member of PhD and Master defenses and I also have 25 years of teaching experience. I served as an international expert evaluator for Agência Nacional de Inovação. I have assisted as an invited reviewer of several papers. Currently, I am also working in the research area of the cosmetic company Mesosystem.

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Jakob A. Shimshoni
Matan Birenboim[1], David Kengisbuch[1], Tarin Paz-Kagan[2], and Jakob A. Shimshoni[1*]

[1]Institute for Postharvest and Food Sciences, Agricultural Research Organization (ARO), Volcani Center, P.O. Box 15159, Rishon LeZion, 7505101 Israel.
[2]French Associates Institute for Agriculture and Biotechnology of Dryland, The Jacob Blaustein Institutes for Desert Research, Ben-Gurion University of the Negev, Sede Boqer Campus, 8499000, Israel.
*jakobs@volcani.agri.gov.il

Near-Infrared Spectroscopy And Machine Learning-Based Technique To Predict Quality-Related Parameters In Cannabis And Basil

Abstract
Currently, the quantitative chemical analysis of secondary metabolitesin edible and medicinal plants is achieved through the use of laborious, expensive, and time-consuming technologies, such as high-pressure liquid-chromatographyand/or gas chromatography-mass spectroscopy (GC-MS). Hence, we aimed to develop a simple, accurate, fast, and cheaptechnique for the quantification of major cannabinoids and terpenes in cannabis inflorescence and terpene, eugenol and polyphenolic concentration in basil leaves, using Fourier transform near infra-red spectroscopy (FT-NIRS). Moreover, for authenticity purposes, we have developed accurate cultivar classification models for cannabis inflorescence and basil cultivars. For that purpose, FT-NIRS was coupled with state-of-the art multivariate classification and regression models,namelypartial least square-discriminant analysis (PLS-DA) and partial least square regression (PLS-R) models. The PLS-DA model yielded an absolute major cannabis and basil class separation and perfect class prediction. The prediction of cannabinoid and terpene concentrations in medicinal cannabis inflorescence and rosmarinic acid, eugenol and terpenes in basil leaves by PLS-R, yielded robust models with high predictive capabilities (R2CV and R2pred> 0.85, RPD> 2.5, RMSECV/RMSEC ratio < 1.2).Our results confirm that there is sufficient information in the FT-NIRS to develop excellent prediction models of secondary metabolites in cannabis and basil and major-cultivar classification models.
Keywords: Cannabis sativa L., basil, near-infrared spectroscopy,cannabinoids, terpene, partial least square regression, partial least square discriminant analysis.

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major cannabinoids quantification and identification in cannabis extracts. Chemom Intell Lab Syst2022:104717.

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M. I. Sri Wuwuhand Edy Rianto
Eni Mulyanti[1]), M. I. Sri Wuwuhand Edy Rianto[2])

[1]Faculty of Animal and Agricultural Sciences, Diponegoro University, Semarang, Indonesia
[2]Permanent address: Kupang Animal Husbandry Training Centre, Kupang, Indonesia
Corresponding author (erianto_05@yahoo.com)

Concentrate Supplementation Improves Reproductive Performance of Beef Cows

Abstract
An experimental study was carried out to examine the effect of concentrate supplementation on the reproductive performance of beef cows. This study used 24 Ongole Crossbred (OG) and 24 Simmental-OG cows. The cows were fed fermented rice straw ad libitumand fresh Napier grass at amount of 5% body weight (BW) as the basal diet. The cows were allocated into a completely randomized design of nested patterns (two factors). The first factor was the breed of cow, namely OG and SOG). The second factor was concentrate supplementation in the diet, namely T0 (without concentrate), T1 (concentrate supplementation of 0.5% BW), and T2 (concentrate supplementation of 1.00% BW). The concentrate contained 11.82% protein; 8.13% fat; 17.76% crude fibre;10.73% ash and 57.58% total digestible nutrients (TDN).Each treatment consisted of 8 cows. The results showed that the breed of cow had no effect (P>0.05) on dry matter intake (DMI) andbody weight gain (BWG), while concentrate supplementation had high significant effects (P<0.01) on DMI and BWG. The estrus cycle was not significantly (P>0.05) affected by the breed of cow, but was significantly (P<0.05) affected by concentrate supplementation. The estrus cycle of T0, T1 and T2 in OG cows were 22.13; 21.38; 20.50 days, respectively; and those in SOG cows were 22.13; 21.25 and 20.38 days, respectively. The duration of estrus was very significantly (P<0.01) affected by the breed of cow, i.e. 16.00 hours in OGcow and 33.50 hours in SOG cow, but not significantly (P>0.05) affected by concentrate supplementation. The breed of cow had no significant effect (P>0.05) on non-return rate (NR) or conception rate (CR)on 90 days after giving birth, while concentrate supplementation affected significantly (P<0.05) on NR 90-days after giving birth,and not significantly (P>0.05) on CR90-days. The average 90-day NR in OG and SOG cows for T0, T1 and T2 were 18.75; 56.25 and 56.25%, respectively. The average 90-day CR for T0, T1 and T2 were 18.75; 56.25 and 50.00%. Service per conception (S/C) of T0, T1 and T2 in OG cows were 3.50; 1.57 and 1.83, respectively, and those in SOG cows were 3.75; 2.00 and 2.00, respectively. It was concluded that that the concentrate supplementation improved the reproductive performance of beef cows, and it was recommended to give concentrate supplement up to 0.50% of body weight before artificial insemination (IB) treatment until three months of pregnancy.

Keywords
Beef cow, body weight gain, concentrate supplementation, intake, reproduction.

Biography
Dr. Edy Rianto is a lecturer at Universitas Diponegoro, Indonesia (1983-present). He was appointed as a professor in animal science in 2009. His major interest is meat ruminant production. His research focuses on the effect of nutrition on meat production and quality. He has mentored over 50 postgraduate students and published more than 200 research articles.He is aneditorial board member of some journalsof animal and agricultural science.

Dominique Rinaldo

Dominique Rinaldo(1) and Dalila Pétro
(1)dominique.rinaldo@inrae.fr
INRAE, UR 1321 ASTRO, Domaine de Duclos, F-97170, Petit-Bourg, Guadeloupe

Browning Susceptibility of Yam (Dioscoreaalata) Depending on Genotype and Location, as Related to Processing Ability

Abstract

Yam production in Guadeloupe, a Caribbeanisland of the French West Indies, decreased by 70 % over the last thirtyyears. In regard to the speciesDioscoreaalata, thisdecreaseispartly due to a fungus diseasenamed anthracnose which can reduce the production yield by up to 90 %. New hybridsresistant to anthracnose wereselected at INRAe Guadeloupe since the 1980s. These cultivars have not been evaluatedyet for theirquality traits and defectsalthoughsome of them are highly susceptible to browning whencut. This presentationaims to rate six new hybrids for theirprocessingability and textural properties, as compared to a commercial cultivar calledkabusah. Thesehybridswerecontrasted for their browning susceptibility. Our data showed a large variability of mostparametersmeasuredafter peeling and/orboiling, due to the cultivar. The new hybridsdiffered for theirmorphologicalcharacteristi cs,the peeling yield, the cooking time whichvariedfrom 16to 24 mn, the shift in pulpweightwhileboiling and the textural properties.An influence of the location on the peeling yield and the susceptibility to browning wasobserved. The cultivars whichoptimizedsimultaneously the maximumnumber of criteriawereidentifiedto be of high ability for processing, whereasothersrevealed to be of littleinterest for cooking. Our resultssuggestthat new hybrids of yamshould not beselectedonly for production yield and resistance to diseases, but a multi-criteriaselectionincludingsomeobjective quality traits and defectsshouldbetakenintoconsideration.

Biography

After studying to become an agricultural engineer, I took a PhD degree in Animal physiology at Rennes University (France). In 1991, I came to Guadeloupe and was recruitedatINRAe where I have studied heat resistance and meat quality in growing pigs until 2004. Since, I have been working on the organoleptic, nutritional and functional qualities of starchy tropical food products. First, I have examined the influence of biotic and abiotic stresses on banana quality for about ten years. Since 2015, I have been focusing on qualities of root crops, mainly yam, with a particular interest in processing ability.

Carlos Artur Nascimento Alves

UNINTA - Centro Universitário, Brazil
carturnalves@gmail.com, carlos.alves@uninta.edu.br

Chemical Profile of Tropical Red Wines from the Sub middle São Francisco Valley, Brazil

Abstract

São Francisco Submiddle Valley (SFSV) is the pioneer wine-producing region in tropical countries, having the first structured and filed Geographical Indication request regarding these conditions. Also, SFSV is the principal Brazilian table grape producing-region and an important producer of sparkling and red wines.Then, red wines have great growth potential in SFSV, since red grapes are the main adapted to the geographical conditions, and these wines having wide scope for market growth. Further, this major adaptation and the red wines market share may be related to phenolics, which play an important role in sensorial traits and aging ability.

Phenolic compounds have been related to antioxidant activity, mainly some of catechins, anthocyanins, and phenolic acids.My recent paper “Chemical typicity of tropical Tannat red wines from Sub-Middle São Francisco Valley, Brazil” discuss the phenolics compounds and antioxidant activity in Tannat and Syrah wines from the Brazilian Northeast, which may bring important discussions concerning how the terroir may to maximize the phenolics production pathways. Furthermore, all discussion about the region may touch the global warming, and how the tropical regions may be a laboratory to temperate regions in the future.

Finally, this speak may contributes to oenological knowledge discussion concerning tropical wine-producing regions, mainly the São Francisco Submiddle Valley. I would like to thank you for the invitation and taking your time to consider my proposal.

Biography

MsC. Carlos Artur N. Alves is a food science and gastronomy professor at the UNINTA University Center, Brazil, with expertise in wine, wine chemistry and sensory analysis. His research in the Master degree focuses in phenolic compounds and deterioration study of red wines from the tropical region São Francisco Sub-middle Valley, in Brazil Northeast. Professor Artur Alves has received a honor bachelor’s degree from the Federal University of Ceará. He has published research papers in international journals, as the International Journal of Gastronomy and Food Science, and the Journal of Food Science and Techonology. He is Sommelier student at the Sommelier Brazilian Association (ABS) and Association de la Sommellerie Internationale (ASI).

Gabriela Grigioni

Food Technology Institute - Science and Technology Institute of Sustainable Food Systems CONICET INTA, Hurlingham, Buenos Aires, B1712JHB, Argentina

Exploring the Attitudes and Concerns of Meat Consumers: Argentina as a Case Study

Abstract

Meat consumption is changing. Information on consumer attitudes and concerns about the different dimensions of meat quality and the characteristics of production systems can support policy discussions and industry perspectives, in order to meet consumer demands and ethics expectations of the society. In general, the behavior of meat-eater is less predictable. Some consumers indicate that they are reducing or willing to reduce or even eliminate their consumption of meat. However, the characteristics and concerns of these consumer groups vary according to the cultural and socioeconomic context. In Argentina, concerns related to animal welfare and environmental aspects are growing among the younger generations. Likewise, a survey shows that 30% of the total responders is willing to partially substitute the consumption of beef to avoid the slaughter of animals and that 8% would abandon it for this reason. In the case of meat consumers, the main drivers of consumption are the hedonic component, its nutritional characteristics and its perception as healthy and essential in a balanced diet. In Argentina, a survey could discriminate groups of consumers based on these aspects. It is important to point out that results showed that consumers consider livestock production as a sustainable activity. The objective of the presentation is to analyze the consumer's perception of quality, eating behaviors and identify the factors that influence consumer attitude. In particular, the results of consumption studies in Argentina are reviewed as a case study.

Biography

Professor Gabriela Grigioni is a food scientist at Argentina's National Institute of Agricultural Technology and Vice-director of the Institute of Science and Technology of Sustainable Food Systems of the National Council for Scientific and Technical Research. Her research interests include new food designs, physical-chemical and rheological properties of food related to manufacturing and preservation processes. She studies quality traits of meat product and their relationship to cattle feeding and management strategies, as well as meat shelf life. She has experience developing functional foods and transferring technologies to the industry. She is the inventor of a patentat the level of Argentina, Chile, Peru and Brazil. She has been lecturer in different postgraduate coursesand Advisor of scholarship and Master and PhD degrees thesis.

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L.Lanzoni
L.Lanzoni[1*], L.Di Paolo[2],S. Abbate[2], M. Giammarco[1], I. Fusaro[1], A. Atzori[3], D. Di Battista[2], G. Vignola[1]

[1]Department of Veterinary Medicine, University of Teramo, Località Piano d'Accio, 64100, Teramo, Italy.
[2]Department of Industrial and Information Engineering and Economics, University of L'Aquila, 67100, L'Aquila, Italy.
[3]Department of Agricultural Sciences, University of Sassari, 07100, Sassari, Italy.
*llanzoni@unite.it

Carbon Footprint Assessment of Pecorino CheeseProduced in Central Italy

Abstract
Small ruminant farming accounts for 6.5% of livestock greenhouse gasses (GHG) emissions. To reduce the environmental impact of this sector it is important to define tailored mitigation solutions, which required a thorough understanding of the differentfarming systems. The following study aimed to assess the environmental impact of three different sheep farmsoriented towards the production of pecorino cheese, located in central Italy. The three farms were classified according to the different management strategies adopted as 'extensive', intermediate' and 'intensive'. The 'extensive' farm presented a single matinggroup, and the lambs were kept with the ewes until the slaughter age (3 months).The "intermediate" farm was characterized by two mating periods (autumn and winter) and the lambs were weaned after the first month of life.The "intensive" farm presented 3 mating groups and adopted an automatic feeder to provide milk to the lambs, which were separated from the mothers a few days after birth. Inventory data were collected on farm to perform the Life Cycle Assessment (LCA) and 'CarbonSheep', developed by the University of Sassari, was used to evaluate the climate change impact to produce 1 kg of pecorino cheese with an economic allocation.The carbon footprint of the three farms was 20.04 (extensive), 17.4 (intermediate) and 16.64 (intensive) kgCO2eq/kg pecorino.However, a different relative contribution of the different sectors (enteric fermentation, manure management, feed purchase, pesticide, electricity and fuel use) was noted between the farms. Indeed, the extensive farm had a higher relative impact related to enteric fermentations and manure management (83% vs. 76%-intermediate and 74%-intensive). In the 'intensive' farm the highest relative level of impact derived from the purchased feed (15% vs 9%-extensive and 6%-intermediate), as it purchased 100% of the concentrates used. On the intermediate farm, there was the greatest contribution related to the use of fuel, associated with a greater agricultural extension of cultivated lands. The present results indicatethat, even though the same production process and geographical area are involved, mitigation solutions need to be studied on a case-by-case basis as the types of management can change considerably.

Keywords
Environmental sustainability; climate change; life cycle assessment; small ruminants; sheep farming

Biography
Dr. Lydia Lanzoni graduated in Veterinary Medicine in 2020 and is currently attending a PhD course in "Veterinary Medical Sciences, Public Health and Animal Welfare" at the University of Teramo. She has worked in the field of farm animal welfare, studying the behaviour of Mediterranean buffaloes during peri-partum. Currently her research activity, in synergy with several national and

international collaborations, focuses on sustainability and welfare of farm animals, in particular on the integration of animal welfare indicators in a holistic assessment of farm sustainability. Recently, she is undertaking a research project on the welfare and environmental impact assessment, with Life Cycle Assessment (LCA), of “pecorino” cheese production in Abruzzo (Italy). She has contributed to the publication of articles in international peer-reviewed journals and participated in national and international conferences.

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T. Frangopoulos
T. Frangopoulos[1*], D. Petridis[1], A. Marinopoulou[1], A. Goulas[1], E. Kannidou[1], A. Ketesidis[1], J. Ozouni[1], S. Dimitriadou[1], A. Arampatzidou[1], L. Tsekmes[1], E. Koulaki[1], A. Lioli[1], D. Georgiou1, E. Kalogianni[1], S. Raphaelides[1], V. Karageorgiou[1]

[1]International Hellenic University, School of Geosciences, Department of food science and technology, Sindos University Campus, Thessaloniki.
*thfrangopoulos@gmail.com

Optimization of Starch Based Biodegradable Films Manufactured with Montmorillonite, Focusing on Mechanical, Barrier and Physicochemical Properties

Abstract

The aim of the present study and at the same time the novelty was the evaluation of the effect of different quantitative and qualitative factors regarding the mechanical, physicochemical and barrier properties of starch biodegradable films with montmorillonite through a parametric analysis method and the determination of the optimum levels of the factors according to the different in each case desired properties of the final product. Also, an accelerated stress test to calculate the failure rate at different stress levels was included to the aims of the present study. Starch biodegradable films were casted using four types of starch, namely chickpea, bean, lentils and rice, plasticized with glycerol using Na-Montmorillonite as nanoclay. Definitive screening design was used in order to obtain the needed tests to evaluate the starch, glycerol and nanoclay concentration, drying temperature, drying tray type and starch species effect on mechanical and barrier properties and thickness. Parametric analysis data showed that the tensile strength of starch biodegradable films was, as expected, positively affected by nanoclay concentration, while starch concentration had also a positive effect on the tensile strength until the maximum was reached at 5.5 wt% of the thermoplastic starch solution. However, a further increase of starch concentration leaded to a decrease of the tensile strength. At the same time, the elongation at break tended to increase when glycerol concentration increased and seemed to be unaffected by nanoclay concentration. Water vapour permeability was also affected negatively by glycerol and starch concentration, but nanoclay concentration seemed to improve barrier properties. Also, plexiglass trays gave films with improved extensibility and barrier properties. Regarding the starch species, only rice starch was differentiated significantly mainly due to the reduced tensile strength and low barrier properties. Results upon optimization showed that, in order to obtain maximum tensile strength and elongation at break, but also minimum water vapor permeability rate and normal thickness, a combination of factors levels should be regulated as follows: 4.69

%wt starch content, 33.5 %wt glycerol based on starch content, 45.9 oC drying temperature, 10.5 %wt MMT based on starch content, bean starch and plexiglass as tray type. In addition, the elongation level was tested as an acceleration factor during accelerated survival tests using 120 film units of several film treatments. Results showed that, according to the linear model analysis results, stressing of starch biodegradable films by means of prolonged extension at increasing elongation levels, affected positively the failure rate of films, which was found to be different at each elongation level but also for each film treatment. This analysis gives the opportunity to predict and evaluate the percentage of samples population that will fail as well as the exact break time under the influence of

elongation as an acceleration stress factor.

Keywords
biodegradable films, montmorillonite, parametric analysis, definitive screening, starch

Biography
Theofilos Fragopoulos is a graduate (2017) of the Department of Agriculture of the Aristotle University of Thessaloniki (A.U.Th), specializing in Food Science and Technology. He received a Master's degree (M.Sc.) in Food Science and Technology from the Faculty of Agriculture of the A.U.Th. (2020), where he conducted his thesis in the Laboratory of Food Chemistry and Biochemistry. From December 2020 he is conducting his Doctorate studies at the department of food science and technology (International Hellenic University) within the framework of the research program "Starch Active Biodegradable Food Packages – StActBioFP". He has worked in industry in the field of developing functional foods with utilization of herbal ingredients with multiple actions. He has published 3 articles in an international peer-reviewed scientific journal and 1 chapter on a book. He has 5 cross-references from individual peer-reviewed articles and an h-index of 2. He, also, has participated as a speaker in 2 international scientific conferences.

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Joana Costa
Caterina Villa, Joana Costa*, andIsabel Mafra

REQUIMTE-LAQV/Faculty of Pharmacy University of Porto, Porto, Portugal.
*jbcosta@ff.up.pt

Novel PCR-Based Approaches for the Detection of Allergenic Sesame in Foods

Abstract
Sesame seeds are widely used as technological ingredients in a wide range of processed foods (e.g., bakery products), but theyare also important allergenic foods[1,2].This workintends to develop highly specific and sensitive PCR methods for sesame detection in processed foods, based on real-time PCR and digital PCR(dPCR). Model mixtures of biscuits containing known amounts of sesame (100,000-0.1 mg/kg, w/w) were prepared as calibrators and blind samples for method development and validation. Several genes were evaluated as potential molecular markers for sesame identification, from which the CO6b1 and ITS regionswere selected.Independent real-time PCR approaches, using hydrolysis probes for the target sequences, were successfully developed with acceptable performance parameters (PCR efficiency of 96.4-109.4%, R2 of 0.991-1.000) and high sensitivity/specificityfor the quantification of sesame (1-50 mg/kg) in raw dough and processed biscuits[2]. Both real-time PCR systems were further validated with blind samples containing known amounts of sesame,complying with precision (CV <25%) and trueness (bias <±25%) criteria. dPCR methods were also proposed using the same calibratorsin a dynamic rangeof 1,000-0.1 mg/kg (w/w). dPCR allowed increasing the sensitivity by one order of magnitude, thus enabling to quantify sesame in dough/biscuits down to 5 and 0.1 mg/kg, targeting the CO6b1 and ITS regions, respectively. Both, real-time PCR and dPCR, provedto be reliable and highly sensitive/specific tools to target sesame as an allergenic species, each of them presenting different advantages, though the dPCR exhibitedenhanced sensitivity.

Acknowledgments
This research was supported by national funds (FCT) through project Hypoallergen (PTDC/BAA-AGR/4005/2021), the EU with project Healthy&ValorFood (NORTE-01-0145-FEDER-000052) and the strategic funding from FCT/MCTES (UIDB/50006/2020|UIDP/50006/2020). J. Costa and I. Mafra thank FCT for funding through (2021.03583.CEECIND/CP1662/CT0012 and 2021.03670. CEECIND/CP1662/CT0011).

Keywords
Sesamum indicum, real-time PCR, digital PCR, sesame allergy, method validation.

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Biography
Dr Joana Costa has a PhD in Pharmaceutical Sciences from Faculty of Pharmacy University of Porto (FFUP). Presently, she is an Assistant Researcher at REQUIMTE-LAQV/FFUP with special focus on FOOD ALLERGY studies, but also on food authentication, plant food supplements and GMO analysis. She is author/co-author in more than 80 publications in international peer-reviewed

journals (H-index 27), 8 book chapters, 59 oral/87 poster presentations, organizing committee (9 events), 11 awards. Participation in n=21 national/international projects and MC member of COST Actions (CA18127, CA18227, FA1402) and INFOGEST WG3-C.

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Isabel Mafra

Catarina Villa, Mónica B.M.V. Moura, Carla S.S. Teixeira, Joana Costa, Isabel Mafra*

REQUIMTE-LAQV/Faculty of Pharmacy University of Porto, Porto, Portugal.
*isabel.mafra@ff.up.pt

A novel Real-Time PCR Method to Detect Yellow Mealworm (Tenebrio molitor) Flour as a Potential Allergenic Food

Abstract

The term yellow mealworm refers to the larval form of the insect species Tenebrio molitor, being the first insect-derived food productwith completed evaluation for human intake. However, yellow mealworm might induce allergic reactions to new IgE-binding proteins in crustacean-allergicand/ or dust mite-allergic subjects (pan-allergens) [1,2]. Therefore, its detection at trace levels in foods is a key issue to verify labelling compliance and protect sensitized individuals. This work aimed at developing a new real-time PCR approach for the quantitative detection of T. molitor as a potential allergenic food. For this purpose, reference mixtures simulating the production of pork sausages and wheat biscuits, containing known amounts of insect flour were used. Real-time PCR with a TaqMan probe targeting the cytochrome b gene of T. molitor allowed detecting down to 2 fg of insect DNA, and 1.0 and 0.1 mg/kg of mealworm flour in autoclaved sausages and baked biscuits, respectively [3]. Generally, the method revealed acceptable analytical performance parameters, which suggested its suitability to analyze processed foods. Food matrix and processing significantly affected real-time PCR data, highlighting the importance of using appropriate calibration models for quantitative analysis. The novel approach was successfully validated with blind mixtures and applied to commercial samples, demonstrating its effectiveness and reliability in the quantification of yellow mealworm in processed foodstuffs.

Keywords

yellow mealworm, real-time PCR, crustacean allergy, insect detection, validation.

Acknowledgments

This research was supported by national funds (FCT) through project Hypoallergen (PTDC/BAA-AGR/4005/2021), the EU with project Healthy&ValorFood (NORTE-01-0145-FEDER-000052) and the strategic funding from FCT/MCTES (UIDB/50006/2020|UIDP/50006/2020). J. Costa and I. Mafra thank FCT for funding (2021.03583.CEECIND/CP1662/CT0012 and 2021.03670.CEECIND/ CP1662/CT0011).

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Biography

Isabel Mafra graduated in Food Engineering from the Portuguese Catholic University in Porto, completed a Master degree in Biological Engineering from the University of Minho and a PhD degree in Chemistry from the University of Aveiro. She is a Principal Researcher at LAQV/REQUIMTE, Faculty of Pharmacy, University of Porto. Her research is focused on molecular biology applied to food authentication, food allergen analysis/characterisation and GMO detection, with strong expertise in the development of DNA-based methods, including DNA extraction from complex food matrices, PCR, real-time PCR, HRM analysis, sequencing, among others. She has also expertise in food chemistry and food technology/biotechnology. She has participated in several national and international research projects (30) and published over 120 papers in index journals (H-index of 34).

Poster Presentation Day-2

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V. Vecerek
V. Vecerek[1*], E. Voslarova[1], L. Valkova[1], P. Dolezelova[1], P. Macakova[1], and Z. Semerad[2]

1Department of Animal Protection and Welfare and Veterinary Public Health, Faculty of Veterinary Hygiene and Ecology, University of Veterinary Sciences Brno, Palackehotr. 1946/1, 612 42 Brno, Czech Republic.
[2]State Veterinary Administration, Slezska 100/7, 120 00 Prague, Czech Republic.
*vecerekv@vfu.cz

The Comparison of the Occurrence of Technological Defects in Slaughtered Cattle, Pigs, Sheep and Goats

Abstract

The aim of this study was to compare the number of detected technological defects between individual species and categories of livestock slaughtered in the Czech Republic.The occurrence of technological defects in animals slaughtered at slaughterhouses was determined during veterinary post mortem examination. All animals transported from Czech farms and slaughtered in slaughterhouses in the Czech Republic in the period from 2010 to 2021 were included in the analysis.

The veterinary examination of slaughtered animals was carried out by official veterinarians of the State Veterinary Administration, who recorded the following technological defects: slaughtered in agony, insufficient bleeding, congestion of the lungs, delayed evisceration, over-scalding, contamination during carcass processing, insufficient technological processing (e.g. debristling), spoilage of muscles, other sensory deviations, and other technological damages.

In slaughterhouses, the occurrence of technological defects was monitored in cattle (dairy cows, heifers, fattening bulls and calves culled from farms), pigs (sows, finishing pigs, piglets culled from farms), sheep (ewes and lambs) and goats (does and kids).The number of slaughtered animals and the total number of technological defects were recorded over the entire monitored period of 12 years. The numbers of findings were recalculated to relative numbers expressed in percentages. Statistical comparison of frequencies was performed by the Chi-square test.

In the monitored period, technological defects were most frequently detected in pigs, namely in sows (the proportion of defects to the number of slaughtered animals was 55.9%), and also in finishing pigs (31.0%) and piglets culled from farms (24.6%). The number of findings in cattle ranged from 12.0% to 14.1%. In sheep, the number of technological defects was lower, (12.3% in ewes and 8.0% in lambs). The lowest incidence of technological defects was found in goats (10.4% in does and 6.3% in lambs). Differences in the numbers of findings between the monitored species and categories were statistically significant, with the exception of the heifers and ewes.

The results of our long-term monitoring of the occurrence of damage to carcass, meat and organs at the slaughterhouse in various species and categories of slaughtered animals show the highest

shortcomings of the current methods of slaughtering and processing the carcasses in pigs, followed by cattle, while they are better in sheep and best in goats. The findings are important from the perspective of the focus of veterinary inspection and also from the perspective of the potential modernization of slaughtering technology and processing of animal carcasses in slaughterhouses.

Keywords
slaughter, livestock, food safety and quality

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E. Voslarova

V. Vecerek[1],E. Voslarova[1*], L. Valkova[1], and Z. Semerad[2]

[1]Department of Animal Protection and Welfare and Veterinary Public Health, Faculty of Veterinary Hygiene and Ecology, University of Veterinary Sciences Brno, Palackehotr. 1946/1, 612 42 Brno, Czech Republic.
[2]State Veterinary Administration, Slezska 100/7, 120 00 Prague, Czech Republic.
*voslarovae@vfu.cz

The Occurrence of Technological Defects in Poultry, Rabbits and Ostriches Slaughtered at Slaughterhouses

Abstract

The occurrence of technological defects during the slaughter of poultry, rabbits and ostriches signals a deficiency caused by non-compliance with the required technological procedures and conditions during the slaughter and subsequent processing of the carcasses of slaughter animals.The aim of the study was to find the differences in the occurrence of technological defects between individual species and categories of poultry, rabbits and ostriches.

In poultry, rabbits and ostriches, the occurrence of defects caused by slaughtering procedures and the processing of the carcasses of slaughtered animals was monitored. The number of defects was determined during the veterinary slaughterhouse inspection when deciding on the edibility of meat and organs. In the period from 2010 to 2021, all animals originating from the Czech farms and slaughtered at slaughterhouses in the Czech Republic were monitored.During the veterinary inspection at the slaughterhouse, the following defects were recorded: slaughtered in agony, insufficient bleeding, congestion of the lungs, delayed evisceration, over-scalding, contamination during carcass processing, insufficient technological processing (e.g. plucking), spoilage of muscles, other sensory deviations, other technological damages.The following species and categories of slaughtered animals were monitored: domestic chickens (end-of-lay hens, broiler chickens), turkeys, ducks, geese, rabbits, ostriches.The number of slaughtered animals and the total number of findings of technological defects were recorded over the entire monitored period of 12 years. The numbers of findings were recalculated to relative numbers expressed in percentages. Statistical comparison of frequencies was performed by the Chi-square test.

During the monitored period, technological defects were most often detected in domestic chickens, in end-of-lay hens, the proportion of defects to the number of slaughtered animals was 1.008% and in broilers 0.934%. They were followed by geese (0.510%), ducks (0.254%) and turkeys (0.222%). The lowest occurrence of defects was found in ostriches (0.047%) and rabbits (0.018%). The differences between individual species and categories of animals were statistically significant, with the exception of rabbits and ostriches.

The results show that when comparing individual species and categories of slaughtered poultry, rabbits and ostriches, current methods of slaughtering and processing of carcasses result in the

statistically significantly highest damage in domestic chickens, followed by geese, ducks and turkeys, and less often in defects in ostriches and rabbits. The results can be beneficial for the further direction of veterinary inspection over the slaughtering and processing of poultry, rabbits and ostriches.

Keywords
slaughter, carcass, processing, food safety and quality

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Jungkee Kwon

Jungkee Kwon[1,*], Ji-Hye Choi[1], Sangmin Lee[1], Hwal Choi[1], Jeonhyeon Lee[1], Jung Tae Sung [2]

[1]Department of Laboratory Animal Medicine, College of Veterinary Medicine, Jeonbuk National University, 79-Gobongro, Iksan, 54596, Republic of Korea.
[2]Gbio Co., Ltd., 242 Pangyo-ro, Seongnam, 13487, Republic of Korea
*Corresponding address: Jungkee Kwon (jkwon@jbnu.ac.kr)

Effects of the germinated Glycine max and Angelica gigasNakai Mixture on Serum Lipid and Bone Formation in Ovariectomized Rats

Abstract
This study was undertaken to determine the effect of Glycine max and Angelica gigasNakai mixture on serum lipid profile levels and bone formation in ovarictomized (OVX) rats. Animals were randomly allocated six groups; the sham control (Sham), the OVX group (OVX), the OVX+ 50 mg/kg body weight (b.w.) of germinated Glycine max (OVX+GGM), the OVX+25 mg/kg b.w. of germinated Glycine max + Angelica gigasNakai mixture (OVX+M25), the OVX+50 mg/kg b.w. of mixture (OVX+M50), the OVX+100 mg/kg b.w. of mixture (OVX+M100). All rats were provided with supplemented experimental diets and water for 8 weeks. Serum lipid profile level analysis showed that the total cholesterol (TC), triglyceride (TG), and low density lipoprotein (LDL)-cholesterol levels were decreased in the OVX+M50 group, and OVX+GGM group compared with OVX group. Serum AST and ALT level were significantly decreased in OVX+M50 and OVX+M100 groups compared with OVX group. In addition, serum ALP activity, osteocalcin, CTx1 and NTx1 contents were significantly decreased in OVX+M100 group compared with OVX group. Bone morphometric markers (BMD, BV/TV, Tb.N) were significantly higher in the OVX+M100 group than in the OVX group. These results suggest Glycine max and Angelica gigasNakaimixtures might offer a means of ameliorating menopause associated symptoms such as osteoporosis, dyslipidemia.

Keywords
Osteoporosis, Glycine max, Angelica gigasNakai, Lipid profile, Bone formation

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Biography

Jungkee Kwon is a professor of Laboratory Animal Medicine at Jeonbuk National University. His research is particularly focused on the evaluating the efficacy of functional foods through animal experiment and their impact on osteoporosis. His research is to find the functionality of various extracts and helps to increase the value of companies that produce functional foods using them.

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M.Amoneit

M.Amoneit[1*] and D.Weckowska[1]

[1]Innovation Management, School of Business and Economics, Freie Universitaet Berlin, Thielallee 73, 14195 Berlin, Germany
*madita.amoneit@fu-berlin.de

The Inclusiveness Of The 'Future Food' Visions: Public Perceptions Of Algae, Crickets, Halophytes, Jellyfishes And Urban Production

Abstract
The complex challenges of our time, such as climate changeand population growth, call for alternative protein sources and urban agriculture [1].Food innovations such as algae, crickets, halophytes and jellyfishes as new sources of protein and urban production aim to provide an answer to current and future challenges.However, alternative protein sources and urban agriculture are still barely embedded in in consumers' daily lives [2].Successful commercialisation and thus widespread use of food innovations depends on consumer acceptance [3].Involving the public during investigating in food innovations not only helps to increase consumer acceptance [4], but is also an important component of responsible research. Only few studies in the food sector take inclusiveness into account [5]. Moreover, a limited number of studies examine the consumer acceptance of the food innovations of interest, especially in Germany [6].Consequently, further research is needed to better understand the extent in which food innovations are accepted and to identify ways to strengthen consumer acceptance. This study investigates public perceptions of the food innovations of interest and thus follows responsible research by considering inclusiveness. The results of the online survey (N=366) show that the overall future food vision including the food innovations of interest, is rated as moderately desirable (M=2.70, SD=0.89) and fairly likely (M=3.01, SD=0.77). The likelihood of widespread consumption of the food innovations was higher for extreme future scenarios (no land, no trade) than for non-specific future scenarios. The participants found it desirable to produce their food at home (M=3.78, SD=.57) and mass production of food in urban areas was seen as likely (M=3.43, SD=.76). The results provide first insights into consumer acceptance of the food innovations and facilitate successful commercialisation. Furthermore, the importance and usefulness of public engagement in terms of responsible research is illustrated. The scenario technique has proven to be a solid method to engage the public in food innovation research and an instrument to foster responsible research.The underlying mechanisms as well as the potential drivers and barriers need to be explored in further research.

Keywords
food innovation, future food, public perception, consumer acceptance, inclusiveness

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Biography

Madita Amoneit is a Research Associate at Freie Universität Berlin. Madita joined the FU Berlin in May 2022. As part of the food4future project funded by the German Federal Ministry of Education and Research (BMBF), she is investigating the impact of different participation methods on short-, medium-, and long-term research and innovation processes in the context of a sustainable food supply. She received her Bachelor's degree in Psychology from the University of Konstanz and Master's degrees in Psychologyfrom FU Berlin, both in Germany. While she is still at the beginning of her professional career, she has already gained diverse experiences in research institutions (University of Konstanz, German Aerospace Center, University of Warsaw, FU Berlin).

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M. Bielecka

M. Bielecka[1*], M. Baranowska[1], A. Dąbrowska[1], J. Tarapata[1], J, Żulewska[1]

[1]Department of Dairy Science and Quality Management, Faculty of Food Science, University of Warmia and Mazury, Oczapowskiego 7, 10-719 Olsztyn, Poland;
*marika.bielecka@uwm.edu.pl

Effect of Milk Fortification with Protein Preparations on Quality of Yogurts

Abstract

Protein-enriched yogurts are more and more popular among consumers interested in increasing their daily apportion of proteins [1]. In the European Union, milk proteins and protein preparations are not regarded as food additives and can be used in the production of clean-label foods [2]. Casein and whey protein preparations are applied in the dairy industry to modify the physicochemical and sensory properties of dairy products, especially yoghurts.

The main objective of this study was to evaluate the influence of casein and whey protein preparations additionto milk, prior to fermentation, on the physicochemical properties (pH, syneresis, hardness, viscosity) and sensory attributes of yoghurts. The effect obtained with the addition of protein preparations obtained from skim milk by membrane filtration was compared withprotein preparations available commercially.

Yoghurts enriched with 2% w/w of protein powder, added prior to fermentation, were prepared in a dairy plant in Department of Dairy Science and Quality Management at the University of Warmia and Mazury in Olsztyn. The following commercial protein preparations were used in the study: micellar casein preparation with 85% protein content (CN85) (Inleit Ingredients, Curtis-A Coruña, Spain), whey protein isolate with 91% protein content (WPI), whey protein concentrate with 60% protein content (WPC) (Superior Ltd., Olsztyn, Poland), as well as protein preparations obtained from skim milk by membrane filtration: micellar casein concentrate containing 75% of protein (MCM) and serum protein concentrate containing 67% of protein (SPC). The control yoghurt was prepared with the addition of skim milk powder to the milk base.

The study assessed the dynamics of fermentation of lactose (pH), syneresis rate, hardness, and viscosity of yoghurts, and their sensory acceptability after 3 and 21 days of cold storage.

The addition of each of the evaluated protein preparations to yogurts increased their buffering properties during storage compared to control yogurts. The use of micellar casein concentrate (MCM) and serum protein concentrates (SPC) increased the syneresis of yoghurt, assessed after 21 days storage, in contrast to commercial protein preparations, which caused a significant reduction in yogurt syneresis. Yogurts with whey protein isolate and serum protein concentrate had the lowest rate of syneresis, which was associated with the highest gel hardness, compared to other yogurts. The addition of micellar casein concentrate (MCM) and serum protein concentrates (SPC), similarly to whey protein isolate, reduced sensory quality of yogurts compared to control samples.Whereas the addition of commercial whey protein concentrate and micellar casein improved the sensory quality of the yogurts.

Fortification of the milk base of yogurt with protein preparations prior to fermentation makes it

possible to produce high-protein yogurt without adding significant amounts of lactose and allows modification of their physicochemical and sensory properties.

Keywords
yogurt, high-protein, whey, micellar casein, sensory quality

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Yamira Cepero-Betancourt

Yamira Cepero-Betancourt[1*], Mario Pérez-Won[1], Gipsy Tabilo-Munizaga[1], Bruno MartínezHaya[2], and Ana RodríguezHortal[2]

[1]Department of Food Engineering, UniversidaddelBío-Bío, Avda. Andrés Bello 720, Chillán, Chile.
[2]Department of Physical, Chemical and Natural Systems, Universidad Pablo de Olavide, 41013 Seville, Spain.
*Email: ycepero@egresados.ubiobio.cl

Allergenicity, Protein Structural PropertiesandDigestibility of Bovine Serum Albumin(BSA) Treated by Pulsed Electric Fields, Ultrasound and High Pressure

Abstract
The effects of pulsed electric fields (PEF: 2 kV/cm, 20 µs) and ultrasound (UT: 500 W, 3 min)combined with high pressure (HP: 600 MPa, 10 min)on allergenicity, protein conformation and in vitrodigestibility of BSA solutions (50 mg/ml)were evaluated. The UT+HP and PEF+UT+HP treatments reduced the allergenicity by 64% and 51%, respectively; and contributed to higher degree of hydrolysis of BSA (95% and 99%) after 120 min of gastrointestinal digestion.The UT+HP, PEF+HP and PEF+UT+HP treatments significantly decreased the sulfhydryl group content, fluorescence emission intensity and surface hydrophobicityof BSA indicating a disrupt of the tertiary structure due to the formation of soluble and insoluble aggregates of subunits. The secondary structure changes showed that α-helix decreased, while β-sheets and β-turns increased.Dimerization was no observedby SDS-PAGE and MALDI-TOF suggesting thatthe electrostatic and hydrophobic interactions are the driving force behind the aggregation. Slight changes were observed in the amino acid composition. In conclusion, combined PEF, UT, and HP treatments reducethe allergenicityof BSA and improve its digestibility, which can be used to develop hypoallergenic food products.
Keywords: BSA,Allergenicity, Protein conformation, Digestibility, Non-thermal processing.

Biography
Yamira Cepero Betancourt was born in La Habana, Cuba. She is a chemical engineer (CUJAE, 2000) with a master's degree in food engineering (CUJAE, 2007) and a PhD degree in food engineering (Universidad del Bío-Bío, Chile, 2018). At present, she is a postdoctoral researcher at the Universidad del Bío-Bío (FONDECYT Postdoctoral Grant 2021, ANID).

Invited Forum
Day-3

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A. Amato

S. Terzo[1], P. Calvi[1,2], F. Mulè[1], A. Amato[1*].

[1]Department of Biological- Chemical- Pharmaceutical Science and Technology, University of Palermo, viale delle Scienze, 90128, Italy.
[2]Department of Biomedicine, Neuroscience and Advanced Diagnostic, University of Palermo, via del Vespro 137, 90127, Italy.
*antonella.amato@unipa.it

Aphanizomenon Flos Aquae (AFA) Extract Improves and Prevents the Obesity Related Dismetabolism in Obese Mice

Abstract
Accumulating evidence indicates that obesity is closely associated with an increased risk of metabolic diseases such as insulin resistance, type 2 diabetes, dyslipidemia and nonalcoholic fatty liver disease [1]. Numerous plant components have been proven to mitigate obesity syndrome [2]. Aphanizomenon flos-aquae (AFA) is a fresh water unicellular blue-green alga rich in phytochemical compounds with antioxidant and anti-inflammatory properties [3,4]. In light of the strict interconnections between inflammation, oxidative stress and the obesity related dysfunctions the aim of this study was to investigate the ability of an AFA extract, KlamExtra, to accelerate the reversion of the obesity dymetabolic conditions in High Fat diet (HFD)-obese mice. For this purpose, we investigated the effects of switching HFD fed obese mice back to a standard diet (STD), alone or in combination with KlamExtra (25 mg/die). To this end, biochemical and histological analysis, oxidative stress and inflammation evaluations in liver and adipose tissue and hepatic gene expression of lipid metabolism factors were carried out. The STD mice supplemented with KlamExtra resulted in marked reductions in body weight, fasting glucose levels, insulin sensitivity, and HOMA index when compared to the obese mice fed with the only standard cow. Cholesterol plasma level was significantly ameliorated in obese mice fed STD+AFA in comparison with HFD and STD animals, while hepatic steatosis was completely normalized. These effects were associated with a reduction in hepatic and adipose tissue oxidative stress and inflammation. A decrease in reactive oxygen species, and TNF-α and IL-6 gene expression was indeed observed. Moreover, AFA-diet was able to strongly reduce HFD- induced hepatic overexpression of FAS, SCD1, and SREBP-1c compared to STD mice. In conclusion, the present results showed that AFA supplementation was able to accelerate the STD-induced reversion of insulin resistance and hepatic steatosis by positively modulating inflammation, oxidative stress and the expression of genes linked to lipid metabolism in liver and adipose tissue.

Keywords
obesity, Aphanizomenon flos-aquae, antioxidant, anti-inflammatory, lipid metabolism

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Biography

Antonella Amato is Associate Professor of Physiology at the Department of Biological- Chemical-Pharmaceutical Science and Technology, University of Palermo in Italy. Prof. Amato is guest Editor of journal “Nutrients” and director of the Advance Course in “Nutrition and Health” at the University of Palermo. Her main research interest is aimed to analyze the effects of natural bioactive compounds contained in dietary supplements and functional foods on the metabolism dysfunctions related to obesity, including insulin-resistance, adiposity and neurodegeneration. Prof. Amato has published over 60 papers; she is co-inventor of data submitted for patent applications. Much of her research has been funded by companies specialized in dietary and foods supplements synthesis.

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S.Terzo
S.Terzo[1*], A.Amato[1],P. Calvi[1,2], M. Allegra[1], A. Attanzio[1], L. Tesoriere[1], and F.Mulè[1]

[1]Department of Biological, Chemical, Pharmaceutical Science and Technology, University of Palermo, VialedelleScienze, 90128 Palermo, Italy.
[2]Department of Biomedicine, Neuroscience and Advanced Diagnostic, University of Palermo, Via del Vespro 129, 90127 Palermo, Italy.
*simona.terzo01@unipa.it

Neuroprotective Effects of IndicaxanthinAgainst Neuronal Damage in Mice Fed a High-Fat Diet

Abstract
Indicaxanthin (Ind) is a bioactive and bioavailable betalain pigment present in Opuntia ficus indicafruits. It possesses a variety of biological activities, including antioxidant, anti-inflammatory, and anti-dysmetabolic properties [1,2]; however, the detailed effects of Ind on a high-fat diet (HFD)-induced neuronal damage remains to be determined. Therefore, the aim of the present study was to clarifywhether Ind has a protective role in HFD-associated neurodegeneration in the mouse brain and to investigate the mechanisms of the action. C57BL 6J mice were maintained for 14 weeks on a normal diet, on HFD (60 kcal% fat), and on HFD+Ind receiving Ind viaoral administration at a nutritionally relevant dose [3] of 0.86 mg/kg/day for the last 4 weeks. Tunel assay and FasL, Bim, P27, Bcl-2, and BDNF gene expression were used to evaluate the effects of HFD and Ind on mouse brain neuronal apoptosis. Western blotting and PCR analyses were used to assess the brain protein expression of COX-2, iNOS, and NF-kB/Nrf-2 axis activation, and the gene expression of inflammatory cytokines TNF-α and IL-6. GFAP immunohistochemistry staining was used to evaluate the presence of inflammation-related astrocytes in the brains of the mice. RONS, malondialdehyde, and NO levels were detected to analyze the brain oxidative stress in the three groups of animals. The results demonstrated that Ind treatment was able to significantly improve brain HFD-induced neuro-apoptosis, reducing the number of apoptotic nuclei, suppressing the increase in pro-apoptotic factors, and increasing the expression of anti-apoptotic genes. Ind also markedly decreased the expression ofprotein and genes involved in neuroinflammation and reduced the GFAP-positive cells in the HFD-treated mouse brain. In addition, Ind inhibited HFD-induced neuronal oxidative stress. These findings indicated that Ind treatment may alleviate HFD-induced neurodegeneration in the mouse brain by inhibiting the expression of crucial genes and proteins involved in oxidative stress and inflammatory reaction.

Keywords
Neurodegeneration, betalain pigment, HFD-mouse, neuroprotection, inflammation, oxidative stress

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M. Allegra, M. Tutone, L. Tesoriere, A.M. Almerico, G. Culletta, M.A. Livrea, Attanzio A, Eur J MedChem., 179, 753– 764,(2019).

Biography

Simona Terzo is a Researcher in Physiology at the Department of Biological- Chemical-Pharmaceutical Science and Technology, University of Palermo in Italy. She is a scientist with five years of experience in physiology and nutrition. Topic research: beneficial effects of functional food and nutraceuticals in obesity-related disorders in the animal model. Specifically, the research activity is focused on studying the interaction between diet and health to clarify and deepen the complex relationships that link eating habits to the risk of diseases. Dr. Terzo has published over 10 papers; she is a co-inventor of data submitted for patent applications.

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Maria Chiara Valerii

University of Bologna, Department of Biological, Geological and Environmental Sciences, Via Selmi 3, 40126, Bologna, Italy.
mariachiara.valerii2@unibo.it

Use of Essential Oils to Restore Colon Physiology and Gut Homeostasis

Abstract
Intestinal dyshomeostasisis a condition that can arise over time due to a wrong diet, an incorrect lifestyle,use of drugs and physiological aging. All these factors canalter thegut microbiota composition and the immune system function, breaking the entire gastro-intestinal system homeostasis. This leads to a chronic inflammatory state known as low-grade systemic inflammation, that represent a risk factor for the development of pathologies of the gastrointestinal tract, but also to autoimmune, metabolic, neurodegenerative, psychiatricand cardiovascular diseases [1].Several Essential Oils (EOs) have been studied in vitro and in animal models of colitis, showing three majorrecognizable effects: anti-inflammatory, linked to the ability to modulate the inflammatory cascade, antioxidant, linked to the inhibition in the formation of reactive oxygen species, and anti-dysbiotic, linked to the ability to selectively inhibit the growth of potentially pathogenic bacteria [1].Only two components of essential oils, mentholand geraniol, have been studied in controlled clinical trials regarding gastrointestinal pathologies and, in particular, Irritable Bowel Syndrome (IBS). As for mint EO, data in the literature are conflicting and the real efficacy of this EO is still a matter of debate[2]. The second component, geraniol,showed efficacy in an open-label pilot study on IBS patients and in a randomized placebo-controlled clinical trial on IBS patients, when administered in delayed release formulations[3].Data in the literature suggest possible and noveltherapeutic role of EOs in restoring gut homeostasis. Newclinical data are needed to support and define their use in humans gut pathologies.

Keywords
Essential Oils, Intestine, Inflammation, Microbiota, Immune System.

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Biography

Maria Chiara Valerii graduated in Biological Sciences in 2006 at the University of Bologna, Italy. She obtained a PhD in Medical, Surgical, Gastroenterologic and Transplantation Sciences in 2010 at the University of Bologna, and a second level Master in Research and Clinical and Preclinical Drug Development in 2011 at the University "Bicocca" of Milan, Italy. Since 2007 she collaborates with the Unit of Translational Physiology and Nutrition at the department of Biological, Geological and Environmental Sciences of the University of Bologna and with the Inflammatory Bowel Diseases

Unit of the “IRCSS Policlinico S.Orsola” of Bologna. Her reasearch is focused on nutrional aspects of health and disease and on the role of diet and natural compounds, especiallyessential oils, in the modulation of the gut physiology and homeostasis.

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D.Vitali Čepo

University of Zagreb, Faculty of Pharmacy and Medicinal Biochemistry, Ante Koviačića 1, 10000 Zagreb, Croatia.
*dvitali@pharma.hr

Possibilities of Nutritional Intervention with Alpha-lipoic Acid in Patients Diagnosed with Low-grade Squamous Intraepithelial Lesion (LSIL)

Abstract

Due to a high rate of spontaneous regression, official guidelines for the management of low grade squamous intraepithelial lesion (LSIL) are conservative and include observation alone [1,2]. The progression to high grade squamous intraepithelial lesion (HSIL), that is considered a major risk factor for developing cervical carcinoma, occurs in approximately 10% of patients (with higher rates observed in older patients)[3,4]. Therefore, possibilities of life-style modifications and nutritional intervention that might prevent progression to HSIL are constantly being investigated.

A double-blind randomized controlled trial was conducted in non-menopausal women diagnosed with LSIL that were allocated either to intervention group receiving 600 mg of alpha-lipoic acid (ALA) (n=41) or to control group receiving placebo (n=48) for 3 months. The primary outcomes were the regression of LSIL and HPV clearance. Secondary outcomes were lipid-, inflammation- and oxidative stress markers in the study groups. Dietary habits of participants were assessed by validated semi-quantitative food frequency questionary (FFQ).

3-month supplementation with ALA had significantly more pronounced effect on the LSIL regression in comparison to placebo (39/41 and 4/48, respectively; $P<0.001$), but did not affect HPV clearance. The effect of ALA supplementation on secondary outcomes (lipid parameters, inflammation- and oxidative stress markers) was only noticeable after conducting subgroup analysis and was found to be dependent on dietary patterns of participants, as assessed by FFQs.

Obtained results indicate significant therapeutic potential of ALA in patients with LSIL. Future studies should focus on benefits of prolonged supplementation (6 months) and implementation of innovative formulations of ALA to achieve therapeutic efficiency on HPV clearance and enable the possibility of using ALA as adjunctive therapy in HSIL treatment.

Keywords

low-gradesquamous intraepithelial lesion, alpha-lipoic acid, human papillomavirus virus, inflammation, oxidative stress

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Biography

Dubravka Vitali Čepo holds a PhD in the field of Biomedicine and Health and today is a full professor at the University of Zagreb, Faculty of Pharmacy and Biochemistry and the leader of several courses in graduate and postgraduate studies, mostly related to dietary supplements, nutrition and nutrition-drug interface in pharmaceutical care. She has participated in numerous international scientific conferences and is the co-author of more than 60 research articles in the field. She is the active reviewer for leading scientific journals in the field of nutrition and health and the member of the editorial board of two scientific journals. Her research interests are primarily focused on the field of nutraceuticals: development of sustainable processes of isolation of bioactive compounds from secondary raw materials; development of pharmaceutical formulations with improved stability/ bioavailability and evidence-based application of nutraceuticals as the part of dietary intervention.

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I. Cea[1*],C.Vergara[2]and P. Robert[3]

[1]Fundación Centro Tecnológico de Investigación y Desarrollo del Alimento Funcional (CIDAF), Parque Tec. Ciencias de la Salud (PTS) – Avda. del Conocimiento 37 – Ed. Inteligencia Artificial, Granada,España.
2Instituto de Investigaciones Agropecuarias, Av. Santa Rosa 11610, La Pintana, Santiago, INIA La Platina, Chile.
3Universidad de Chile, DepartamentoCiencia de los Alimentos y TecnologíaQuímica, Facultad de CienciasQuímicas y Farmacéuticas,Santos Dumont 964, Independencia, Santiago, Chile.
*ines.cea@cidaf.es

Smart Ingredient Formulation: Controlled Release of Bioactive Compounds

Abstract
Food industry research trends show an increasing interest in utilization of phenolic compounds such as natural ingredients. However, phenolic compounds are susceptible to degradation from environmental (light, oxygen, moisture and temperature), food (pH, enzymes and interaction with other components) and gastrointestinal tract (pH, enzymes) conditions, limiting its application of as ingredients. In this context, the extraction of polyphenols and their subsequent encapsulation are an alternative for obtaining, protection and control release of phenolic compounds. Spray drying is one of the most widely used industrial technologies for encapsulation; it is a fast, inexpensive and reproducible procedure. Nevertheless, biopolymers with gastrointestinal release properties have a high viscosity in aqueous solutions and cannot be used by spray drying at an acceptable solids level. Therefore, fluid bed is presented as a technology for to apply an additional layer to microparticles formulated for specific release in the intestine. Thus, the objective of this work was to study the effect the encapsulation of polyphenols from olive pomace extract (OP), using maltodextrin (MD) by spray-drying and applying an additional layer to the MD microparticles with inulin (IN) or sodium alginate (SA) per fluid bed on the bioaccessibility of phenolic compounds of OP. Microparticles obtained under optimal conditions were characterized by EE, morphology, particle size, moisture, aw, antioxidant activity by ORAC and the bioaccessibilitywere determined by in vitro simulated digestion.This protection showed stability during the in vitro gastrointestinal digestion model, it is observed that the bioaccessibility of phenolic compounds increases in the microparticles covered by the fluidized bed, modifying their release profile at the gastrointestinal digestion model.

Keywords
phenolic compound, microencapsulation, control release.

Biography
Agricultural engineerwith agroindustry mention´sand PhD in Nutrition and Foods. She is a researcher of food science and technology at the Fundación Centro Tecnológico de Investigación y Desarrollo del AlimentoFuncional (CIDAF)- Spain. Her research area focuses on researcher of extraction and encapsulation of bioactive compounds to development specialized ingredients and additives with application in food, nutraceutical, cosmetic and agricultural industry.

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Csaba Olah

Csaba Olah [1], A.M. Shaikh [2], L. Daróczi [3] and J. Prokisch[4]

[1]Borsod County Teaching Hospital, 3526 Miskolc, Szentpéteri kapu 72., Hungary
ZingBee Ltd., 4100 Berettyóújfalu, Dózsa György út 28/A Hungary
[2]Institute of Food Science, University of Debrecen, 4032 Debrecen, Böszörményi út 138 , Hungary
ZingBee Ltd., 4100 Berettyóújfalu, Dózsa György út 28/A Hungary
[3]ZingBee Ltd., 4100 Berettyóújfalu, Dózsa György út 28/A Hungary
[4]Institute of Animal Science, Biotechnology and Nature Conservation, Faculty of Agricultural and Food Sciences and Environmental Management, University of Debrecen, 4032 Debrecen , Böszörményi út 138 Hungary ZingBee Ltd., 4100 Berettyóújfalu, Dózsa György út 28/A Hungary
*olahcs@gmail.com

Functional Yogurt Fortified with Honey Produced by Feeding Bees Natural Plant Extracts for Controlling Human Blood Sugar Level

Abstract

The human blood sugar level is important and should be controlled to avoid any damage to nerves and blood vessels which could lead to heart disease and many other problems. In a double-blind human study, four kinds of honey from bees fed on acacia, sea buckthorn, chlorella alga, and green walnut extracts were used in fortifying yogurt for controlling human blood sugar. The impact of a previously fortified honey was investigated on blood levels and other parameters of healthy individuals in a human study with 60 participants. The participants received 150 mL of yogurt mixed with 30 g of honey every morning for 21 days. Before and after the study period, the basic blood parameters were tested, and the participants filled out standardized self-report questionnaires. Acacia honey was the traditional honey used as a control; the special honey products were produced by the patented technology. The consumption of green walnut honey had a significant effect on the morning blood sugar level, which decreased for every participant in the group (15 people). The average blood sugar level at the beginning in the walnut group was 4.81 mmol L−1 , whereas the value after 21 days was 3.73 mmol L−1 . The total decrease level of the individuals was about 22.45% (1.08 mmol L−1). Concerning the sea buckthorn and chlorella alga-based honey product groups, there was no significant change in the blood sugar level, which were recorded at 4.91 and 5.28 mmol L−1 before treatment and 5.28 and 5.07 mmol L−1 after, respectively. In the case of the acacia honey group, there was a slight significant decrease as well, it was 4.77 mmol L−1 at the beginning and 4.27 mmol L−1 at the end with a total decrease rate of 10.48%. It could thus be concluded that the active ingredients of green walnut can significantly decrease the blood sugar level in humans. This study, as a first report, is not only a new innovative process to add herbs or healthy active ingredients to honey but also shows how these beneficial ingredients aid the honey in controlling the human blood sugar level.

Keywords
active ingredients; acacia honey; chlorella alga honey; sea buckthorn honey

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Biography
Dr. Csaba Olah completed his studies at the University of Debrecen, where he graduated in 1998. He gained his surgical experience in the 2000s in various major surgery centers in Hungary (e.g. Debrecen, Győr). In 2004, he obtained a specialist exam in pediatric surgery and in 2009 in general surgery. In the last 10 years, he gained extensive surgical experience abroad, in Germany, and In 2016, he also obtained a professional qualification in proctology in Germany. Initially, he worked in a teaching hospital of the University of Münster in North Rhine-Westphalia and obtained the appointment of chief physician, then he worked as a chief physician in a teaching hospital of the Nuremberg Clinic belonging to the University of Salzburg in Bavaria, where he headed the proctology practice. His appointment at the time was also mentioned by the local media in Germany.

Virve Cavallucci

Università Cattolica del Sacro Cuore, Italy

The Influence of Dysmetabolism and Nutrient Intake on Neurogenesis and Brain Function

Metabolic disorders like obesity and diabetes are increasing at an alarming rate in the population, and are bound to become a public health issue and a major cause of disability, loss of independence and high social costs in the near future. A large body of evidence has highlighted, among the negative effects of overnutrition and glucose dysmetabolism, also an acceleration of cognitive decline and brain senescence, through cellular and molecular mechanisms still incompletely clarified. One of these could involve adult neurogenesis, the generation of mature functional neurons from neural stem cells in specific regions of the adult mammalian brain. Adult neurogenesis is involved in repair of neural damage and contributes to brain homeostasis and higher functions including learning and memory. Among the many intrinsic and extrinsic factors that modulate neurogenic activity, the role of nutrients, energy metabolism, and gut microbiota has recently emerged. It is increasingly evident that excessive calorie intake accelerates the age- dependent decline of neurogenesis, while calorie restriction and physical exercise have the opposite effect. Understanding how overweight and impaired glucose homeostasis negatively affect brain function represents both a major scientific challenge and an avenue to early detection and possibly prevention of this invalidating complication.

Battaglia R

Battaglia R[1], Caponnetto A[1], Ferrara C[1], Purrello M[1], and Di Pietro C[1].

[1]University of Catania, Department of Biomedical and Biotechnological Sciences, Catania, Italy.

Isolation and characterization of Extracellular Vesicles from Pomegranate Juice

Abstract

Plant Extracellular Vesicles (P-EVs) are lipid-bound vesicles secreted by eukaryotic cells that can transfer their cargo, consisting of proteins, RNAs, metabolites, and lipids, from one cell to another, thereby influencing the function of recipient cells. P-EVs perform different tasks in reorganizing cell structure, development, plant immunity, defence against pathogens, and counteracting the effects of oxidative stress. Moreover, preliminary data on the efficient uptake of P-EVs by human cells, their low immunogenic characteristics, and their use as new drug delivery systems are promising. In this study, we report for the first time the successful isolation and characterization of the P-EVs contained in Pomegranate Juice and the identification of vesicle cargo non-coding RNAs, particularly microRNAs, capable of mediating the cross-kingdom interaction with human mRNAs and inducing a cellular response. Thus, our results provide a better understanding of the biological function of P-EVs and new insights into the treatment of human diseases.

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C. A. Guerra

C. L. A. Godoy[1], L. M. Costa[2], C. A. Guerra[2], V. S. Oliveira[3], B. P. Paula[4], W. J. F. Lemos Junior[5], V. S. Duarte[6], R. H. Luchese[3], I. R. Bautitz[1]and A. F. Guerra[4,*]

[1]BiotechnologyPostgraduateProgram, Sector of Palotina, Federal Universityof Paraná (UFPR), cityof Palotina, stateof Paraná 85950-000, Brazil.
[2]BRC Ingredientes Ltda. 13505 600 Rio Claro, São Paulo, Brazil.
[3]Departmentof Food Technology, Federal Rural Universityof Rio de Janeiro, Seropédica, Rio de Janeiro 23.897 970, Brazil.
[4]Departamento de Engenharia de Alimentos, Centro Federal de Educação Tecnológica Celso Suckow da Fonseca (CEFET/RJ), Valenca, Rio de Janeiro 27600 000, Brazil.
[5]Bioresources Unit, Center for Health &Bioresources, AIT Austrian Institute of Technology GmbH, Tulln, Austria.
[5]Faculty of Chemistry, Biotechnology, and Food Science, Norwegian University of Life Sciences, PO Box 5003, N-1432, Ås, Norway
*Correspondence: andre.guerra@cefet-rj.br, andrefioravanteguerra@gmail.com

Potentially Postbiotic-Containing Preservative to Extend the Use-By Date of Raw Chicken Sausages and Semifinished Chicken Products

Abstract

This study aimed to evaluate the use of potentially postbiotic-containing preservative (PPCP), produced in a semiculture fermentation system with Lacticaseibacillus paracasei DTA 83 and Saccharomyces cerevisiae var. boulardii, to extend the use-by date of raw chicken sausages and semifinished chicken products. Microorganisms associated with the spoilage of chicken products were stimulated to grow by pair incubation of the products at two different temperatures (3 and 25 °C) and with collection at different times. The turbidity method was performed to evaluate the microbial susceptibility to PPCP. PPCP was added in chicken products to obtain an in situ partial inhibitory effect on spoilage microorganisms to extend the use-by date. The in vitro trial showed total inhibition of the microbial growth by adding above 3.0 % of PPCP. Although this concentration showed a remarkable inhibitory potential, its addition can severely impact the formulation cost. Thus, the application of doses with partial microbial inhibition may be a suitable strategy for the use of PPCP in chicken products. The results revealed that cold chain management and co-use of PPCP in chicken products extended the proposed use-by date, suggesting an alternative food preservation technology for the use of naturally derived compounds.

Keywords

Biopreservative; Biocontrol; Metabiotic; Beneficial; Compound.

Biography

Carlos Alberto Guerra has graduated in Food Engineering at the age of 25 years from Federal Rural University of Rio de Janeiro and graduated with MBA degree in Project Management and Business Management from Getúlio Vargas Foundation. He is a founding partner of Guerra & Castro Consulting, and the Technical Salesman of BRC Ingredientes, a food ingredients supplier company. He is co-author of the method named MicroLab_ShelfLife®, a predictive method to validade shelf-life of meat products by a durability study or challenge test. Recently, he has carried out research to extend shelf-life of meat products with natural technology alternative.

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L. M. Costa
A. L. Lima[1,2], C. A. Guerra[3], L. M. Costa[3], V. S. Oliveira[1], W. J. F. Lemos Junior[4], R. H. Luchese[1]and A. F. Guerra[5,*]

[1]Departmentof Food Technology, Federal Rural Universityof Rio de Janeiro, Seropédica, Rio de Janeiro 23.897 970, Brazil.
[2]Instituto Federal do Rio de Janeiro (IFRJ), Pinheiral, Rio de Janeiro 27197 000, Brazil.
[3]BRC Ingredientes Ltda. 13505 600 Rio Claro, São Paulo, Brazil.
[4]Bioresources Unit, Center for Health &Bioresources, AIT Austrian Institute of Technology GmbH, Tulln, Austria.
[5]Departamento de Engenharia de Alimentos, Centro Federal de Educação Tecnológica Celso Suckow da Fonseca (CEFET/RJ), Valenca, Rio de Janeiro 27600 000, Brazil.
*Correspondence: andre.guerra@cefet-rj.br, andrefioravanteguerra@gmail.com

A Natural Technology for Vacuum-Packaged Cooked Sausage Preservation with Potentially Postbiotic-Containing Preservative

Abstract
In this study, a potentially postbiotic-containing preservative (PPCP) was produced in an axenic fermentation system with Lacticaseibacillus paracasei DTA 83 as a natural technology alternative for vacuum-packaged cooked sausages preservation. Cooked sausage-related microorganisms were obtained during the induced spoiling process in packages by pair incubation of the sausages at different temperatures (7 and 36 °C). The turbidity method was used to determine the microbiota susceptibility to PPCP. A controlled in situ design was performed by adding PPCP on the surface or to the mass of the sausages. Widespread commercial preservative sodium lactate, which was used according to the manufacturer's recommendation, was included in the design for comparison. The results revealed that PPCP was as effective as the sodium lactate in preserving vacuum-packaged cooked sausages. Thus, it can be highlighted as a promisor alternative to the use natural technologies to preserve and produce functional cooked sausages. The results also revealed a logic relation regarding in vitro and in situ tests to evaluate sausage preservation. Thus, the concentration needed to achieve the total inhibition of the microbiota, determined by an in vitro trial, should be respected when adding PPCP on sausages' surface. When adding PPCP to the mass of the sausages, the concentration that showed a partial inhibition in vitro can also be applied in situ. However, proper chain management during distribution and disposal of products in the market is pivotal to achieve the desired use-by date.

Keywords
Biocontrol; Biocin; Heat-inactivated microorganism; Food safety; Sustainability.

Biography
Lucas Marques Costa has graduated in Food Engineering at the age of 27 years from University of São Paulo and graduated with an MBA degree in Sales Management from Getúlio Vargas

Foundation. He is the business manager of BRC Ingredientes, a food ingredients supplier company. He is co-author of the method named MicroLab_ShelfLife®, a predictive method to validade shelf-life of meat products by a durability study or challenge test. Recently, he has carried out research providing natural technology alternative to preserve and produce functional meat products.

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I. Barukčić Jurina

I. Barukčić Jurina[1*], M. Blažić[2],E. Zandona[2], R. Božanić[1] and K. Lisak Jakopović[1]

[1]University of Zagreb, Faculty of Food Technology and Biotechnology,Pierottijeva 6, Zagreb, Croatia.
[2]University of Applied Sciences Karlovac, Trg J.J. Strossmeyera 9, Karlovac, Croatia.
*irena.barukcic@pbf.unizg.hr

Development of Functional Dairy Products Enrcuhed with Plant Extracts Obtained from Food Industry Waste

Abstract

Food industry is generally recognised as one of the leading generators of waste like leaves, peels, seeds, shells, pomace, etc., remaining at the end of the food production process,which has emerged a great concern for their management and environmental footprint.Very often, the generated waste is characterised by high contents of components with antioxidant and antimicrobial properties (i.e. phenolic compounds) making thosepreferable for further utilisation in the functional food production. Thus, lots of efforts are being made in order to raise awareness among all participants in the food chainto decrease the loss of valuable components by promoting the “zero waste” policy and sustainable food production systems. There is also an ongoing growing interest of consumers towards healthier food choices, which together with environmental concerns, has led the food industry to develop novel functional foods. Among them, dairy products like cheese and fermented milkshave been recognized as one of the most popular functional food matrixes, since they are being consumed daily and health-conscious consumers prefer fortified dairy products. In this context,the supplementation of cheese, butter, yoghurt and other fermented milks with various extracts fromplant by-products likeolive leaves, grape or olive pomace, grape skins and seeds, coffee sliver skin,orange, lemon and pomegranate peel, etc., has been studied so far. However, many aspects arise therefrom, such as the choice of the most appropriate extraction methodand the optimal method of fortification, the safety for consumption, possible desirable and undesirable interactions with milk components, impact on sensory properties and economic feasibility. Accordingly, the aim of this paper is to give an overview of the most important data obtained from research studies focused on development of such functional dairy products with regard to the perspective of future research.

Keywords

fermented milk, cheese, plant extracts, food waste, processing, safety

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Biography

Irena Barukčić Jurina, Associate Professor, PhD,is a researcher at the University of Zagreb, Faculty of Food Technology and Biotechnology, Croatia. Her area of expertise relates to the research of technology, processing, characteristics and safety of milk and dairy products with a special focus on whey. She was attending professional for 6 months at the Research Centre for Nutrition and Food Sciences, Technical University Munich, Germany, and at the Faculty of Food and Biochemical Technology, Prague, Czech Republic. She is additionally trained for inspection of food products assigned by PDO/PGI/TSG status and is collaborating with the Croatian Accreditation Agency. She is editorial board member of several journals, topic advisory board member of the journal Fermentation where she is a Guest Editor of the Special Issue dedicated to the trends in the development of fermented dairy products.

Her published scientific work can be accessed at the following links:
https://orcid.org/0000-0002-4322-2266
https://scholar.google.com/citations?hl=en&user=4mT3-mUAAAAJ
https://www.bib.irb.hr/pregled/profil/23611

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Adriana Łobacz
Adriana Łobacz, Maria Baranowska, Justyna Żulewska

Department of Dairy Science and Quality Management, Faculty of Food Science, University of Warmia and Mazury in Olsztyn, 7OczapowskiegoStr, 10-719 Olsztyn, Poland
e-mail: adriana.lobacz@uwm.edu.pl

Application of Predictive Microbiology in Milk Processing – Case Study of Listeria Monocytogenes in Ripened Raw Milk Cheese

Abstract
Managing microbiological safety of dairy products is a challenge due to changes in the production and implementation of technological innovations, adaptation of microorganisms,development of international trade, and changes in the behaviour of consumers anddemographic changes. The intensive development of computer techniques in recent decades and the need to quantify the microbiological risk in the entire food chain have contributed to increased interest in mathematical models describing the growth of microorganisms as a function of environmental factors (e.g., temperature, water activity, pH, oxygen availability, etc.). Predictive microbiology deals with the mathematical modelling of microorganisms' behaviour in varied environments and is being applied in: challenge test, evaluation of microbiological shelf-life, prediction of the microbiological hazards connected with foods and microbiological risk assessment.

In industrial dairy processing, microbiological growth models are used, among other things, to predict the impact of product characteristics and storage conditions on microbial response, which is applied to determine the safety and shelf-life of food products, to predict the impact of food product reformulation during new product development, in the HACCP system to determine CCPs, when carrying out Quantitative Microbiological Risk Assessment (QMRA) and when setting thermal treatment parameters.

The presentation will discuss the principles of predictive microbiology, the possibilities of application in food production - especially in the milk processing sector.

A case study will address the risk posed by the presence of Listeria monocytogenes in cheeses made from non-heat-treated milk.

Keywords
predictive microbiology, food safety, raw milk cheeses

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J.Zulewska[1*]

J.Zulewska[1*], J. Tarapata[1], B. Dec[1], A.Lobacz[1],J. Kowalik[1], K. Kielczewska[1], M. Baranowska[1], K. Przybylowicz[2], Z. Yang[3], M. Darewicz[4]

[1]Department ofDairy Science and Quality Management, Faculty of Food Sciences, University of Warmia and Mazury in Olsztyn, ul. Oczapowskiego 7, 10-719 Olsztyn, Poland,
[2]Department ofHuman Nutrition, Faculty of Food Sciences, University of Warmia and Mazury in Olsztyn, ul. Słoneczna 45F, 10-719 Olsztyn, Poland,
[3]School of Food and Health, Beijing Technology and Business University, No. 11 Fucheng Road, Haidian District, Beijing 100048, PR China,
[4]Department ofFood Biochemistry, Faculty of Food Sciences, University of Warmia and Mazury in Olsztyn,PlacCieszynski 1, 10-726 Olsztyn, Poland,
*justyna.zulewska@uwm.edu.pl

Membrane Fractionation in Food Industry–Opportunities and Limitations

Abstract
Membranes contain small pores of a defined average size, which permit molecules smaller than the pore size to pass through into the permeate stream, while larger molecules that cannot pass through the membrane are concentrated in the retentate. Membrane separation processes have numerous industrial applications, with the pressure-driven processes of microfiltration (MF), ultrafiltration (UF), nanofiltration (NF) and reverse osmosis (RO) being the most well established in the food industry. Membrane filtration technology is widely used in food processing to concentrate, fractionate, isolate, demineralize, defat and purify different target macro-molecules, such as proteins, phospholipids and sugars, i.e. lactose. The application of membrane fractionation processes in food industry, i.e. dairy industry, creates opportunity to produce new ingredients with targeted composition. Several aspects of the process must be considered in order to increase its effectiveness, i.e. membrane structure and configuration, operating temperature, factors affecting fouling, etc. The project “Research on key technologies for dairy-based functional ingredients and innovational development of the products” (acronym DairyFunInn) aimed to fractionate the bioactive components from milk.
Research financially supported by The National Centre for Research and Development, Project No. WPC1/DairyFunInn/2019, amount of funding 1.950.000,00 PLN.

Keywords
membrane processes,fractionation

Biography
Dr. Justyna Żulewska has been employed at University of Warmia and Mazury (UWM) in Olsztyn, Poland, since 2006 as Professor of Food Science. She received her B.Sc. and M.Sc. degrees from Olsztyn Academy of Agriculture and Technology, Poland. Her doctorate was received in 2004 from

UWM, Poland with her dissertation in the area of functional properties of whey proteins. Nowadays, she is acting as Head of Department of Dairy Science and Quality Management. She completed several fellowships at Universidade Catolica Portuguesa, Universidade de Aveiro, University of Hawaii at Manoa, and Cornell University. She has published over 90 journal articles and presented over 120 communications/abstracts to national and international conferences. Her main research interests are: factors influencing quality and yield of cheese, production of cheese with altered ratio of casein fractions, whey management, factors affecting the efficiency of filtration processes, i.e. MF, UF, food product development, functional dairy ingredients.

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Ítala M.G Marx

Ítala M.G Marx[1,2]; Elizandra Ardohain[1,2]; Paula Rodrigues[1,2]; Andreia Afonso[3]; IzamaraOliveira[1,2]; Tânia Pires[1,2];Lillian Barros[1,2]; Sandrina A. Heleno[1,2*]

[1]Centro de Investigação de Montanha (CIMO), Instituto Politécnico de Bragança, 5300-253, Portugal;
[2]Laboratório Associado para a Sustentabilidade e Tecnologia em Regiões de Montanha (SusTEC), Instituto Politécnico de Bragança, 5300-253, Bragança, Portugal;
[3]Deifil, Povoa de Lanhoso, Portugal.
*sheleno@ipb.pt

Valorization of Castanea Sativa Mill. Flowers and Eucalyptus Globulus L. leaves as a Source of Bioactive Compounds with Potential to Inhibit Grape Pathogens

Abstract

Chestnut flowers have been reported as a potential source of bioactive compounds with biological activity [1]. In addition, eucalyptus(Eucalyptus globulus L.) leaves, one of the by-products of the pulp and paper industry in northern and central Portugal [2], represent a residual resource with potential for the extraction of bioactive compounds, such as phenolics. In this context, the valorization of these by-products as a source of phenolic compoundswith high value, presents great economic and environmental impact[1,3]. For this purpose, the present work aimed to extract and characterize the phenolic compositionofcv. LongalC. sativamale flowers and E. globulusleavesthrough HPLC-DAD/ESI-MS and evaluate the antimicrobial potential against food contaminants, including grape pathogens, namely Botrytis cinerea using the microdilution method.The individual polyphenol with the highest concentration in chestnut flowers' samples wastrigalloyl-HHDP-glucoside, while for eucalyptus leaves thedigalloylglucosewas the major compound, both hydrolysable tannins. The sum of phenolics in plant extracts were 55±2 and 53±0.4 mg/g of extract, for chestnut flowers and eucalyptus leaves, respectively, subdivided by hydrolysable tannins, flavonoids, and phenolic acids. The extracts also revealed interesting capacity to inhibit the majority of the tested microorganisms and also the growth of B. cinerea at a concentration of 10 mg/mL.Thus, due to the high phenolic composition observed in both plant extracts, these by-products could be applied assources of antimicrobial compounds, for instance in wine industry, acting against B. cinerea and protecting the grapes by a natural way, decreasing, or avoiding the use of artificial antimicrobials.

Keywords

Castanea sativa Mill.; Eucalyptus globulus L.; Plant extracts; Phenolic compounds; Botrytis cinerea; By-products valorization

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Biography
Dr.ÍtalaM.G. Marx is a Postdoc Researcher ofPreVineGrape POCI-01-0247-FEDER-049695project. She has background in nutrition and food chemistry, specifically in the chemical characterization and valorization of plantbioactive compounds.

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Elizandra Ardohain

Elizandra Ardohain[1,2]; Ítala M.G Marx[1,2]; Paula Rodrigues[1,2]; Andreia Afonso[3]; Izamara Oliveira[1,2]; Tânia Pires[1,2];Lillian Barros[1,2]; Sandrina A. Heleno[1,2*]

[1]Centro de Investigação de Montanha (CIMO), Instituto Politécnico de Bragança, 5300-253, Bragança, Portugal;
[2]Laboratório Associado para a Sustentabilidade e Tecnologia em Regiões de Montanha (SusTEC), Instituto Politécnico de Bragança, 5300-253, Bragança, Portugal;
[3]Deifil, Povoa de Lanhoso, Portugal.
*sheleno@ipb.pt

Plant Extracts: A study on the Chemical Characterization and Bioactive Potential to Inhibit Grape Pathogens

Abstract

Orange (Citrus sinensis L.) peels are usually discarded as wastes; however, they are rich sources of bioactive compounds, including organic acids with biological properties[1]. In addition, fennel (Foeniculum vulgareMill.)and salvia (Salvia officinalis L.)are widespreadherbs, traditionallyused for medicinal purposes and human consumption. Their leaves have been described as potential sources of polyphenols, such as flavonoids with antioxidant and antifungal activities[2,3]. In this sense, the present study aimed to perform the phenolic characterization of fennel and salvia leaves extracts through HPLC-DAD/ESI-MS after a maceration process. Additionally, the extraction and the further characterization of orange peels'in terms of organic acids was also evaluated through HPLC-DAD. The antimicrobial potential of these plant extracts against food contaminants, including grapevine pathogens, such asBotrytis cinerea, was evaluated using the microdilution method. The results obtained showed thatthepolyphenols with the highest concentration in leave's extractswerethe flavonoids luteolin-7-O-glucuronide and quercetin-3-O-glucuronide, for salvia and fennel, respectively. The total amount of phenolic compounds in salvia was266±1 g/mg of extract, while for fennel was30±0.7 mg/g of extract, comprising the sum of total flavonoids and phenolic acids. The concentration of determined organic acids in orange peels was 8±0.1g/100g dw, in which the main compound found was citric acid(6±0.1g/100g dw).In this study, allplant extracts have demonstratedthe ability to inhibit the growth of B. cinerea at a concentration of 10 mg/mL. Therefore, these plant extracts, due to their potential composition in bioactive agents, could be used as naturalantifungals, acting against B. cinerea. Natural antimicrobials, based on plant extracts, represent a promising alternative for disease control and could provide significant economic benefits for the wine industry.

Keywords

Polyphenols; Citrus sinensis L.; Foeniculum vulgare Mill.; Salvia officinalis L.; antimicrobial activity; Botrytis cinerea

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Foundation for Science and Technology (FCT, Portugal) for financial support through national funds FCT/MCTES to the CIMO (UIDB/00690/2020 and UIDP/00690/2020) and SusTEC (LA/P/0007/2021). S. Heleno thanks FCT for her individual employment program–contract (CEECIND/03040/2017); L. Barros also thanks the national funding by FCT through the institutional scientific employment program–contract for her contract. FEDER through the North 2020 Regional Operational Program to the R&D project "PreVineGrape: Desenvolvimento de um biofungicida para combate a doenças da videira" (POCI-01- 0247-FEDER-049695) (NORTE-01-0247-FEDER- 113508).

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Biography
Mst. Elizandra N. G. Ardohain is a doctoral researcher for the PreVineGrape POCI-01-0247-FEDER-049695 project. Student with experience in the agro-food area, especially in the chemical characterization, nutritional and bioactive properties evaluation of food and plant matrices.

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M. G.Volpe

G. Cascone[1],G. Crescente[1], S. Moccia[1], M. G.Volpe[1*]

[1]Institute of Food Science, National research Council, Via Roma 64, 83100 - Avellino, Italy;
*mgvolpe@isa.cnr.it

Formulation of Candied Chestnuts with Reduced-Calories Content

Abstract

Chestnuts industry focused on processing chestnuts into a large variety of products, such as chestnut cream, marmalade, flour,dried nuts and the luxurious candied chestnuts called marrón glacé.

The preparation of the latter requires several days, during which the chestnuts are immersed in sugary syrups in order to obtained the candy products that in the final stage are covered with a glaze.

Although the known beneficial properties and nutritional of chestnut, marron glacé are considered very caloric foodsdue to the high free sugar content, monosaccharides and disaccharides, that the European food safety agencies, the FAO, the WHO and even the American FDA invite to take a quantity of less than 10% of requirements daily calorie.

In this study the sugars(sucrose and glucose) used for the chestnut candying process have been replaced by sweetenerswith low or zero calories. The decrease of sucrose was performed using erythritol, polyols noncaloric sweet and stevia (Stevia rebaudiana bertoni), non caloric natural sweet herb native of Latin America. The optimal viscosity was obtained by adding a small percentage of inulin,polysaccharide obtained from different plant sourcesand belongs to a group of non-digestible carbohydrates called fructans.Finally, a coating based on chitosan with inulin was poured on candied chestnutsas a replacement for glaze.

The physical chemical analysis carried out compared the commercial candied chestnuts with those prepared with the experimental protocols.

The prepared samples were sensory well valued, and also their nutritional quality were interesting. Moreover,the chitosan based coating allowed an optimal preservation of the products which does not undergo moisture loss up to six months of storage.

Keywords

candied chestnuts, low calories, sensory properties, biocoating

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A. Saraiva, C. Carrascosa, D. Raheem, F. Ramos, A. Raposo, Int J Environ Res Public Health, 28;17(17):6285,(2020)

Biography

Research activity of Dr Maria Grazia Volpe is directed to the preservation and enhancement of the quality of agro-food products through innovative technologies and sustainable approaches.

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Linda Ethangatta
Linda Ethangatta[1], PhD, Renson Muchiri[2], PhD., Bonface Ngari[3], PhD, Kendi Muchungi[1], PhD, Githii, Kagwathi[1], Kimani, Gichuhi[1], PhD.

[1]From Africa Nazarene University, Kenya; 2From KCA University, Kenya, 3From Multimedia University of Kenya.
lethangatta@anu,ac.ke or Linda.Kairuthi@gmail.com

Is Aflatoxin Contamination of Staple Children's Foods In Communities An Underlying Factor In Child Stunting?

Abstract
The objective of this study was to examine the relationship between aflatoxin and stunting in children 6 to 59 months. The study presents a question of aflatoxin as a contaminant of staple foods for children and therefore an "underlying factor" contributing to stunting outcome in children in affected study areas. Analysis of factors that contribute to stunting raises an important question on the underlying possibility of aflatoxin and high prevalence of stunting in children 6 -59 months of age in the counties of Meru and Tharaka Nithi. These counties are geographically located in the eastern zones of Kenya, a region with results showing high aflatoxin in soils, and endemic presence of aflatoxin in staple foods which are normally used to feed young children. The geographic zones also have presented stunting rates above national average of 26% for more than two decades. Children's foods are made from locally grown grain, home processed products from maize, and animal products. Animal feed was highly contaminated with aflatoxin. Anthropometric measurement were taken (height or length) for children 6 to 59 months of age from 517 households. Prevalence of stunting (height for age in z scores) was calculated as per WHO criteria. Thirty percent were classified as stunted. A significant relationship was established between breastfeeding and stunting through ANOVA p/> 0.017 (t –value -2.810 and robust standard error of 0.5131 and coefficient value of -1.4411. Aflatoxin levels from samples of maize grain, four mixes and animal feed collected was 19.8% of toxicity above national and regional safe margin of 10ppb. Key interventions to reduce aflatoxin in the region are very important.

Keywords
aflatoxin, stunting, staple foods.

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K. Papadimitriou

K. Papadimitriou[1,*], , M. Papadelli[2], A. Slavko[2]and J. Kapolos[2]

[1]Laboratory of Food Quality Control and Hygiene, Department of Food Science and Human Nutrition, School of Food Science and Human Nutrition, 75 Iera Odos, 18855 Athens, Greece.

[2]Department of Food Science and Technology, University of the Peloponnese, 24100 Kalamata, Greece.

*kpapadimitriou@aua.gr

Application of Metagenomics to Study the Microbiome of White Brined Cheeses

Abstract

White brined cheese is a type of cheese popular in the Mediterranean and Middle Eastern cuisine. It is a flavorful and versatile cheese, usually made with sheep's or goat's milk or a combination of the two, but other types of milk are not excluded. The main characteristic of such cheese is that it ripens in brine. The microbiology of white brined cheese is an important aspect of cheese-making, as it plays a critical role for the fermentations process, the shelf life and the safety of the product, as well as its final organoleptic characteristics. Metagenomics is a powerful tool for studying the microbiology of cheese, as it allows for the comprehensive analysis of microbial communities including typical dairy species but also previously unknown microorganisms that may play a role in cheese production and flavor development. This study presents the results of a metagenomics analysis of microbial communities of selected industrial and artisanal white brined cheeses produced in Greece and Cyprus. The analysis identified the taxonomic composition and functional capabilities of the microbial communities in each type of cheese and revealed significant differences in the abundance and diversity of microbial species between the two. The findings provide new insights into the microbial ecology of white brined cheese and suggest that metagenomics is a valuable tool for understanding their microbiology.

Keywords

cheese, amplicon sequencing, shotgun metagenomics, 16S rDNA, ITS, binning

Acknowledgments

This research has been co-financed by the European Union and Greek national funds through the Operational Program Competitiveness, Entrepreneurship and Innovation, under the call SUPPORT FOR REGIONAL EXCELLENCE (MIS 5047289).

Biography

Current position: Assistant Professor of Food Quality Control, Laboratory of Food Quality and Hygiene, Department of Food Science and Human Nutrition, Agricultural University of Athens, Greece I have a BSc/MSc in Food Science and Technology from the Agricultural University of Athens (1998). I then pursued an MSc in Genetic Manipulation and Molecular Biology from Sussex University (2000). I was awarded my PhD in Food Microbiology with distinction from AUA (2006). My research interests include the microbiology of dairy products, the physiology, the genetics and the genomics of lactic

acid bacteria, the metagenomics of food ecosystems, single cell microbiology, plasmid biology and applied bioinformatics. I am also interested in probiotics research and probiotics application in human health. I have currently published 63 articles (mean IF > 4.0, h-index 25). I am co-editor of the books entitled “The stress physiology of lactic acid bacteria” (Springer, more than 50k chapter downloads) and “Non-Bovine Milk and Milk Products” (Elsevier), as well as the eBook “Omics and Systems Approaches to Study the Biology and Applications of Lactic Acid Bacteria” (Frontiers in Microbiology). I have also published more than 100 abstracts in scientific conferences and 10 book chapters. Furthermore, I am an Editor in BMC Genomics, an Associate Editor in Frontiers in Microbiology, an Academic Editor in PLOS ONE, and a Section editor in FOODS. I am a member of the Editorial board of 10 journals including Applied and Environmental Microbiology (ASM), Microbial Biotechnology, International Dairy Journal and Journal of Food Protection.

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S. S. I. Chemane

S. S. I. Chemane[1,2,3*], S. Casal[1], M. Ribeiro, M. Khan[4], O. Pinho[1,2]and O. Viegas[1,2]

[1]LAQV/REQUIMTE, Laboratório de Bromatologia e Hidrologia, Faculdade de Farmácia da Universidade do Porto, 4050-313 Porto, Portugal.
[2]Faculdade de Ciências da Nutrição e Alimentação da Universidade do Porto, 4150-180 Porto, Portugal.
[3]Departamento de Engenharia Rural, Faculdade de Agronomia e Engenharia Florestal, Universidade Eduardo Mondlane, Maputo 257, Mozambique.
[4]Departamento de Engenharia Química, Faculdade de Engenharia, U. Eduardo Mondlane, Maputo 257, Mozambique.
*s.chemane.se@gmail.com

The Nutritional Potential of Lipids from the Strychnos Madagascariensis Fruit

Abstract

In the southern part of Mozambique, the Strychnosmadagascariensisfruitis called “macuácua”, and it is usually eaten after being transformed into a flour-like product obtained from the dried pulp (nfuma),from which some communities extract an oil with intense orange-brown color.

The goal of this work was to determine the compositional basis and quality of the lipid fraction, while ascertainingits technological potential. Fruits (n=x) were collected in the southern Mozambique, andboth flour(pulp dried by sun and heat) and oil were locally produced; the analysis were carried out applying AOAC methods or previously validated chromatographic methodologies.

Macuácuafresh pulp comprises4.0 to12.5g/100gof total lipids and carries outstanding amounts of carotenes (5.8 - 11.4 mg β-carotene eq/100 g pulp), and considerable amounts of vitamin E (3.3 - 8.4 mg/100 g).Nfuma flour stands out for its high content of fat (26.3–27.8 g/100g) and presents 2.2 - 2.6 mg β-carotene eq/100 g. Considering the fatty acids profile, through the analysis of its oil, it could be observed that oleic (62-63%) > palmitic (20%)>and linoleic (7%) acids are its main components. Additionally, this oil contains considerable amounts of carotenes (8-10 mg/100g), vitamin E (25-34 mg/100g), as well as sterols (431±10 mg/100g) and triterpenic alcohols (191±4 mg/100g). On the other side, this oil presents high content of free fatty acids (22-25%), probably derived from lipases activity during storage and drying whose extent can potentially be reduced with the optimization of the technological process. Despite the high contents of carotenes found in both flour and oil, high losses occur during their preparation.

Macuácuaand its products reveal an outstanding carotene content, dominated by β-carotene, the carotenoid with the highest theoretical vitamin A activity. Vitamin A deficiency in children is a major public health concern in Mozambique [1]. According to the dietary reference value (DRV) for children (0.250 and 0.300 mg RE/day for 1-3 and 4-6 years old, respectively) [2], the consumption of 50 g of the fruits provides at least 100% of the DRV. With, the daily consumption of 50 g of nfuma, children aged 1-3 and 4-6 years can obtain, respectively, 82 and 68% of vitamin A DRV. The consumption of 10 g of the oil, the children aged 1-3 and 4-6 years can obtain, respectively, 67 and 56 % of vitamin

A DRV. Therefore, this fruit could be a sustainable and promising strategy to alleviate vitamin A deficiency.
Globally, this fruit can be regarded as a promising source of edible oil, with health and technological potential,whosestorage and processing to flour and oil deserve to be explored and optimized.
Keywords:, Strychnosmadagascariensis, Mozambique, high-oleic oil, Vitamin A, Fruit flour

References

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Poster Presentation Day-3

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Jakub Michał Kurek
Jakub Michał Kurek, Joanna Mikołajczyk Stecyna, Zbigniew Krejpcio*

Department of Human Nutrition and Dietetics, Poznań University of Life Sciences, Wojska Polskiego 31, 60-624 Poznań, Poland; jakub.kurek@up.poznan.pl;joanna.stecyna@up.poznan.pl; zbigniew.krejpcio@up.poznan.pl

Steviol Glycosides Attenuate Histological Alterations in Liver of Diabetic Rats fed High-Fat Diet

Abstract
Intro Stevia rebaudiana Bertoni and its glycosides are currently a popular subject of food and nutrition science research. Stevia derived compounds are mainly used in the food industry ascalorie-free sweeteners (E960). However, research results have shown that compounds isolated from stevia could provide many health-promoting properties, including antiproliferative, anti-inflammatory, anti-cancerogenic, anti-hypertensive and anti-hyperglycaemic effects. Nevertheless, the mechanisms of the antidiabetic effects of stevia and/or steviol glycosides (SG) have not yet been fully elucidated.
The purpose of this in vivo experiment was to determine the effect of the addition of stevioside (ST) and rebaudioside A (RA) to ahigh-fat diet on liver health indices of rats with type 2 diabetes. Histopathological evaluation of liver lesions and the effects of the tested compounds on the expression of genes associated with pathological changes in this organ have been investigated.

Methods
The study was performed with 70 male Wistar rats, which were fed a high-fat diet for 8 weeks, after which hyperglycaemia was induced with streptozotocin (intraperitoneal injection, 35 mg/kg), with the aim of inducing type 2 diabetes.Afterwards,the animals were divided into test groups fed for 5 weeks: a high-fat diet enriched with the addition of test substances (ST or RA (0.5 or 2.5%)), a diabetic group receiving metformin (150 mg/kg) in the diet, a diabetic group (without supplementation) and a healthy group. At the end of the experiment the animals' tissues were collected for analysis.
For histopathological examination, properly truncated livers were placed in 10% buffered formalin and transported to professional commercial laboratory.
For gene expression examination,genetic material was isolated from animals' livers and then analysed using RT-PCR method in terms of FAS gene expression levels.

Results
The results were statistically evaluated and showed a significant and pro-health effect of SG. The diabetic rats had a noticeably worse liver condition, which was visible in the images from the histopathological examination. However, the tested compounds mitigated the changes. The therapeutic effect was further confirmed by gene expression analysis, which showed significantly lower FAS gene expression in the liver of rats whose diets were supplemented with SG.

Conclusions
The results indicated that SG providea significant pro-health effect on liver health in type 2 diabetic rats.The effects was observed in histopathological examination and confirmed via gene expression

analysis.

The presented work is an integral part of the research project (National Science Centre, Poland, NCN 2017/27/B/NZ9/00677).

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Zbigniew Krejpcio

Jakub Michał Kurek, Zbigniew Krejpcio*

Department of Human Nutrition and Dietetics, Poznań University of Life Sciences, WojskaPolskiego 31, 60-624 Poznań, Poland; jakub.kurek@up.poznan.pl; zbigniew.krejpcio@up.poznan.pl

Co-Supplementary Steviol Glycosides, L-Arginine and Cr(III) Improve Blood Antioxidant Status Biomarkers in Mildly Diabetic Rats Fed High-Fat Diet

Introduction

In type 2 diabetes (T2D), the antioxidant status is significantly disturbed by chronic hyperglycaemia, and the accompanying oxidative stress exacerbates systemic damage to certain organs. In addition, various experimental trials have reported the overproduction of free radicals and defects in the protective function of antioxidants.

In our previous in vivo study, serum OxLDL and GPx levels increased in type 2 diabetic rats, which indicates increased oxidative stress caused by chronic hyperglycaemia, while supplementation with steviol glycosides did not affect the antioxidant status, probably due to very high hyperglycaemia (FBG > 400 mg/dL). A number of studies indicate that L-arginine can improve antioxidant status. The beneficial effect of Cr(III) on antioxidant status in T2Dwas also reported by some authors. A recent extensive review concluded that chromium supplementation decreases oxidative stress in T2D. In this study we hypothesized that co-supplementary L-arginine and Cr(III) can improve antioxidant status in mildly diabetic rats fed high fat diet.

Methods

The six-week intervention period started with the introduction of diets with supplements. The control group (C) received a standard AIN-93M diet throughout the whole experiment, the Db group received high-fat diet(HFD), and the Db+Met group received HFD with 0.3% metformin, whereas the remaining groups received HFD enriched with the combination of ST/RA, L-arg, and Cr in the following manner: Db+SA1C1 group–HFD with 2.5% ST, 2% L-arg and 0.001% Cr; Db+SA1C2 group–HFD with 2.5% ST, 2% L-arg and 0.005% Cr; Db+SA2C1 group–HFD with 2.5% ST, 4% L-arg and 0.001% Cr; Db +SA2C2 group–HFD with 2.5% ST, 4% L-arg and 0.005% Cr; Db+RA1C1 group–HFD with 2.5% RA, 2% L-arg and 0.001% Cr; Db+RA1C2 group–HFD with 2.5% RA, 2% L-arg and 0.005% Cr; Db+RA2C1 group–HFD with 2.5% RA, 4% L-arg and 0.001% Cr, and Db+RA2C2 group–HFD with 2.5% RA, 4% L-arg and 0.005% Cr. The antioxidant status was assessed by measuring three blood markers: total antioxidant capacity (TAC), catalase, and nitric oxide concentrations, using relevant analytical methods.

Results

TAC was significantly lowered by diabetes (Db and Db+Met groups), while the combined steviol glycosides, L-arg, and Cr(III) supplementation restored or even increased this status above the values found in healthy control rats. TAC was particularly affected (increased) by the supplementationwith ST combined with a high dose of L-arg and a high dose of Cr(III).

Conclusions

Supplementation with stevioside combined with L-arginine and Cr(III) may be beneficial for improving the antioxidant status for mild T2D. However, further studies, including clinical trials, are warranted to confirm these effects in humans and fully explain the mechanism of action on a molecular level.

The presented work is an integral part of the research project (National Science Centre, Poland, NCN 2017/27/B/NZ9/00677).

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J. Tkaczewska
J. Tkaczewska[1*], E.Jamróz[2],M.Kasprzak[1], N. Nowak[2], W. Grzebieniarz[2], P. Pająk[3], LesławJuszczak[3]

[1]Department of Animal Product Technology, Faculty of Food Technology, University of Agriculture, ul. Balicka 122, 30-149 Kraków, Poland.
[2]Department of Chemistry, University of Agriculture, ul. Balicka 122, 30-149 Kraków, Poland.
[3]Department of Food Analysis and Quality Assessment, Faculty of Food Technology, University of Agriculture in Kraków, ul. Balicka 122, 30-149 Kraków, Poland
*joanna.tkaczewska@urk.edu.pl

Technology for the Production of Active Coatings for the Preservation of Fish -Impact on the Quality of Carp (Cyprinus carpio) Fillets

Abstract
This is the first study in which coatings containing a furcellaran-gelatin complex were made directly from carp skins in the form of a solution. Therefore, the primary objective of our study was to develop a technology for producing coatings made of protein waste from carp processing that can be used as components in healthy convenience food products.

The effects were investigated of furcellaran/gelatin (FUR/GEL) coatings incorporated with herb extracts on the quality retention of carp fish during refrigeration. Herbs of nutmeg, rosemary, thyme, milfoil, marjoram, parsley, turmeric, basil and ginger were subjected to water and ethanol extraction methods (10% concentration of herbs). The water extractions of the rosemary and thyme (5%) were used for further development of coatings due to their higher 2,2-Diphenyl-1-picrylhydrazyl (DPPH: 85.49 and 83.28%) and Ferric Reducing Antioxidant Power Assay values (FRAP: 0.46 and 0.56 mM/L) ($P<0.05$), respectively. Coatings were tested for their mechanical properties and the obtained results showed that the control coatings, and those with the addition of rosemary, had the best strength-related parameters.

A new, ready-to-cook product with the coatings (carp fillets) was evaluated regarding quality in terms of colur parameters, texture profile, water activity, Thiobarbituric Acid Reactive Substances (TBARS),pH, biogenic amine formulation, microbial changes and sensory analyses during 12 days of storage at 4°C.
The results showed that the colour of carp fillets treated with rosemary and thyme extracts became slightly darker and had a propensity towards redness and yellowness. In contrast to the control group, the carp fillets stored in the coatings with the rosemary extract effectively slowed lipid oxidation processes.

The coatings with added rosemary proved effective in inhibiting the formation of biogenic amines, and slowing down the microbial deterioration of carp fillets (reduction by 0.53 and 0.29 log cfu/g). The evaluated herb coatings changed the characteristic taste of fish. Interestingly, the coatings emphasized the natural saltiness of fish meat.The developed coatings show great potential for commercial use as a simple and cheap technology for stabilising carp fillets and preparing ready-to-cook products. The use of innovative active coatings may make the sensory features of the product more attractive and may find an audience among consumers who do not like the taste of fish or carp. Such research should be undertaken in the future, especially with regard to packaging and

implementing longer storage durations.

Keywords
fish by-products, furcellaran, convenience food, fish gelatin
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Zarroug, Youkabed
Zarroug, Youkabed[1]., Sfayhi Terras, Dorra[1]., Guermech S.[2], HadjYahia[1], Nesrine., Marzouki, Sarra[3]., Ben Araar, A[3]., Gargouri, Samia, [2]

[1]Field crops Laboratory, National Institute of Agronomic Research of Tunisia (INRAT)
[2]Plant Protection Laboratory, National Institute of Agronomic Research of Tunisia (INRAT)
[3]National institute of Field Crop (INGC)

Effect of Fursaium Culmorum on Tunisian Durum Wheat Grain and Pasta Quality

Abstract
Fusarium foot and root rot caused by Fursaium culmorum is one of the major soil-borne diseases of wheat in Tunisia that may be responsible of important yield loss especially under semi-arid conditions. The aim of this study was to investigate the effect of the disease on wheat grain and pasta quality. Plots of nine Tunisian commercial varieties of durum wheat were inoculated with Fursaium culmorum at three leaf stage and compared to non-inoculated plots. Physical parameters (TKW, TW, YB%), chemical composition, SDS test and gluten index were measured for grains collected from each plot. Moreover, pasta was manufactured from these samples and pasta quality was determined. The results indicated that inoculation with Fursaium culmorum significantly reduced thousand kernel (TKW) weight, test weight (TW) whereas an increase in yellow berry percent (YB%) was observed. Furthermore, Fusarium Culumorum significantly affected the ash and protein contents, where an increase is observed for the innocolated sample. This effect is also observed on polyphenol and carotenoid contents of wheat grain. This study also demonstrated that pasta manufactured from inoculated plots presents a higher cooking time than the non-inoculated samples, followed by a significant positive effect on starch loss percent. These results are observed for the studied varieties and could be related to the gluten network and consequently pasta quality.

Keywords
Fusarium Culmorum, varieties, grain quality, pasta quality

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P. Nowicka

P. Nowicka[1*], A. Wojdyło[1], K. Tkacz[1], and I. Turkiewicz[1]

[1]Department of Fruit, Vegetable and Plant Nutraceutical Technology, Wrocław University of Environmental and Life Sciences, 37 Chełmońskiego Str., 51-630 Wrocław, Poland
*paulina.nowicka@upwr.edu.pl

Fruit Leather With Addition of FOS Sources – As A Functional Foods Dedicated To Children

Abstract
Among the society, including children, increase the risk of cardiovascular disease, diabetes, and obesity. These unfavorable trends are the result of a sedentary lifestyle and the consumption of highly processed foods. However, consumers' nutritional awareness is increasing. Increasingly, attention is paid to the fact that food is not only used to satisfy hunger, but also is a carrier of a number of bioactive ingredients that contribute to maintaining and even improving human health. With the development of food science, the functional food market and the growing consumer demand, there was a need to design new, functional products, including those dedicated to children with attractive sensory and nutritional characteristics.
Therefore, the aim of this study was to develop a technology for obtaining fruit leather with addition of fructooligosaccharides' (FOS) sources, and evaluation the pro-health, nutritional, and sensory properties of the obtained products.
It has been shown that fruit leather can be an interesting alternative to the available natural fruit snacks dedicated to children. The fruit used in the production, i.e. plum, peach and honeyberry, are donors of polyphenolic compounds and shape the anti-diabetic, antioxidant and anti-obesity properties of the final product. Jerusalem artichoke - is a source of FOS and dietary fiber, but shapes also sensory qualities. In turn, chicory, apart from FOS, fortifies the finished product with minerals - sodium, potassium, magnesium and calcium. It is therefore worth using this type of formulations in children's nutrition.
This work was conducted under Grant NCBR LIDER IX [LIDER/25/0102/L-9/17/NCBR/2018].
The presentation is the result of activity of research group 'Plants4FOOD'.

Keywords
Jerusalem artichoke, chicory, fruit leather, bioactive compounds, pro-health properties

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M. Baranowska, J. Żulewska, A. Dąbrowska, K. Kiełczewska, J. Kowalik, A. Łobacz

University of Warmia and Mazury in Olsztyn, ul. Oczapowskiego 7, 10-719 Olsztyn, Poland
e-mail: mbb@uwm.edu.pl

Characteristics of Yoghurt with Milk Protein Hydrolysates

Abstract

The most popular and appreciatedfermentedmilk in the worldisyoghurt.It isunique for its high nutritionalvalue and exceptionalorganolepticcharacteristics.The health-promotingproperties of yoghurtcan be enhanced by enrichingit with milk protein hydrolysates.

The aim of thisstudy was to evaluate the effect of milk protein hydrolysates (casein and wheyproteins) addition on yoghurtcharacteristics.

In the experiment, yogurtswereproduced from milkwhosecomposition was standardized to about 15.0% drymatter by adding: skimmedmilkpowder (SMP), native casein (NC), caseinhydrolysate (CH) and whey protein hydrolysate (WPH).Yoghurtscontained 0.5% addition of: CN, CH, WPH and 0.5% combination of CN and WPH in appropriateratios (NC:WPH: 1:1; 1.5:0.5; 1.75:0.25; 1.9:0.1). The controlsampleswere SMP-thickenedyogurts. The yoghurt was produced by thermostaticmethodaccording to standard technologyand thenevaluatedafter 3 and 21 days of storageat 5ºC±1ºC.The range of yoghurtanalysisincludedmeasurement of composition and pHvalues, determination of gelviscosity, syneresis and rheologicalproperties and organolepticevaluation of overallacceptability on a scale of 1-5, where 5 was the highest and 1 the lowest.

Yoghurtscontainingonlyhydrolysateswerecharacterised by higherpHvalues and lowerviscosity, firmness and curdsyneresisthan the other products. The addition of native casein, on the otherhand, caused the oppositeeffect. The properties of yoghurts with 0.5% addition of NC and WPH mixturedid not differsignificantly from eachother and were most similar to those of controlyoghurts.

The results of the studyindicatethatitispossible to produceyoghurt with milk protein hydrolysates, althoughitisimportant to chooseappropriatethermalprocessingparameters and watchfullycontrol the fermentationprocess. A good and recommendedway of enrichingyoghurts with WPH isitsapplicationtogether with native casein in the amount not higherthan 0.5%.

Keywords

yoghurt, caseinhydrolysate, wheyproteinshydrolysate

Researchfinanciallysupported by The National Centre for Research and Development, Project No. WPC1/DairyFunInn/2019, amount of funding 1.950.000,00 PLN.

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S. S. I. Chemane[1,2,3*], S. Casal[1], M. Ribeiro, M. Khan[4], O. Pinho[1,2]and O. Viegas[1,2]

[1]LAQV/REQUIMTE, Laboratório de Bromatologia e Hidrologia, Faculdade de Farmácia da Universidade do Porto, 4050-313 Porto, Portugal.
[2]Faculdade de Ciências da Nutrição e Alimentação da Universidade do Porto, 4150-180 Porto, Portugal.
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[4]Departamento de Engenharia Química, Faculdade de Engenharia, U. Eduardo Mondlane, Maputo 257, Mozambique.
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Keywords
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O. Pinho

M. Ribeiro[1], S. Chemane[1,2,3], E. Pinto[1,4], M. Khan[5], I.M.P.L.V.O. Ferreira[1], S. Casal[1], O. Pinho[1,2*]and O. Viegas[1,2]

[1]LAQV/REQUIMTE, Laboratório de Bromatologia e Hidrologia, Faculdade de Farmácia da Universidade do Porto, 4050-313 Porto, Portugal.
[2]Faculdade de Ciências da Nutrição e Alimentação da Universidade do Porto, 4150-180 Porto, Portugal.
[3]Departamento de Engenharia Rural, Faculdade de Agronomia e Engenharia Florestal, Universidade Eduardo Mondlane, Maputo 257, Mozambique.
[4]Department of Environmental Health, School of Health, P. Porto, 4200-072 Porto, Portugal.
[5]Departamento de Engenharia Química, Faculdade de Engenharia, U. Eduardo Mondlane, Maputo 257, Mozambique.
*oliviapinho@fcna.up.pt

Nutrient Adequacy of Nfuma, the Flour from Strychnos Madagascariensis Fruit

Abstract
African native fruits play a significant role in reducingmicronutrient deficiencies and increasing the income of poor rural communitiesin developing countries. In Mozambique, the fruit of Strychnosmadagascariensis is usually processed into flour, nfuma, and is consumed by local communities during staple food shortage.However, there is practically no data on its nutritional value. Therefore, this study aimed to evaluate the nutritional composition and adequacy of nfuma. Flours were collected from four districts of Mozambique and analyzed using AOAC methods for proximate composition, HPLC for sugars, vitamin E and carotene profiles and ICP-MS and FAAS for minerals. The estimated daily intake of nutrients, as % of EFSA dietary reference values (DRVs), was calculated assuming an average daily consumption of 100 g and 50 g of nfuma for adults and children, respectively.

Nfumapresents high content of fat (~27%), fiber (> 6%), sugars (~10%), vitamin E (6.7 to 8.0 mg/100 g) and carotenes (2.2 to 2.6 mg/100 g). Oleic acid was the main fatty acid ofnfuma (~16g/100 g of flour). The mineral composition reveals K (~1200 to 1700 mg/100g) and Mn (~4 mg/100g) as the main macro-mineral and trace element, respectively. Regarding current DRVsfor adults, the consumption of 100 g of nfuma provides 30% of fiber, 27-48% of alpha-linolenic acid, 55-63% of vitamin A and 56-66% of vitamin E. Moreover, nfuma can contribute to the daily intake of Mg, K, and Mn (22 - 26%, 40% and > 100% of DRVs, respectively). Due to its high β-carotene content, the daily consumption of 50 g of nfuma provides 82% of vitamin A DRV for toddlers, representing a promising food-based strategy to alleviate the high prevalence of vitamin A deficiency in Mozambique.

This fruit flour stands out for its high fat content, mainly composed by MUFA, delivering vitamin E and carotenes, together with naturally occurring sugars and high fiber content. Its local use to enrich maize-based porridges or to develop healthier new food products deserve to be technologically approached for wider valorization.

Keywords
African fruits, Strychnosmadagascariensis, fruit flour, Dietary recommendations

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Biography

Olivia Maria de Castro Pinho Nutritionist,
Full Professor at the University of Porto Faculty of Nutrition Sciences and Researcher at LAQV / REQUIMTE.
Researcher in the area of Food safety, Food innovation applied to the improvement of technological processes of food and cooking to promote consumer health and sensory analysis. Supervisor of 10 MSD theses and 9 doctoral thesis, The relevant scientific publications are associated with H-Index 33, with 9 chapters of books,114 articles indexed in ISIother publications 80 and 3 patents. https://orcid.org/0000-0001-9477-8638

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Silvia Villaró[1,2], Tomas Lafarga[1,2], Israel Hernández-López[3], Ingrid Aguiló-Aguayo[3], José María Fernández-Sevilla[1,2], Ruperto Bermejo [4], Gabriel Acién[1,2]

[1]Department of Chemical Engineering, University of Almeria, 04120, Almeria, Spain
[2]CIESOL Solar Energy Research Centre, Joint Centre University of Almeria-CIEMAT, 04120, Almeria, Spain
[3]Postharvest Programme, Institute of Agrifood Research and Technology, 25003, Lleida, Spain
[4]Department of Analytical and Physics Chemistry, University of Jaen, Jaen, Spain.

Novel applications of marine microalgae as functional ingredients in baked goods

Abstract

Powdered biomass of the marine microalgae Nannochloropsissp. and Tetraselmis sp. produced using demo-scale tubular photobioreactors were used as innovative ingredients in the production of bread, crackers, and wheat tortillas. Overall, the incorporation of microalgal biomass in bread, crackers, and tortillas at flour substitution levels of 1.0-2.0, 2.5, and 0.5-3.0% did not affect the overall physical quality of the products, except for their colour. The microalgae-containing products had higher protein content and a higher content of polyphenols, valuable compounds generally presents in fruits and vegetables and with proven health effects. The in vitro antioxidant capacity of the microalgae-enriched products assessed using the FRAP and DPPH methods was higher than that of the controls. The bioaccessibility of polyphenols and other antioxidant compounds was determined using the INFOGEST 2.0 methodology, observing a higher antioxidant capacity of the enzymatic extracts. These results suggest that the amount of antioxidants in baked products assessed after solvent extraction is generally underestimated. Finally, the organoleptic properties of the products were assessed using semi-trained penellists achieving high overall acceptability scores and a purchase intention comparable to that of the controls. However, results suggested that the flour substitution level is of key importance to achieve high acceptability as the formulations containing higher concentrations of microalgae were scored negatively. Results reported herein suggested that marine microalgae of the genus Nannochloropsisand Tetraselmis could be used in the development of functional foods that are not only safe and nutritious but also sustainable.

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J. Kapolos

J. Kapolos[1*], M. Papadelli[1], K. Papadimitriou[2], L. Farmakis[1], K. Moschovitis[1], A. Koliadima

[1]Department of Food Science and Technology, University of the Peloponnese, 24100 Kalamata, Greece
[2]Laboratory of Food Quality Control and Hygiene, Department of Food Science and Human Nutrition, School of Food Science and Human Nutrition, 75 Iera Odos, 18855 Athens, Greece.
[3]Department of Chemistry, University of Patras, 26504 Patras, Greece

Kinetic Study of Cells Proliferation of Yeast Strains Isolated from the Region of Peloponnese.

Abstract

In this work, a kinetic study of cells proliferation of yeast strains isolated from the region of Nemea Peloponnese, is performed using the Field – Flow Fractionation Technique. The experimental parameter that was varied was the sampling time. The determination, at regular intervals, of the size and mass distribution of the yeast cells was combined with the cell growth rate and life cycle. The experimental results are in agreement with those obtained by microscopy technique and literature.
Field – Flow Fractionation Technique is an analytical technique that has been successfully applied for the analysis, characterization and separation of colloidal materials of biological interest. In field-flow chromatography, the movement of the chemical species to be analysed near the column surface is achieved by a force released through the use of a centrifuge. As the particles of the solute are pushed towards one wall of the column, a static layer of varying thickness is formed, depending on the density and size of the particles. Larger particles are pushed into layers closer to the column walls and consequently these particles, due to the parabolic solvent flow front, will be more retained in the column and elute later.

Field – Flow Fractionation Technique is an analytical technique that can be successfully used for the kinetic study of yeast cell growth and at the same time, it enables the determination of the size distribution of yeast cells and the monitoring of the biomass production rate.

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Biography

John Kapolos is a Professor in the Food Science and Technology Dept. University of the Peloponnese, obtained his Bachelor and Ph.D. in Chemistry, Diploma in Chemical Engineering and M.Sc. in Natural Sciences Didactic from the University of Patras. He was Postdoctoral researcher in the Chemical Engineering Dept., University of Patras and the ICE-HT. He worked in the N.AG.RE.F/Institute of Plant Protection. He is author and co-author of 44 research articles in peer review journals and he has more than 70 participations in international conferences.

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T. M. Neves-Gonçalves[1*], O.Viegas[2, 3],E. Pinto[3, 4], I. M.P.L.V.O. Ferreira[3], V. V. De Rosso[5]and S. M. A.Domene[6]

[1]Programa de Pós-Graduação em Nutrição, Escola Paulista de Medicina, Universidade Federal de São Paulo,04023-062 São Paulo, Brasil.
[2]Faculdade de Ciências da Nutrição e Alimentação da Universidade do Porto, 4150-180 Porto,Portugal.
[3]LAQV/REQUIMTE, Laboratório de Bromatologia e Hidrologia, Departamento deCiênciasQuímicas, Faculdade de Farmácia da Universidade do Porto, 4050-313Porto, Portugal.
[4]Departamento de Saúde Ambiental,Escola Superior de Saúde, Instituto Politécnico do Porto, 4200-072Porto, Portugal.
[5]Departamento de Biociências, Universidade Federal de São Paulo, 11015-020 Santos, São Paulo, Brasil
[6]Departamento de Políticas Públicas e Saúde Coletiva, Universidade Federal de São Paulo,11015-020 Santos, São Paulo, Brasil.
*moura.neves@unifesp.br

Effects of Seasoning with Annatto (Bixa orellana L.) seeds on the Formation of Polycyclic Aromatic Hydrocarbons in Barbecued Beef Patties

Abstract

Polycyclic aromatic hydrocarbons (PAH) are ubiquitous compounds, however the highest PAH concentration in foods is usually described when grilled and/or barbecued, mainly when charred, which contribute significantly to the intake of these compounds[1]. In view of their carcinogenic potential, mitigation strategies have been investigated, among them the use of condiments rich in bioactive compounds that could, owing to potential to modulate the oxidative system, suppress the reactive species involved in the formation of PAH[2]. Despite this, no studies were found concerning the effect of annatto (Bixa orellana L.) seeds, a product of Brazilian biodiversity, source of bioactive compounds and used as a food coloring[3], on PAH formation. Therefore, this study aimed to evaluate the effect of annatto seedson the formation of PAH in barbecued beefpatties.

Beef patties (80g) seasonedwith annatto seeds (0.5%, w/w), and unseasoned (control) were barbecued (n = 2), at well-done level, and 14PAHwere analyzed using an acetonitrile based-extraction followed by high-performance liquid chromatography with fluorescence detection (HPLC-FLD)[4].

The unseasoned samples showed a total ΣPAH of 140.1 ± 1.2 ng g-1, and a significant reduction($p < 0.05$) were observed in patties with annatto(ΣPAH 106.2 ± 0.2 ng g-1). In relation to the EFSA most suitable indicator for the occurrence and carcinogenic potency of PAHin foods[1], ΣPAH4 (benz[a] anthracene, chrysene, benzo[b]fluoranthene and benzo[a]pyrene),the same trend was observed (ΣPAH4 1.88 ± 0.01 ng g-1 in unseasonedvs ΣPAH4 1.29 ± 0.01 ng g-1). In addition to the known natural coloring and antioxidant properties of annatto seeds, this study demonstrate its potentialas a seasoning in meat to reduce dietary exposure to PAH from charcoal grilled meat. Other cooking methods and conditions, as well as other food processing contaminants, deserve to be evaluated in further studies.

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Keywords
Polycyclic Aromatic Hydrocarbons, Bixaceae, Spices, Cooking techniques,HPLC.

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Biography
Thaís de Moura Neves-Gonçalves is a nutritionist, Master of Science and PhD studentat Graduate Program in Nutrition from Federal University of São Paulo (UNIFESP). Researcherof theLaboratory of Experimental Dietetics(LaDEx) at UNIFESP, currently on internship at the University of Porto.Hermain research interests: valorization and use of bioactive compounds from Brazilian biodiversity;the looking for strategies to mitigate the formation ofheat processing contaminants.

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