

FAT 2018

Euro-Global Conference On
**FOOD SCIENCE,
AGRONOMY AND
TECHNOLOGY**

*Theme: Current Trends and Future Perspectives in the Food Sector:
From novel concepts to industrial applications*

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ROME, ITALY

Euro-Global Conference on

Food Science, Agronomy and Technology

Theme:
*Current Trends and Future Perspectives in
the Food Sector: From novel concepts to
industrial applications*

SEPTEMBER 20-22, 2018
ROME, ITALY



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FAT 2018



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Thomas Goudoulas
Technical University of
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FAT 2018



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Halu Oleo University
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Thank You
All...

Welcome Message



Dear Esteemed Attendees of the Food Science
Agronomy and Technology Conference, 2018

Welcome to Rome!

I am very excited to be part of this important event. Understanding and explaining the nexus of food science, agronomy and technology in a rapidly changing climate is critical not only for feeding the developing world, but also for providing improved nutrition. It is critical not only for bringing to light new innovations and methodologies, but also for making technology available and accessible to the developing countries. Finally, it is critical not only for sustaining global resources today, but also to ensure socio-ecological resilience and adaptability for generations to come.

Our hopes for a maximum increase of 20 Centigrade over pre-industrial conditions are being dashed and the consequences of carbon sourcing are already

“widespread and consequential”, according to the Fifth Assessment of the IPCC. Models currently project an increase between 3-40 in the deserts of Argentina and Peru. The work you are doing in food research and safety, chemical processes, microbiology, enzymology and nanotechnology must not be stored in isolated silos. I look forward to an enlightening conference and helping to disseminate the results of your research worldwide.



A handwritten signature in blue ink, appearing to read 'Michael Davidson'.

Michael Davidson, PhD
President
Davidson Consultants, USA

Welcome Message



Dear Conference participants,

It is an honor and pleasure to communicate with you the following welcome notes. Food science and technology makes excellent progress by implementing the state-of-the-art interdisciplinary research. As a result, new perspectives and opportunities are arising for functional and novel food products. Research in food colloids and polymers crosses many disciplines, which is exemplified by the involvement of researchers from many Schools, Departments, and Institutes in the present Conference. FAT 2018 comprises sessions which pay particular attention to the microstructure, stability, and rheology of colloidal systems. Factors affecting the composition, dynamic properties and structure of fluids as ingredients of foods, predominantly the role of adsorbed polymers



and biopolymers in structure stability will be described. In addition, proposed physical concepts of microstructure and mechanical properties of food colloids are expected to give insight into the processing. Finally, this meeting will provide a great opportunity for all participants to communicate with each other, and will strengthen the friendship among them. I hope that this Conference in Rome will be both productive and fruitful and will be a particularly exciting time for colloid and food science.

Dr. THOMAS GOUDOULAS
Technical University of Munich, Germany

Welcome Message



On behalf of the organizing committee, it gives me immense pleasure to cordially welcome you all to the “Euro-Global Conference on Food Science, Agronomy and Technology” (FAT 2018) here in Roma, Italy.

Today marks the major activity in the brief existence of the Euro-Global Conference, a moment where we are interacting, sharing experiences and reflecting on various areas related to Food Science, Agronomy and Technology with the aim to bring together eminent affiliated personality’s, food laureates, Scientists, researchers, entrepreneurs, executives, technologists, and more together to network, collaborate, share best practices from all over the world to explore the future and trends in Food, Agronomy and Technology as well as to discuss on the theme: “Current Trends and Future Perspectives



in the Food Sector: From Novel Concepts to Industrial Applications”. I wish you all a present stay in Roma, and fruitful deliberations at the Euro-Global Conference on Food Science, Agronomy and Technology.

A handwritten signature in blue ink, appearing to be 'Y. Henuk'.

Prof. Yusuf Leonard Henuk, Ph.D
University of Sumatera Utara (USU)
Medan, Indonesia

keynote speakers



Michael Davidson
Davidson Consultants
USA



Thomas Goudoulas
Technical University of Munich
Germany



Solomon Nfor
St. Philip's College
USA



Yusuf Leonard Henuk
University of Sumatera Utara
(USU) Indonesia



Kiran G. Dande
Mahatma Basweshwar College
India



Ezendu Ariwa
Warwick University
UK

About

MAGNUS GROUP

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

Participation from 80 different countries and 688 different Universities have contributed to the success of our conferences. Our first International Conference was organized on Oncology and Radiology (ICOR) in Dubai, UAE. Our conferences usually run for 2-3 days completely covering Keynote & Oral sessions along with workshops and poster presentations. Our organization runs promptly with dedicated and proficient employees' managing different conferences throughout the world, without compromising service and quality.

About FAT 2018

On behalf of our organizing committee, we take an enormous pleasure in inviting you to attend the "Euro-Global Conference on Food Science, Agronomy and Technology" (FAT 2018) which is going to be held during September 20-22, 2018 at Rome, Italy. With the presence of highly affiliated personality's, food laureates, Scientists, researchers, entrepreneurs, executives, technologists, and more together to network, collaborate, share best practices to explore the future and trends in Food Chemistry, Agronomy & Technology.

The main theme of the conference is "Current Trends and Future Perspectives in the Food Sector: From Novel Concepts to Industrial Applications"

FAT 2018 will feature a series of presentations in keynote talks, oral presentations, poster presentations, networking, and discussions which keep participants engaged in learning and making new connections.



DAY 1

KEYNOTE FORUM

Euro-Global Conference on

Food Science, Agronomy
and Technology

SEPTEMBER 20-22, 2018
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Biography

I am a PhD in public policy with a special emphasis on climate change and agriculture. I have forty years' experience in the agricultural sector as a farmer, scholar, consultant, business-owner and speaker. I am currently consulting for the IFC division of the World Bank on missions to improve irrigation efficiency and production in sub-Asia and West Africa. I am the "expert speaker" on climate change and agriculture for the United States Department of State. I was a founding member of a Kibbutz in Israel and am a dual American/Israeli citizen.

Climate-smart agriculture unpacked

Michael Davidson, Ph.D.

Davidson Consultants, USA

This paper explicates the theory-practical interface of Climate-smart Agriculture. Climate-smart Agriculture was developed as a suite of tools to improve socio-ecological systems by fundamentally changing the methods and outcomes of farming. The rationale for Climate-smart Agriculture is the urgency of: reducing the impact of agriculture on climate change; improving food security and nutrition, particularly within the Least Developed countries; developing models for planetary sustainability. The theory of Climate-smart Agriculture states—if interventions to mitigate the damages that traditional agricultural systems cause to the environment are adopted and if growers embrace methods and products that adapt to changing environmental conditions, then greater yields and profitability are achieved while ecological systems are protected, ensuring long-term sustainability. Reliable and internally valid data support the generalizability and replicability of this theory. Each tool of Climate-smart Agriculture is characterized by its equivalent tons of carbon sequestered per given area. Additionally, the cost-benefit analyses of mitigation and adaptation are generally significant and positive. The practical implementation of Climate-smart Agriculture is challenged by a broad set of constraints and barriers, which emanate from social, economic, political and agronomic sources. This paper explains the disconnect between the theory of Climate-smart Agriculture and its practical, long-term implementation in Least Developed countries.

Audience Take Away:

- An understanding of the extent to which agriculture contributes to overall climate change and the extent to which tools of Climate-smart Agriculture contribute to carbon sequestration.
- A clear understanding of food security within the context of projected population growth, water scarcity and soil degradation.
- An enlightened view of the business-as-usual model the Development community uses to reduce poverty in the Least Developed countries, to what extent the associated programs are effective, and why they are largely ineffective.
- An understanding of the complexity and wide range of constraints and barriers that exist in the Least Developed countries, which inhibit the implementation of Climate-smart Agriculture.
- An understanding and appreciation of the disconnect between the Development community and professional agricultural organizations and institutions

For any researcher, non-government organization or government organization who is engaged in improving socio-ecological systems and quality of life for the populations of the Least Developed countries, it is critical to understand the agricultural sector in detail for several reasons. First, this sector represents the livelihood of more than 70% of all laborers in the Least Developed countries. Second, the fundamental

planetary elements: water; nitrogen; phosphorus; and carbon are the predominant biochemical ingredients of agriculture. The manner in which water, soil, phosphates and nitrates are managed is key to the sustainability of the planet. This paper also discusses the implementation of Climate-smart Agriculture within the context of public policy. Mandating and measuring the sustainable use of natural resources is an emerging field of public policy with implications for social and physical sciences.

This paper addresses climate change and the interlinkages between environmental security, economic growth and resilience of agricultural systems. Agriculture depends on irrigation and applied nutrients. Farmers depend on delivery of their products to the market. These and other components of agriculture depend on reliable and cost-effective energy systems. The water/energy/food security nexus impacts all designs for environmental management.



Biography

Thomas Goudoulas, Chemical Engineer, obtained his PhD in 2003 (Aristotle University of Thessaloniki, Greece). He has been assigned as adjunct Assistant Professor in Greek Universities and Technological Institutes, for about a decade (2004 -2013). There was also a successful professional activity as consultant engineer on R&D issues, between 2005 to 2010. He has participated in national and international research projects. He has published studies on the rheology of suspensions, biomaterials like synovial fluid, alginate foulants, biofilms from multiphase bioreactors, and high-molecular weight linear polymers in semi-dilute conditions. Presently, he is a senior researcher in experimental projects of complex biofluids in TUM, WZW Freising, Germany. His current interests include gelation of binary mixtures, rheology of soft matter, new techniques for appropriate in situ measurements, and rheo-PIV.

Large amplitude oscillatory rheology and phase transition study of binary gelatin/alginate gels

Thomas Goudoulas, Chem. Eng. Ph.D.

Fluid Dynamics of Complex Biosystems, School of Life Sciences
Weihenstephan, Technical University of Munich, 85354 Freising,
Germany

Gelatin hydrogels are extensively employed in the food industry for the purposes of thickening, textural engineering, and stabilization, mainly due to their viscoelasticity and thermo-reversibility. The present study extends the investigation on the rheological behavior of binary aqueous mixtures of gelatin and alginate. The biomaterial concentration was up to 5 wt.% whereas the alginate to gelatin ratio was up to one. Using custom-made isolated prototype modules, discrete and thin gel layers were created at 5 °C. The gelation and the melting point of the gels were studied under small amplitude oscillatory measurements, by applying a rate of 1 °C/min. We found that both phase transitions were shifted to higher temperatures for the binary mixtures. Isothermal measurements of the storage modulus (G') against the gelation time were also performed, at 10, 15, and 20 °C. The isothermal curves were sharply increased at lower temperatures, reflecting the increased formation rate of the gelatin triple helices. The kinetic gelation model of Djabourov et al. could describe all isothermal gelation data of binary solutions. Large amplitude oscillatory shear (LAOS) measurements were conducted on fresh gels, prepared on the rheometer plate, as well as on individual gel specimens at 5 °C. Strain sweeps up to 1000% strain were performed at 5, 10, and 20 °C. Although the sweep patterns were qualitatively similar, the waveform analysis showed that the lower temperature results in an earlier onset of the nonlinear behavior, at about 10% strain. Additionally, nonlinear stress analysis of the Lissajous plots was performed. It was found that the fresh gels exhibited strain hardening behavior whereas the layers were intact and showed strain softening. Furthermore, alginate microbeads with diameters from 30 to 200 μm were generated using microfluidics. First insights into the LAOS behavior of filled gelatin gels will be presented.

Audience Take Away:

- The audience will be able to understand the viscoelasticity and thermo-reversibility of binary gels (e.g., gelatin/alginate gels).
- The participants will probably use such binary systems as food additives.
- The mechanical properties of binary gels will be presented in relation to the large amplitude deformation that is usually the actual conditions in food processing industry.
- The participants will realize that practical solutions on strain hardening or thermal softening of binary gels can be utilized and a more efficient application of such gels can be tuned.
- The current results will be beneficial to the audience since the new information on the gelation behavior will assist to design advanced hydrogels, which can have a variety of application (e.g., active coating, taste enchantment, etc.)



Biography

Professor Ezendu Ariwa is a Chartered Fellow of British Computer Society (BCS) and Chair of IEEE Consumer Electronics & Broadcast Technology Chapter, UK and Ireland. He is an Academic Supervisor at the University of Warwick, UK and held various academic and professional positions with many years of experience in the United Kingdom and Internationally.

He has achieved good collaboration with multicultural SMEs in the United Kingdom, with respect to mentoring and working on joint professional development on ICT enterprise programmes. He has experience of doctoral research supervision and consultancy as well as doctoral external examiner for various Universities both in the UK and internationally on Information Risk Management and applicable computing in Smart Cities and Healthcare.

He has a good research profile and the Founding Editor-in-Chief of the International Journal of Green Computing (IJGC), Editor-in-Chief of the International Journal of Computing and Digital Systems (IJCDS), Journal of E-Technology, and the Associate Editor of the International Journal of E-Politics and the Associate Editor of International Journal of Distributed Systems and Technologies (IJDST)

Ezendu is author of a number of books and papers published in international journals and conference proceedings. He has also delivered keynote speeches at various international conferences. He recently published a book on Green Technology Applications for Enterprise and Academic Innovation, Publisher: IGI Global, USA.

Green technology sustainability and cloud computing for corporate social responsibility in smart agriculture mechanization

Professor Ezendu Ariwa

Warwick University, UK

Cloud Computing and Engineering Sustainability remains an essential aspect of providing effective industrial portfolio for delivering cost savings systems that will enable the achievement of energy saving and environmental sustainable applications in both the business and industrial sectors.

The issue of virtual usability and awareness management strategy may result in achieving excellence in energy efficiency and usage, environmental considerations and energy re-use strategic models. The return on investment (ROI) as strategic outcome of cloud computing model may restore and create value analysis for organisations with huge energy wastage without thinking of cost, environmental impact and carbon emissions.

Cloud computing is a recent development of the future generation communication technology which contributes towards industrialization and commercialisation of product development in terms of virtual applications and service delivery through the internet for the purpose of cost benefit and usability of business and enterprise services

Cloud computing can be defined as the concept of delivering virtual services through the internet medium using electronic devices to achieve competitive edge with respect to cost savings, improvement of performance, efficiency and effectiveness. The services may focus within FIVE of the different service domains, such as:

- Public Cloud
- Private Cloud
- Hybrid Cloud
- Community Cloud
- Education Cloud

The choice of each or combination of the cloud services will depend on value analysis, cost savings, improve performance, competitive edge and Marketization of the deliverables and monetization in terms of financial benefits for the industries.

DAY 1

SPEAKERS

Euro-Global Conference on

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and Technology

SEPTEMBER 20-22, 2018
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Exploring rice husk by-product as source of phenolic compounds

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This study aimed to characterize the rice husk phenolic compounds from different genetic background that may contribute to valorize these by-products. The extraction techniques and LC-DAD-MS profiles will be presented and main compounds highlighted: triclin derivatives, including triclin-glycosides and triclin-lignans. The biological activities of triclin and their potential for protecting rice paddy against pathogens will be discussed.

Audience Take Away:

- The audience will be aware of the innovative solutions for valorizing rice by-products.
- The information of tricline present in rice husk and their variability can be useful for the commercial exploitation of this flavone.
- The knowledge of biological activities of triclin is relevant for the entire rice chain stakeholder's.

Biography

Carmo Serrano has a PhD in Chemistry (2008, Universidade da Beira Interior). She is a senior researcher of the Food Technology Services and Investigation Unit of INIAV, I. P (Instituto Nacional de Investigação Agrária), Portugal (since 2007), develops R&D activities and is responsible for technology transfer between academia and industry. Research interests include the analytical chemistry applied to the study of food components. Separation techniques as liquid chromatography in tandem mass with spectrometry to study food components and related food components. Performs bioactivity studies (*in vitro* studies). Regularly provides support for innovation, research and development of new products.

Importance of the field and new technologies to give better and enough food

Emerson Fachini

Master in Soil Science, Doctor Degree in Irrigation, EFirriga Agrobusiness and University of Rio Preto (UNIRP), Brazil

The production of food necessarily passes through the countryside, or rather through agriculture. The development of agriculture is of fundamental importance to feed the growing world population, and for this growth we need to use the land more. Some movements are criminalizing agriculture, but we need to demean this controversy.

Large-scale agriculture depends on the use of the soil for it to occur, so it is impossible to imagine feeding the world, which necessarily goes through agriculture, without modifying the environment, but through technical knowledge of production and modern techniques in all areas, changes in the environment will occur, but with criteria and in a sustainable way, so that we can leave the ground to be used by future generations.

With regard to technologies, it is possible to verify modified seeds, giving more vigor and resistance to some pests and diseases. Application technologies, making chemicals and fertilizers consume reaching the desired target more efficiently. Modern machines and equipment, which work almost with surgical precision, to improve operational performance in quality and quantity.

However, it is possible to verify that the management of the soil, although some techniques are concerned with the subject, such as the "Direct Planting", has been left in the background, being able to make all of the aforementioned technology unfeasible, and the development of new and expensive technologies to correct the damage caused by lack of proper soil management.

The current pressure of pests, diseases and low fertility of soils, in the current context of food production, does not originate in the present day, but in some managements that were left to be carried out, due to intensive agriculture rampant that was meant to supply the world of food.

New technologies "outside the gate" are very important, but we can not stop developing technologies inside the gate, especially in the management of soil and water, which could increase food production, with less use of pesticides and fertilizers. We need to develop mechanisms to improve water infiltration and improve soil life.

Audience Take Away:

- Evidence the importance of the field to feed the populations.
- Instigate to rethink the way choice to improve the quality and the quantity of the production food on the world.
- All areas of the Agriculture have the same intensity of research?

Biography

Graduation in Agronomy by the Federal University of Uberlândia (1994), graduation in Business Administration by the Municipal Institute of Higher Education of Bebedouro (2002), master's degree in Agronomy (Soil Science) by the Paulista State University Júlio de Mesquita Filho (2002) and PhD in Agronomy (Irrigation and Drainage) by the Paulista State University Júlio de Mesquita Filho (2006). Worked in the USA in the fruit production process; visited the agriculture of Spain, Israel, China, USA, Chile, Argentina and Uruguay. Currently is a researcher - Technical Contribution for Agricultural Development (TCAD), consultant / researcher - Efirriga Agronegócio and Professor of the University Center of Rio Preto (UNIRP) ministering the disciplines of Irrigation and Drainage, Management of Hydrographic Basins, Agrometeorology and Agricultural Hydraulics. Served Professor of the University Center of Araraquara (UNIARA) ministering the disciplines of Management of Hydrographic Basins, Agrometeorology and Rural Administration; He served as President of the Regional Council for Rural Development of Barretos.

Impacts of both water deficits and seasonal influence on berry development and composition of Cabernet Sauvignon (*Vitis vinifera* L.) grown in a hot climate

Nicola Cooley^{*1,2}, Ph.D., Peter R. Clingeleffer², Rob R. Walker², Ph.D.

¹Melbourne Polytechnic

²CSIRO, Australia

There is a rising trend to impose deficit irrigation in vineyards of the inland growing districts of Australia where hot climates dominate. Impacts of the water deficit practice across seasons on Cabernet Sauvignon (*Vitis vinifera* L.) wine grapes will be presented. Vine physiological impacts will be discussed alongside berry development, berry juice composition and wine chemical analysis. Impacts of these findings for the industry will be discussed and may be relevant to understanding some future climate change impacts.

Audience Take Away:

- The audience will become more familiar with irrigated practice of hot climate grape production in Australia. This knowledge can be used as a learning tool to better understand wine grape production.
- Outputs presented here may be relevant to other areas of the world where hotter climates are predicted to be experienced through climate change impacts. Our findings indicated that “seasonal effects were shown to have a greater impact than the within-season water deficit treatments on most aspects of berry development and composition” and therefore understanding this can assist with quality control and wine production.
- Industry audience members (viticulture lists/wine makers) may better understand how grape colour may be intensified in Cabernet using this practice where hot climates were possible.
- The study has demonstrated the utility of the PD treatment as an irrigation tool, where water availability is significantly limited and/or where improved spectral properties are required for wines.

Biography

I have been researching into the impacts of climate change on both environmental and production systems for the past 20 years. I am interested in plant stress responses, viticulture and wine production. Currently I manage the Higher Education Agriculture and Technology program at Melbourne Polytechnic where degrees and industry relevant short programs are taught. I am an Honorary Fellow (Affiliate Staff) at La Trobe University and an Honorary Fellow Melbourne University. The work presented here is based on collaboration with the Australian government organization, CSIRO Agriculture, SA Australia.

Genetically modified crops between precaution and innovation: The European court of justice decision of 13 September 2017 and its consequences

Luciano Butti

University of Padua, Italy; Life Member – Clare Hall College – University of Cambridge (UK)

Genetically Modified Crops are at the very center of a long-lasting discussion between a precautionary approach and technological innovation. Such a discussion has been particularly relevant in Europe, where it gave rise to Court litigation. In 1998, the European Commission authorized the placing on the market of genetically modified maize MON 810. In its decision, the Commission referred to the opinion of the Scientific Committee which stated that there was no reason to believe that that product would have any adverse effects on human health or the environment. In 2013, however, the Italian Government asked the Commission to adopt emergency measures to prohibit the cultivation of such maize in the light of some new scientific studies. On the basis of a scientific opinion issued by the European Food Safety Authority (EFSA), the Commission concluded that there was no new science-based evidence to support the requested emergency measures and to invalidate its previous conclusions about the safety of maize MON 810. Despite this, in 2013 the Italian Government adopted a ministerial decree prohibiting the cultivation of MON 810 in Italian territory. After a complicated legal proceedings, the ECJ (European Court of Justice) found that, as it is not evident that genetically modified products are likely to constitute a serious risk to human health, animal health or the environment, no European regulation allows Member States to adopt provisional risk management measures in specific circumstances (Judgment of the European Court of Justice – Third Chamber – 13 September 2017 in Case C-111/16). The Court emphasized that the precautionary principle, which presupposes scientific uncertainty as regards the existence of a particular risk, is not sufficient for the adoption of such measures. The presentation discusses this case and offers ideas and guidelines to manage effectively and safely the challenges that the precautionary principle poses to technological innovation.

Audience Take Away:

- Direct knowledge of the legal proceedings related to GMO which took place in Europe;
- Awareness of the political and legal debate about the role of the precautionary principle as a potential limit to technological innovation;
- Better understanding of the most recent trends as well as of the best guidelines aimed at addressing the challenges that the precautionary principle poses to technological innovation.

Biography

After working as a state criminal judge from 1984 to 1997, Luciano Butti joined B&P Law Firm as a partner in 1998. At the firm he assists clients in litigation before the Italian Court of Cassation and through out-of-court advice. He is also Affiliated Professor of International Environmental Law at the University of Padua. He has written books and articles on Italian, European and International Law and is involved in academic research projects and training courses held in Italy and abroad. Luciano was recently invited by the University of Cambridge (UK) to conduct a research project as a Visiting Scholar (October 2016 to May 2017).

Risk-based quality management in the global fruit juice industry – fighting food fraud with SGF International e.V.

Markus Jungen

Technical Manager SGF/IQCS and SGF/IRMA
SGF International e.V., 55268 Nieder-Olm, Germany

The main objectives of European food law regulations are beneath the high level of protection of human life, health and the consumers' interests safeguarding fair practices in food trade along the supply chain. Therefore, "Food Fraud" is not a buzzword! As certain fruit juices are perennially named being within the Top 10 products that are most at risk of food fraud, the deviations reported in the literature are compared with SGF's worldwide observations 2017.

Successful strategies for our industry are necessary to meet these challenges and to avoid scandals and bad news for the fruit juice business. Therefore, a holistic view in raw material procurement is necessary, especially as modern food safety management systems like GFSI recognized schemes long for authenticity checks in their most recent versions. A useful approach here is the participation in the Voluntary Control System established by SGF.

Beneath the assurance of the supply chain from tree to bottle SGF's work in research and development of new analytical methods, SGF's role as central data warehouse of the fruit juice branch and SGF's technical support in case of possible complaints or unjustified attacks represent a holistic way to meet requirements of modern food quality and of a transparent market.

A high-level market transparency in raw material and intermediates production is proven year by year by the results from SGF control work. The successful results from audits and analyses demonstrate the high addiction of SGF certified companies to authenticity, quality and safety.

As example for SGF's activities in R&D the technical background and best practice examples of SGF-Profiling™ are demonstrated by the non-targeted identification of the geographical origins, the detection of foreign fruits and the indirect proof of sugar addition.

A crucial service for member companies is SGF's role as a central data warehouse in fruit juice business. Authenticity parameters are subject to natural fluctuations caused by e.g. the geographical origin. Various fruit-specific guidelines of the AIJN Code of Practice list A- and B-criteria with the usual variability of each figure in order to assess the authenticity and quality of fruit juices manufactured by usual industrial processing techniques. It is obvious that it is not possible to account for all possible variations due to specific geographical origins or climatic extremes. Therefore, two things are necessary in authentication of fruit juices:

To have in mind the entire analytical picture of different parameters in order to assess the product appropriately and to rely on regional-specific analytical databases.

One of SGF's statutory tasks is supporting members in averting unjust attempts. This technical support of members ranges from phone calls to acting as independent claim agent between two member companies or third parties. In such cases SGF offers its members access to latest analytical techniques and highly qualified experts and auditors to aim at a joint solution of an issue.

Biography

Markus Jungen got an engineering degree (Dipl.-Ing.) after studies in food technology and biotechnology at the University of Bonn with focus on flavour chemistry and statistical design of experiments (DoE) at reaction kinetics modelling of D-limonene degradation and off-flavour formation.

His professional experiences are composed by working in R&D and QA of wheat flour and bakery improvers and since November 2009 as Technical Manager IQCS (bottler control) and IRMA (semi-finished goods control) at SGF INTERNATIONAL E.V., Nieder-Olm, Germany.

In his current position, he is performing analytical evaluation of fruit juices' authenticity throughout the supply chain from tree to bottle and he is involved in the organisation of plant inspections and audits world-wide in the framework of SGF's voluntary control systems. Assessments regarding current legal frameworks at semi-finished goods and finished goods are his daily routine work.

In addition, he is driving further development in KDD (knowledge discovery in databases), in particular statistical modelling SGF's Analytical Database and he is expert in questions of fruit juice authentication.

Markus Jungen is member of the German "DLG-Kommission für Fruchtgetränke und Erfrischungsgetränke", member of German VdF's "Unterausschuss Richtwerte und Schwankungsbreiten bestimmter Kenngrößen (RSK)" and member of the AIJN Code of Practice Expert Core Group.

Alternative microscopic methods in assessment of pesticides genotoxicity

Davor Zeljezic, Ph.D.

Institute for Medical Research and Occupational Health, Croatia

In our work we implemented novel approaches in assessment of pesticide genotoxicity to humans. In the first row we wanted to evaluate the effect of different pesticides to genes TP53 and c-Myc under realistic levels of exposure to glyphosate, carbofuran, chlorpyrifos, α -cypermetri and, imidacloprid. Carbofuran lead to significant DNA migration into the tail in a concentration-dependent manner, while for terbuthylazine lead to significant migration to the tail only at the higher concentration. of c-Myc signals into the comet tail. A significant occurrence of TP53 signals in the tail was observed at highest doses tested corresponding to realistic exposure. In the presence of S9, distribution of signals shifted toward increased their presence in tail. The opposite results were obtained after treatment of the cells with chlorpyrifos, α -cypermetri and, imidacloprid. No matter what concentration has been applied, with or without metabolic activation, no increase of fragmentation of TP53 tumor suppressor gene or c-Myc as prooncogene were observed.

The other technique for addressing the genotoxic potential of pesticides is their preference to be subjected to missegregation due to pesticide effect and mode of action.

Audience Take Away:

- They will be stimulate to broaden their research of pesticide mode of action.
- It will help to deduce the mode of action of pesticides and other substances at the gene level. The data that could be obtained present valuable base of teaching the adverse effects of substance genotoxicity and its effect on carcinogenicity.
- It helps to move forward and upgrade the research at the specific gene level that is involved in genome damage. The model that is presented here is common to many other carcinogens and it makes an assessor's job more effective.

Biography

Prof. Davor Zeljezic, Ph.D. obtained the Master of Science degree in the field of toxicology in 2000 at the Faculty of Science, University of Zagreb, Croatia. Doctoral thesis that he defended was in the field of genetic toxicology of pesticides. Since yet he published more than 70 scientific papers in indexed journals, with more than 1200 citations. At the moment he is the scientific advisor at the Institute for Medical Research and Occupational Health, Zagreb, Croatia. He is also the expert on behalf the Republic of Croatia in Member state committee of European Chemicals Agency (ECHA), and member of the Food enzymes scientific working group of European Food Safety Authority (EFSA). The main subject of his scientific work was pesticides' modes of action in regards to genetic material. His research approaches were based on experiments on human cell cultures *in vitro*, rodent experiments *in vivo* and epidemiological studies comprising both, residents and occupationally exposed individuals. The methods that he applied in the work were chromosomal aberrations, micronucleus cytome assay, sister chromatid exchange assay, alkaline comet assay, hOGG1 enzyme modified comet assay, fluorescence in situ hybridization (FISH), and comet-FISH. At the moment he is the principal investigator at the project entitled Organic Pollutants in Environment - Markers and Biomarkers of Toxicity (OPENTOX), financed by Croatian Science Foundation. Besides, he led, collaborated as the scientist or advisor at 7 additional scientific projects. He is member of the editorial board of BioMed Research International, vice-president of Croatian Toxicological Society, member of several national panels for projects proposal evaluation, reviewer in many scientific journals indexed in Current contents. He collaborated in the organization of domestic and international scientific conferences and held the lectures in the field of toxicology two domestic universities (Zagreb and Rijeka).

Climate change mitigation in sugarcane by transplanting on dry land

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This research is concerned with the development of seedlings transplantation technology of sugarcane cultivation on dry land. The technology used comprised single bud chip seedlings, mycorrhizal arbuscular inoculation, climate change mitigation by transplanting and increasing the millable cane population by arrangement of interrow spacing. This research aimed to ascertain the effects of mycorrhiza on growth, increase of sucrose content, crystal of sugar, and farmer income. Dry land research location was in Gunung Kidul, Yogyakarta Indonesia with limited soil moisture, no irrigation, six wet months per year. Seedlings transplanting was done when the rain is evenly distributed. The transplanting system will shorten the age of growth on dry land by about 40 days due to the germination phase for 40 days in the nursery. This is in contrast to the conventional planting with a stem with more nodes which requires 40 days to germinate phase in the field and the seed germination capacity is not yet known. The transplanting system prevents plants from water shortages during the growth phase, the tillering phase, and stem elongation because it is done in the rainy season. In the dry season, the plant goes into the maturation phase and sucrose accumulation in the stem. The seeds used are single bud chips that have the advantage that the seed volume is 80% more efficient than the stem with more nodes, simplifying the to arrangement of seedlings in transplantation by interrow spacing treatment, increasing the number of millable canes, forming the optimal clump angles (aged 3 months). The clump angle determines the productivity of 10.31%. To increase the growth capacity of seedlings transplanted on dry land, the seeds are inoculated with mycorrhiza in the nursery. Mycorrhiza enhances the growth of shoot roots (secondary roots) ie accelerates the emergence of roots, root length, root surface area, and number of secondary roots. The application of mycorrhiza also increased the biomass of seedlings, the weight of stem biomass by 11-61%. The percentage of mycorrhizal infections was correlated with the weight of stem biomass $r^2 = 0.54$. Interrow spacing of 60 cm increased the yield of millable cane, sucrose content, sugar, and profit of farm operation compared with the system of stem planting with several nodes, respectively by 46.4%, 5.8%, 48.3%, and 122.5% with R/C ratio of 1.6. This treatment also had significant effects on specific leaf weight (SLW), leaf area, net assimilation rate (LAB), plant growth rate (PGR), light uptake, transpiration, leaf area index (ILD), lowest leaf proline level, and increase in the number tillers, number of stem nodes, stem diameter, plant height, clump angles, and millable canes per clump. Interrow spacing of 60cm resulted in productivity of 110 tons/ha, crystal of sugar of 8.93 tons/ha. The clone type determines the interrow spacing. PS881 clone gave the best yield at 75cm interrow spacing with productivity of 123.45 tons/ha, higher gain 60.8% than the system of stem planting with several nodes, and R/C ratio 1.36.

Audience Take Away:

The important things that participant takes away from my presentation are:

- Agronomy research is applicable in terms of the aspects of growth, yield and profit of farming operations.
- Agronomy for sustainable development on dry land with the application of arbuscular mycorrhizal fungi (AMF) can improve plant growth and soil fertility.
- The climate change mitigation by transplanting of single bud chip seedlings on dry land avoids water limitations (rainfall).

The things that the audience will be able to use what they learn are:

- The concept of agricultural sustainability, ie application of AMF. The single bud chips seedlings inoculated by AMF in the nursery before transplanting on dry land. This treatment causes drought-tolerant plants, water-sustained crops continuously due to the increasing ability of the root surface area thus photosynthesis goes normal, resulting in optimal sugar formation until the accumulation of sucrose on the stem.
- Application of soil fertility. Mycorrhiza can improve the rhizosphere. Mycorrhizae produces glomalin compounds that are glycoproteins that are resistant to the reshuffling of microorganisms. This compound is sticky to give carbon contribution in the soil, so it can be used for global CO₂ mitigation. CO₂ in the air is tethered into the soil.
- The concept of transplanting sugarcane seedlings on dry land. Several matters related to the application of this technology are: (1) preparing sugarcane seeds in the nursery to be bred so that it grows normal, healthy, and its purity is selected; (2) good single bud chips transplanting techniques on dry land. Transplanting of seedlings by

including soil media in the mycorrhizal-infected polybag will increase soil fertility and increase soil microbes and the optimal tillers; (3) The system of planting seedlings will shorten the age of plants in the field for about 40 days, uniform seeds, the number of millable canes increases, increasing the sucrose content caused by normal photosynthesis and uniform of tillers.

This research will help the audience in terms of:

- Helping the application of the AMF method at the appropriate time and optimal dose of mycorrhizal inoculum for the growth of single bud chips seedlings on dry land.
- Helping to implement agricultural sustainability with application of AMF on dry land.
- Increasing the productivity of sugarcane in rain-fed dry land with a system of transplanting seedlings with climate mitigation approaches and arrangement of interrow spacing to obtain optimal millable cane population.

From this research that other faculty could use to expand their research or teaching are:

- This research can be applied and expanded in faculty of Biology and microbiology, that is by doing research on the types of the appropriate mycorrhiza for sugarcane and its effect on soil fertility.
- This research can be developed and applied in the Faculty of Environmental Science and Sustainable Agriculture. Its application is to examine the role of sugarcane seedlings inoculated with AMF in the transplantings to the impact of global CO₂ mitigation. Determine how much CO₂ in the air that can be moved into the soil.
- This research can be applied to the discipline of mechanization and engineering of agricultural tools. Planting of seedlings in the transplanting system of single bud chips seedlings is done manually by farmers. To save labor one can design a power drill and a machine for planting single bud chips seedlings.
- This research can be applied to the field of agricultural climatology. By paying attention to climate change, rainfall on dry land, this system can be adopted on dry land. The seedlings in germination phase are cultivated in the nursery, after the rain is evenly distributed and the moisture content of the soil is sufficient the selected seedlings can be transplanted to the field. In the field the transplanted seedlings can soon enter the tillering phase.

This research provides a practical solution to the problems of sugarcane cultivation on dry land and addresses the limitations of fertility and soil moisture on dry land with the following things:

- Mycorrhizal application on sugarcane seedlings causes the soil to be more fertile, the crops to be more tolerant on dry land so that limited water on dry land can be addressed. With mycorrhizal inoculation, fertilization especially P can also be reduced.
- Planting of single seed buds can save the seeds 80% compared to planting by farmers (stem with more nodes).
- The transplanted seedlings are seedling whose growth has been selected and will provide a high growth rate of 95-100%, so the work of embroidery is not necessary.
- Better plant growth is the number of tillers, the number of milled sugarcane per hill, the number of nodes, and the weight of the sugar cane. This is because in addition to the tillers and millable cane, the plant has sufficient time for rapid vegetative growth and maximum stem elongation. In contrast to the farmer's system, its growth in the field is about 40-50 days for the germination process. Therefore, the productivity, yield, and sugar produced increase.
- Plant maintenance is easier and costs less, especially in planting interrow spacing of 60 and 75cm and productivity and sugar content are better.
- Treatment of breeding can be done by women and farming families so as to provide employment and income of farmers. This is especially true if nurseries are collaborated with sugar factory.

The results of this study provide new information to improve the sugarcane cultivation system on dry land without irrigation, namely:

- The optimal dose and appropriate time of mycorrhizal inoculation in single bud chips seedlings that it can improve growth, productivity, sucrose content, and sugar. Mycorrhizal inoculation is recommended to be applied because mycorrhizal infections occur in seeds correlated with the increase in the weight of stem biomass ie $r^2 = 0,54$.
- Provide information that single bud chips transplanting inoculated with AMF can increase the growth of shoot root

seedlings. Shoot root parameters are root surface area, root diameter, and root:shoot dry weight ratio determines the weight of millable cane 52.09%, 40.84% and 7.06%, respectively.

- Transplanting of seedlings system with mycorrhizal inoculation on dry land increased stem weight 11-61%, thus increasing productivity by 46.4%, increasing sucrose content 12.8%. The productivity of sugarcane reached 123.45 tons/ha, with sucrose content of 8.2% and crystal of sugar 8.93 tons/ha.
- Helping to overcome the problem of sugarcane cultivation on dry land with approaches: transplanting system, use of single bud chips, mycorrhizal inoculation in seedlings in nurseries, arrangement of interrow spacing to increase millable cane population per ha, yield of millable cane, productivity, and sugar obtained by farmers.
- Improving and maintaining dry soil fertility by mycorrhizal inoculation.

Biography

Wawan Sulistiono, 40 years old is a researcher at the Assessment Institute for Agricultural Technology of North Maluku, Sofifi Indonesia. He earned his bachelor's degree in Agronomy at Universitas Muhammadiyah Malang in 2001. His studies for a Master's degree in Agronomy at Universitas Gadjah Mada Faculty of Agriculture in Yogyakarta, graduated in 2004. He earned his doctorate in Agronomy at the same university in 2017. His doctoral dissertation is the development of sugarcane seedlings transplantation system on dry land. His articles have been published in international journals, i.e. Journal of Agronomy and Australian Journal of Crop Science.

Application of Coherent Anti-Stokes Raman Scattering (CARS) spectroscopy to the determination of degree of unsaturation and the authentication of edible oils

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Dept. of Physics and Photon Science, Gwangju Institute of Science & Technology, Republic of Korea

We demonstrate the use of Coherent anti-Stokes Raman Scattering (CARS) spectroscopy for determination of degree of unsaturation and the authentication of edible oils. We have measured CARS spectra of commercial edible oils having different degree of unsaturation, and found the spectral intensity ratio of two specific bands in C-H stretch region depends on the degree of unsaturation of sample. The mass unsaturation of different oils could be estimated through the results of CARS spectroscopy in fatty acids, which are major component of edible oils. In addition, we obtained the calibration curve for determining iodine value (IV), and the result of our work was well matched with referred IV. Also a comparative analysis on five edible oils with the same chemical composition but different composition ratios was performed. Intensity ratio in C-H stretching region was obtained according to the mixing ratio of the two types of edible oil, and we found that the results were quite well matched with theoretical fitting curves and they were well matched with the referred values. And finally, we will discuss that the CARS spectroscopy might be used as a method of authentication of adulterated edible oil by introducing a method to determine the type and the amount of unknown mixed oil.

Audience Take Away:

- The audience will understand the principles of ultrashort Coherent anti-Stokes Raman Scattering spectroscopy.
- They will see a novel method for the determination of unsaturation in edible oils instead of conventional iodine value (IV) method.
- We will share a new method for authentication of adulterated edible oils

Biography

Do-Kyeong Ko received the Ph.D. degree in Physics from Seoul National University of Korea in 1992. From 1992 to 2003 he had worked in Korea Atomic Energy Research Institute(KAERI) as a Senior/Principal Researcher. Since 2003 he has been with Gwangju Institute of Science and Technology(GIST) as an Associate/Full Professor. Currently, he is full professor of the Department of Physics and Photon Science of GIST, the Dean of GIST College, a vice-president of the Optical Society of Korea, a fellow of the Korean Physical Society, and a Senior Member of the Optical Society of America. He published more than 200 peer reviewed journal papers and his research interests are nonlinear optics, ultrafast nonlinear spectroscopy, and ultrafast lasers development and their applications.

The importance of soil yeasts in agriculture

Danka Radić^{1*}, Ph.D., Vera Karličić², Ph.D., Jelena Jovičić-Petrović², Ph.D., Vera Raičević², Ljubinko Jovanović¹

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A significant status in the formation and maintenance of soil fertility is held by microorganisms that can reliably provide the assessment of the health and quality of the soil. Soil microorganisms have been applied in agriculture as biofertilizers and biopesticides as well as phytoremediation agents. Microbial cooperation in the rhizosphere is essential for the sustainability of soil fertility and plant growth. Plant-growth-promoting microorganisms (PGPM) are defined as soil-borne bacteria, fungi and yeasts with plant promotion or protection activities. Positive outcomes of PGP microbe's application are enhancement of seedlings emergence, faster plant growth, higher biomass production, increase of root length, and branching, increased leaf area, and chlorophyll content, and higher resistance to abiotic stresses as well as to pests or diseases.

The total soil yeast count is usually relatively low as compared with the number of bacteria and filamentous fungi. Yeasts are important as a source of food for other soil microorganisms, they participate in the cycling of matter in soil, and are involved in the formation of the soil mechanical structure. Some yeasts' strains are recognized as PGP microbes, with ability to produce indole-3-acetic acid (IAA), siderophores, to stimulate mycorrhizal-root colonization, pathogen inhibition and phosphate solubilization. Several genera of soil yeasts, such as *Candida*, *Geotrichum* and *Rhodotorula* were positive to *in vitro* P solubilization tests. Representatives of *Candida*, *Geotrichum*, *Rhodotorula*, *Saccharomyces*, and *Williopsis* are able to nitrify ammonium to nitrate via nitrite *in vitro*. Also, yeasts exert biocontrol against fungal phytopathogens indirectly, by competing for space and nutrients, modifying the environmental conditions (pH), or promoting plant growth and plant defensive mechanisms with inducing plant systemic resistance to pathogens and antibiosis.

Literature data claim that soil yeasts can find its use in sustainable agriculture.

Audience Take Away:

The application of beneficial microorganisms is an important alternative to some of the traditional agricultural techniques. Environmentally friendly techniques in agriculture improve the quality and quantity of certain agricultural products and preserve soil. This is especially important since human population is constantly increasing together with need for food. Presented research contributes to a better understanding of the soil yeasts importance in agriculture.

This work accentuates the importance of biological soil components. In most cases soil is precipitated as dead structure consisted of solid, liquid and gaseous phases while their inhabitants are neglected. The truth is that soil is the most vivid ecosystem with over one million bacterial cells in just one gram. This work tries to point out that the solution of numerous environmental problems (soil, groundwater, air pollution, soil structure distraction) is under our feet.

- Current research show possible applications of soil yeasts in the area of plant growth promotion, bioremediation and soil quality in general.
- This work tries to point out the solution of numerous environmental problems (soil, groundwater, air pollution, soil structure distraction) is within soil microflora and its biodiversity.
- Selected yeasts strains can be used as microbial inoculants and significantly improve microbial quality.

Biography

Danka Radić assistant professor at University Educons - Faculty of Ecological Agriculture, Vojvode Putnika 87, 21208 Sremska Kamenica, Serbia. Finished Ph.D studies in the Faculty of Agriculture, University in Belgrade, Serbia. Scientific field: Microbiology, Scientific discipline: Microbial ecology (Name of Ph.D thesis: "Biodiversity of soil yeasts and their importance in sustainable agriculture"). Member of the Serbian Society for Microbiology.

Development of synbiotic yoghurt by using inulin and *Bifidobacterium breve*

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¹Ph.D. Scholar at National Institute of Food Science and Technology, University of Agriculture, Faisalabad, Pakistan

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Probiotics are live microorganisms which when ingested in adequate amount confer certain health benefits beyond the basic nutrition. These help to maintain our digestive system improve the health conditions like constipation, stomach virus, urinary tract infection, inflammatory bowel disease and lactose intolerance. *Bifidobacterium breve* (*B. breve*) used in different probiotic foods, which act as biotherapeutic agent mainly to control the antibiotic associated diarrhea (AAD). Prebiotics are hardly consumable food ingredients that positively affect the host by increasing the movement and escalation of one or inadequate number of microbes in colon. Inulin is a polyfructans which is widely used as prebiotics, sugar replacer, fat replacer and texture modifier. Food products which consist of both probiotics and prebiotics are termed as synbiotic. The objective of the present study was to utilized indigenously isolated *B. breve* and extracted inulin for the development of synbiotic yoghurt. *B. breve* was added at the rate of 1% and inulin at different levels (0.5%, 1%, 1.5%, 2%) along with control. The final product was analyzed for physiochemical and sensory characteristics. The data obtained from all these parameters was subjected to statistical analysis. The pH, showed decreasing trend as concentration of inulin increased during storage. The acidity, viscosity showed increasing trend as concentration of inulin increased during storage. The panelists awarded maximum score to T3 on the basis of overall acceptability. It is concluded that yoghurt could be used as effective vehicle for the delivery of probiotics.

Biography

Wahab Ali Khan, a Ph.D. student in the field of Food Science & Technology from National Institute of Food Science and Technology, University of Agriculture Faisalabad, Pakistan. He received his Bachelor's degree in Dairy Technology from University of Veterinary and Animal Sciences, Lahore, Pakistan and Master degree in Food Science and Technology from University of Agriculture Faisalabad, Pakistan. He received various scholarship and awards during his academics. His research project has been focused on encapsulation of Vitamin D to improve its stability during processing and storage.

Soil available nutrients and nutritional food quality of crops

Surendra Singh, Ph.D.

Soil Science and Agricultural Chemistry, Banaras Hindu University, India

Nutritious food is essential to meet the dietary needs for healthy human life. Continuous crop production can reduce nutrient reserve in the soil. As reserves get depleted crop growth and productivity can be compromised, over time, cumulative depletion can decrease crop yields, food quality and soil health. Hence, an adequate supply of plant nutrients is essential in soils for crop production and nutritional food quality. An integral approach recognizes that soils are the store house of most of the plant nutrients essential for plant growth and that the way in which nutrients are managed will have a major impact on crop yields, nutritional food quality and soil health. The addition of N generally has the greatest effect on plant growth and also considerable influence on food quality, especially through increase in protein content and its quality. The major P- containing compounds that are important for crop quality are phosphate esters, phytin and phospholipids. K is very closely associated with crop quality. It improves the quality of several products including tubers, fruits and vegetables. Adequate supplies of Ca prevent a number of crop quality problems, such as inner decay of cabbage, brown spot and bitter rot in apples and empty shells in groundnuts. A good supply of Mg increases the concentration of carbohydrates and also chlorophyll. An adequate supply of S improves: oil percentage in oil seeds and grain sizes, seed protein content in pulses and grain sizes, flour quality for milling and baking, marketability of copra, quality of tobacco, nutritive value of forage, starch content in tubers, head size in cauliflower and sugar content and sugar recovery in sugarcane. Micronutrients are involved in many metabolic processes, their adequate supply is a precondition for good food quality, especially with respect to the concentrations of proteins and vitamins. Soil health for adequate supply of nutrients will be discussed for ensuring nutritional food quality of crops to sustained human health.

Audience Take Away:

- Soil is an important source of nutrients in our food supply.
- It needs to be widely recognized that “healthy people need healthy food from healthy soils”.
- Healthy soils grow food that ensures correct uptake of nutrients by plants and improve human health.
- Nutritious food is essential to meet the dietary needs for healthy human life. Plant nutrition research in soil has direct relation with food and human health..
- Nutrients play a vital role in the synthesis of food such as carbohydrate, starch, protein and vitamins etc.

Biography

Prof. Surendra Singh, Formerly Head, now professor, Department of Soil Science and Agricultural Chemistry obtained M.Sc. (Ag) and Ph.D. Degrees in Soil Science and Agricultural Chemistry, Banaras Hindu University. Served as capacity of Assistant professor, Associate professor and University professor at BAU, Ranchi (Jharkhand) during 1989-2006. Dr. Singh joined Banaras Hindu University on 21st November, 2006 as professor of Agricultural chemistry and altogether has experience more than 30 years (teaching, research, extension, consultancy, development, administration, etc.). Prof. Singh has worked extensively in the research areas of: use of sulphur, boron, organic resources, industrial by-products, minerals and INM in soils for enhancing nutrient use efficiency, nutritional food quality and crop productivity in different type of soils. Prof. Singh has 198 publications to his credit. He has guided/advised many M.Sc. and Ph.D. students. Dr. Singh has successfully executed a number of externally aided research, extension and developmental projects. He received prestigious TSI-FAI Award on Plant Nutrient Sulphur (1998), Fellow of Indian Society of Soil Science (2012) and best teacher award.

Growth performance, body composition and metabolic response to feeding rates in juvenile Brazilian sardine *Sardinella brasiliensis*

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The Brazilian sardine, *Sardinella brasiliensis*, together with other *Sardinella spp*, accounts for 5% of the world production of marine fish. The Brazilian sardine is not only ecologically important but is also one of the most commercially important fishery resources caught along the south-eastern Brazilian. It is currently captured by various fleets for use in the canning industry and extensively as live bait for skipjack tuna fishery, and its availability varies seasonally due to overfishing and environmental changes. Recent attempts to breed Brazilian sardine in captivity have resulted in the first production of larvae in south of Brazil. This study was conducted to evaluate the effects of feeding rate on growth performance, body composition, plasma metabolites and enzyme activities, and to determine the optimal feeding rate for juvenile Brazilian sardine.

Audience Take Away:

- The results of this research have practical application in the production of sardines in captivity;
- This research brings the solution to the fluctuations of the sardine fishery, being able to be used by research institutions or fishing industry of sardine.

Biography

Mr. Baloi has BSc degree in Marine Biology (School of Marine and Coastal Sciences, Mozambique) Master's and PhD degree in Aquaculture by the Post-Graduation Program in Aquaculture of the Federal University of Santa Catarina (Brazil). In aquaculture, I have experience in water quality, marine shrimp culture in biofloc systems (BFT); feeding and nutritional management of fish. Besides being a lecturer and researcher, he is also coordinator of the Marine Biology undergraduate course at School of Marine and Coastal Sciences.

Agronomic practices to increase the seed yield of chia (*Salvia hispanica* L.) crop

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Chia (*Salvia hispanica* L.) is an ancestral crop from Mexico that today is one of the main sources of fatty acids Omega-3. This source of Omega-3 is more sustainable, safer and cheaper than others ones used in the world. The estimated potential chia seed yield (SY) is about 3 tons ha⁻¹ but the actual SY is only 0.3 - 0.7 tons ha⁻¹. The main reason for this low production is that chia crop has not been fully integrated into the modern agriculture and farmers do not know how to manage chia crop. On the other hand, the importance of the chia as raw material in the nutraceuticals production is enormous. In 2013, the agricultural research team in Amway Corporation started a long-term research project to improve chia SY at the Nutrilite farm located at El Petacal, Jalisco, México. The objectives of this project are (1) to develop new chia varieties with breeding program; and (2) to investigate the effect of fertilization, pest and disease control, and the planting dates on the yield of the chia. The results indicated that the use of improved varieties and N fertilization are two best agronomic practices to increase Chia SY. Furthermore, the improved genotypes are more efficient to use the N applied via fertilization than the inbred varieties. Recently, Amway Corporation submitted a patent application for a new chia variety named the Rehnborg. The SY of Rehnborg is 1.72 tons ha⁻¹ which is not only higher than the SY of its progenitor, Pinta cultivar (1.35 ton ha⁻¹) but also other inbred varieties commonly used in Mexico, such as Black Puebla and White Acatic (1.28, and 1.27 ton ha⁻¹, respectively). The high SY of the Rehnborg variety is associated with its efficiency to use the N fertilizer applied (8.1 kg of Seed Yield kg⁻¹ N applied), that is 2.5, 1.6, and 1.7 times as much as that for the cultivars Pinta, White Acatic and Black Puebla (3.2, 5.1 and 4.8 kg of Seed Yield kg⁻¹ N applied, respectively). Currently the chia crop is growing during the summer season in our farm. This is the option for temperate regions but not for tropical zones where the high temperature and rainfall resulted in the high incidences of pests and diseases that frequently decreased chia SY. Farmers and researchers consider the chia crop as resistant to pest and diseases, however, we found that when chia is planted in the summer season, *Diabrotica sp.* and *Fusarium sp.* reduced 43 and 55 % of SY, respectively if pests and diseases were no controlled. Also, we have observed that in central Mexico area where free of frost, it is possible to grow and harvest chia seeds for two cycles each year. It is feasible for farmers to obtain high SY in both cycles, however, farmers must use the improved varieties along with proper irrigation, adequate fertilization, optimal sowing dates, proper plant density and an integrated management of pests and diseases in their production system.

Audience Take Away:

- Currently there are several assumptions related to agricultural management practices for chia crops. First, people considered chia as an exclusive summer crop. Second, people believed that chia crop resisted to pests and diseases attack. Third, people thought that chia exhibits low water requirements and low nutrients requirement. As the result of these assumptions, the yield gains on this crop have been scarce in the past 27 years. In this presentation, we will use solid data to convince farmers that it is possible to obtain high seed yield for chia crop. Farmers must use all the modernized agricultural management practices to achieve such success. The research work provided in this presentation could be the fundamental for researchers to develop technology to improve the SY of chia crop. At the same time, agronomy professors can teach their students the agronomic knowledge we present here. Finally, consultants of agricultural production can teach farmers the technology in this presentation to as the pathway to obtain high yield for oil crop.

Biography

Anacleto Sosa-Baldivia is an Agronomist from Ticuman Morelos, Mexico. He obtained his Master degree of soil fertility from Colegio de postgraduados at Montecillos, México. He is R&D manager at Nutrilite Farm of Amway, Mexico. He is also a part time PhD student on productive biotechnology on Centro de Investigación en Biotecnología Aplicada (CIBA-IPN), at Tlaxcala, México. His work experiences included CIMMYT, INIFAP, MARBRAN Co., Pioneer seed Co., UABC, and Amway Corporation. In the last four years, he focused on the development of agronomic technology to improve the SY on the chia crop. Based on his research work, in 2018 Amway filed a patent application for the new chia variety "Rehnborg" with high yield potential.

The role of pre and post-harvest technology on pod yield and quality of peanut (*Arachis hypogaea* L.) kernels

Dr. Agustina Asri Rahmianna*, Ir. Joko Purnomo, MS, Joko Susilo Utomo, Ph.D.

Indonesian Legumes and Tuber Crops Research Institute - Iletri

In the era of world free trading, low aflatoxin contamination on peanut kernels and its products is an ultimate prerequisite stated by the imported countries. Aflatoxin is a carcinogen, immune suppressing and anti-nutritional natural contaminant of peanuts and hence it is a major human food and animal feed quality problem in all over the world. This toxin is produced in peanut kernels by soil fungi *Aspergillus flavus*, *A. paraciticus* and *A. nomius*. The toxin is produced either when the crops are still standing in the fields (pre harvest contamination) or when the kernels have been harvested, or when they have already in the food supply chain (post harvest contamination). In both situations, the toxin is produced when the moisture content of the kernels is in the critical range for fungus to produce the toxin. In semi arid and arid areas, aflatoxin contamination starts at preharvest, in humid areas, however, the contamination builds up during post harvest condition. This research therefore was done to study the effect of cultural practices on the production of aflatoxin just after harvesting. Eleven drought tolerant peanut lines were grew using recommended and local variety was grown by using farmer's technologies. Both preharvest technologies were followed by post harvest handlings. The results showed that recommended technology was succesfully increase pod yield by more than 100% compared to that of farmer's technology: 2.315 tons and 0.4-0.6 t/ha of dry pods, respectively. The aflatoxin contamination of peanut kernels produced by recommended technology was 0.59 ppb only. Whilst that was produced by farmer's technology was 59 ppb. On the other hand, farmer's technology was superior in physical kernel quality as shown by higher percent of sound mature kernels, and lower shriveled and damage kernels compared to those of recommended technology.

Audience Take Away:

- The audience will learn that literally aflatoxin contamination is a serious health problem to Indonesian. The Government of Indonesia has set a regulation on critical amount of allowable limits of aflatoxin content in various peanut food products and grains, and other food products since year 1995.
- Aflatoxin contamination was the result of inappropriate conditions (especially mositure content of the kernels) obtained both at preharvest and post harvest for the fungus to produce toxin. Therefore, managing the low aflatoxin level has to be done thoroughly start from pre, through to post harvest and drying the pods.
- In Indonesia, high aflatoxin incidence especially in the food supply chain (post harvest contamination) was mainly baccuse the players did not properly apply the good post harvest handling, merely because they want to spend the very minimum amount of expenses.
- Indonesia scientists have been working in the various aspects of aflatoxin reduction since 1970's and one of the technology is growing peanut variety that tolerant to drought stress, as one way to obtain peanut kernels low in aflatoxin contamination.
- In dry lands, peanuts are grown during wet season where wet condition is around during harvesting time. It is very common that farmers in Indonesia will delay in drying the peanut pods. As a result, this humid and hot condition will fasten fungal infection and most probably aflatoxin production. We suggest to do wind drying i.e. by spreading the wet pods in the airy rooms.

Biography

The author obtained her Ph.D from the Department of Natural and Rural Systems Management, Faculty of Food and Science, Univ. of Queensland, Australia in 1999. After finishing this study, she returned to Iletri based in Malang City, Indonesia, where she has been joining this institute since 1985. As a researcher, she works mostly on managing the cultural practices of peanut to increase its productivity in various agro ecological zones of Indonesia. Her interest on aflatoxin contamination in peanut was started when she joined in ACIAR Project "Reducing Aflatoxin in Peanuts Using Bio-Control and Agronomic Management Strategies in Indonesia and Australia".

Changes in rapeseed canopy spectral reflectance under different cultivars and nitrogen levels

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It is particularly important that obtain and diagnosis crop growing, nitrogen nutrition status real-time, fast and non-destructively through informatization technology. This experiments were carried out at Jiangsu Provincial Academy of Agricultural Experimental Farm from 2014 to 2016, the field experiments for varieties and fertilizer were set up. Using of Crop Scan MS16R, and ASD Field Spec Hand-Held, the spectrum reflectance for various rapeseed growth period was measured. Through rapeseed spectral information, physiological and biochemical indices and statistical analysis, the relationships between the spectral reflectance characteristics and the leaf nitrogen contents for rape seedlings under the various cultivars and nitrogen levels had been cleared, the sensitive spectral bands in rape seedlings leaf nitrogen content were found, and the rapeseed monitoring model of leaf nitrogen content for rapeseed seedlings were constructed based on spectrum. This provided a theoretical basis and technical support for the use of remote sensing technology in rapeseed nitrogen application, nondestructive sensing monitoring for leaf nitrogen, and fertilizer recommendation suitability, etc. The results were as follows:

1. Changes in the spectral reflectance from transplanting to flowering stage for rapeseed gradually decreased in the visible range, while gradually increased in the near infrared region; However, after flowering, canopy spectral reflectance increased gradually with the development of postponement in the visible range, but gradually reduced in the near infrared region.
2. Rapeseed spectral reflectance had significant differences under different nitrogen levels, and three rape varieties had similar trend, especially in the near-infrared region. The increased nitrogen levels improved spectral reflectance in the near-infrared region, but in the visible place, increased nitrogen levels reduced spectral reflectance.
3. Between the varieties of rapeseed, changes in rapeseed canopy spectral reflectance curves were the same. But there were some differences in canopy spectrum reflectance between varieties of rapeseed. It may be due to the different crop varieties, effect of background soil and weed coverage. There are some differences in the whole growth process, even under the same conditions of field management, resulting in the difference between the spectra of different varieties.
4. At 870nm and 1320 nm bands there were a very significant correlation on spectral reflectance and leaf nitrogen content in seedling phase. The coefficient of determination R^2 was 0.651 and 0.670. Through single-band linear and nonlinear regression analysis, the coefficient of determination presented regularity of the regression equation corresponding to each band, That was that: R^2 Polynomial $>R^2$ Logarithm $>R^2$ Linear $>R^2$ Exponentiation $>R^2$ Index. R_{870} and R_{1320} . The corresponding to the polynomial regression equation between the single band reflectance and rape leaf nitrogen content, R^2 reached to 0.73 and 0.795, so it can be used to characterize the quantitative relationship between 870nm and 1320 nm bands.

Audience Take Away:

- Based on this study, it can be used in develop quantitatively diagnose model to rapeseed nitrogen precision management.
- This is a rapid monitoring method for crop nutrition status, and it will help the audience in their job.

Biography

Hongxin Cao studied a Bachelor of Science (Agronomy), and a Master of Science (Crop Cultivation and Tillage) graduating in 1985 and 1988 from the former The Northwestern Agricultural University, China. He obtained a Ph.D in Agronomy from The University of Nanjing Agriculture Chinese in 1997. Also in 2000 and from 2009 to 2010 he was a Visiting Academic at The International Maize and Wheat Improvement Center, and The University of Queensland, respectively. Presently he is working as a professor and an associated director in Institute of Agricultural Information/Engineering

Center for Digital Agriculture, Jiangsu Academy of Agricultural Sciences (JAAS), China to develop crop growth models, morphological models, and agricultural information technology, etc. He is a deputy president of the Computer in Agriculture Sub-Association of China Agriculture Association of Science Society, a deputy president of the Agricultural Meteorology Sub-Association of China Agriculture Association of Science Society, a supervisor of Jiangsu Province Agriculture Association of Science Society, a supervisor for postdoctoral station of JAAS, an advisor for postgraduate in The University of Nanjing Agriculture and The University of Yangzhou and for Ph.D. postgraduate in The National University of KwaZulu in South African, and a member of Editorial Board of Agricultural Sciences in China.

Effect of preparation methods on chemical composition and aflatoxin content of peanut products

Erliana Ginting*, MSc, A.A. Rahmianna, Ph.D, Eriyanto Yusnawan, Ph.D

Indonesian Legumes and Tuber Crops Research Institute (ILETRI) Malang, Indonesia

Peanut production in Indonesia is predominantly used for food. Therefore, information on nutritional aspects and aflatoxin contamination in peanuts is essential in terms of food security and food safety. Preparation of peanuts into food products normally involves heat treatment, the use of water, spices, and microorganism that may affect the nutrient and aflatoxin contents. Hence, the effect of preparation methods on the chemical composition and aflatoxin content of selected peanut food products was studied in the Food Chemistry and Technology Laboratory of ILETRI, Malang. The peanut pods harvested from farmer practices in Ponorogo, East Java were stored for one month, then the kernels were prepared into deep-fried peanut, pressed-fried peanut, peanut sauce, peanut press cake (defatted peanut), fermented peanut press cake (peanut tempe) and fried peanut tempe. The trial was a randomized complete design with three replicates. Observations included physical and chemical characteristics of peanut kernels, chemical composition of peanut products and aflatoxin content using ELISA method. The results showed that peanut kernels contained 26.3% of protein (dw) and 50.4% of fat (dw) with relatively low aflatoxin B₁ content (9.1 ppb) due to low moisture level (5.6%), no *A.flavus* infection and high sound/intact kernels (73.1%). Peanuts prepared into peanut tempe showed the highest increase in protein content, followed by fried peanut tempe, peanut press cake, and pressed-fried peanut, while fat content decreased in all products. The preparation of deep-fried and pressed-fried peanuts decreased aflatoxin B₁ by 26.4% and 41.8%, respectively, while no significant differences were noted in peanut sauce and peanut press cake preparation. Aflatoxin B₁ increased two-fold during peanut tempe preparation, however it significantly decreased by 38.9% after deep-fried. Excluding peanut tempe, all peanut products contained aflatoxin B₁ below the permitted maximum level (15 ppb), therefore safe for consumption.

Audience Take Away:

- Information on aflatoxin contamination levels in peanut kernels obtained from farmer produce/harvest in tropical conditions.
- Nutritional information and aflatoxin reduce/increase in peanut food products as a result of processing. The effective processing methods can be further used as a control for aflatoxin contamination in peanut products.
- Information on the safeness of peanut products for consumption in terms of food safety.

Biography

Erliana Ginting, was born in Medan, North Sumatra, Indonesia on 14th December 1963. She took her B.Sc from the Faculty of Agricultural Technology, Gadjah Mada University, Yogyakarta, Indonesia in 1987 and Postgraduate Program (Master by research) on Food Science and Technology at the University of New South Wales, Sydney, Australia in 2002. Currently, she is working as a principal researcher in post-harvest and food processing of soybean, peanut, mung bean, sweet potato, cassava and potential tubers since 1987 at Indonesian Legumes and Tuber Crops Research Institute, Malang, East Java, Indonesia.

Tapping on bee resource for food and nutrition security

Grace A Asiko

Ministry of Agriculture and Irrigation, State Department of Livestock, National Beekeeping Institute, Lenana-Nairobi, P.O Box 34188-00100, NAIROBI-Kenya

Bees, both stingless and honeybees, are important pollinators to a wide range of crops and fruits, thus enhancing food productivity in terms of quantity and quality (Connor, 1970; Crane, 1985; Roubik, 1995 and Bradbear, 2009). The value of honey bee pollination to crop yields reveal \$US 238.9 billion worldwide (Gallai et al., 2009). The honey from the bee is an important aspect of food security through direct consumption or indirect: in pastry, savory, salad and tonic. Most hive products are high value food supplements, complementing health and beauty, thus supporting the notion, 'good nutrition, healthy body; good health, sound mind.' The bee is indeed an icon of food and nutrition security, leading to healthy individuals. Beekeeping may be integrated into farming systems for food and natural resource sustainability as stipulated in the Sustainable Development Goals and in the Vision 2030 of the Kenyan Government Agenda.

Biography

Grace Adala Asiko has a PhD Degree in Agricultural Entomology, obtained from the University of Nairobi, in 2012. She too has a Masters in Tropical Bees and Beekeeping in Tropical Climates, from Utrecht University, Netherlands, Awarded in 2004. Prior to that, Dr. Asiko had studied Botany, Zoology and Geography, at the University of Nairobi for her Bachelor of Science Degree. Dr. Asiko was employed by the Ministry of Agriculture, State Department of Livestock, and rose through the ranks to Deputy Director of Livestock Production. She is the current Head of the National Beekeeping Institute, Nairobi-Kenya, whose mandate include: Policy formulation, research and training in all aspects pertaining to beekeeping industry. She has authored and co-authored many scientific publications on beekeeping and the Agricultural sector at large. Most striking is the "Utumishi Bora Award," which was presented to her in 2017, by Kenya Professional Christian Forum, for work excellence, research and documentation, particularly in the area of stingless bee research. She has participated in several national and international seminars and conferences and is interested in professional presentations. She progressively positioned herself on the executive and technical advisory committees of re-knowned professional bodies/programs, with great zeal and commitment. She is contemplating teaching at the University, on part-time basis, as her drive is on mentoring.

The response of some productivity and quality traits of fodder beet (*Beta vulgaris* L.) to organic and potassium fertilizers in Syria

Entessar AL-Jbawi^{*1}, Hiba Shams Aldeen², Samir Shamsham³

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The production of forage crops is very important for livestock production in Syria, which contributes largely to the national income. Animal production in Syria depends mainly on natural range which is affected by rain fluctuations and low-quality grasses. This necessitates the introduction of irrigated forage crops in the irrigated schemes and in farms around cities like Damascus. There are many constraints facing forage production in Syria, like lack of information of forage cultivars and technological packages. Suggested solutions for these problems are application of technological packages, integration of animal production with forage production and introduction of new forage species of high yield (Al Jbawi, 2014) especially during periods of forage shortage like late winter and early summer.

Fodder beet (*Beta vulgaris* L.) is the focus of attention as forage crop in Syria. However, recommended agronomic practices for maximizing productivity are limited. The study was conducted on summer date (1st of September), during 2016/2017 season, to study the effect of organic and potassium fertilizer on the productivity traits of fodder beet, assigned in randomized completely block design (RCBD), arranged in split plot design with three replicates. The organic treatments (control, manure, sea weed extracts) were assigned in the main plots, while potassium treatments (90, 120, and 160 pure unit of K₂O/ha) were distributed randomly in the sub plots. The results of analysis of variance ANOVA showed a significant ($P \leq 0.05$) effect of potassium treatment on root and shoot weight per plant, root and shoot crude protein contents. The best treatment was K90 to get the best productivity and quality traits. In terms of organic treatments, the sea weed extracts surpassed the other treatments significantly.

Audience Take Away:

The audience will know the importance of new source of biofertilizer (sea weeds), which are increasingly used in crop production. Sea weeds are environmentally benign and safe for the health of animals and humans.

- Seaweed extracts includes many components such as macro- and microelement nutrients, amino acids, vitamins, cytokinins, auxins, and abscisic acid (ABA)-like growth substances affect cellular metabolism in treated plants leading to enhanced growth and crop yield. Also Plants sprayed with seaweed extracts exhibit enhanced salt and freezing tolerance.
- The audience will have a good experience in designing a field experiment of two factors, and how to analyze the results and explain it.
- Also the audience will have an overview about fodder beet growing in Syria.

Food, agriculture, nutrition and development

Agugo, Udodiri A; M.Sc, B.Sc.

Imo State Polytechnic Umuagwo-Ohaji, Owerri Nigeria

There is a strong link between food, agriculture, nutrition and development. Food is a product of agriculture while the knowledge, proper utilization of food nutrients and the processes nutrients undergo in sustaining life of an individual is based on nutrition. Apart from social and economic factors, food nutrients can also be influenced by agricultural practices, posing the agronomist with additional challenge of managing environmental impacts on the quantity and quality of food nutrients during cultivation in order to achieve healthy foods. Good nutrition is capable of improving people's physical and mental development, even their capacity to learn, work and exhibit their full potentials as human beings. On the other hand, development is seen as a process that builds on itself and involves all round changes especially from individuals, social and economic aspects. Food system, social and other environmental factors have been indicted for the delay in achieving good nutrition and national development. To correct this menace, a collective effort of government at all levels, nutritionists, food technologists, agriculturists and individuals is greatly needed. However, women's strong involvement and participation in the spread of nutrition education is capable of evolving positive change in food choices, promoting dietary diversification as well as achieving sustainable food system at the household level. Improving household food processing and storage facilities will facilitate the adoption and practice of research findings and recommendations. Just as adopting environment-friendly agricultural practices may enhance the quantity and quality of food nutrients while improving crop yields. This paper gives an overview of how social and environmental factors will influence human and national development; constraints that hinder the achievement of good nutrition and suggested right approaches that can transform the situation for better.

Biography

Agugo Udodiri. A is a lecturer with Imo State Polytechnic, an external examiner, and a recourse person for Nutrition and Dietetics programs all in Nigeria.

She possesses an M.Sc and B.Sc degrees and currently enrolled in a Philosophy degree (PhD) program.

She is a member of editorial board and reviewer panel of national and internet based journals; co-author of several journal publications; a co-author of several conference and seminar papers and a sole author of "Handbook of Nutrition and Dietetics".

She has passion for scientific research and conferences and great desire in promoting healthy life style using food nutrients.

Evaluating the nutritional and sensory qualities of supplementary mungbean diets

Agugo U.A¹, M.Sc, B.Sc, Asinobi, C.O², Prof. Ph.D, M.Sc, B.Sc and Afam-Anene, O, ² Prof. Ph.D, M.Sc, B.Sc.

¹Imo State Polytechnic, Umuagwo- Ohaji Owerri, Nigeria

²Imo State University, Owerri Nigeria

Objectives: The study evaluated four (4) recipes developed from mungbean (*Vigna radiata*) in supplement with some staple foods (rice, yam, and plantain) in south east Nigeria. The objective of the research is to enhance the nutrient composition of the selected staple foods, aimed at improving the iron bioavailability of the supplementary mungbean diets and to provide dietary diversification.

Materials and method: The principles of food-to-food fortification were applied to generate culturally acceptable plant-based diets. The recipe includes mungbean-rice jellof (MRJ), mungbean-yam porridge (MYP), mungbean-unripe plantain porridge (MUP) and mungbean-ripe plantain porridge (MRP). The traditional methods of preparing the selected diets were adopted with slight modification, which is the addition of tomato and vegetable (scent leaf). Nutrient (proximate and amino acid profile) compositions as well as the sensory properties of the diets were determined. The sensory qualities of the diets were determined by 15 (untrained) taste panels (school age children).

Results: It was found that all the porridge recipes with 70% mungbean supplementation which contains 75 g tomato ranked highest in taste (7.0- 8.9) and general acceptability (7.1 -8.2) in all the parameters, though not significant ($P>0.05$). The nutrient composition of the supplementary mungbean diets ranged from; 12.01 % - 18.34% (protein), 6.31mg – 7.73mg (vitamin C), 1.75 mg – 2.17 mg (iron) and 0.45 mg – 0.63mg (zinc). Supplementary mungbean diets were found to contain 18 amino acids including histidine (2.01-2.3 g/100g protein). The energy content of supplementary mungbean diets fell within the 376 -480 Kcal/100g recommended levels for infants and young children.

Conclusion: Yam and plantain (ripe and unripe) supplemented with 70% mungbean, in traditional porridge and 50% mungbean in jellof rice cooked with tomato and scent leaf were more acceptable.

Audience Take Away:

- The audience will have better understanding of the principles of food-to-food fortification which they can apply in their different traditions and culture in producing plant-based acceptable diets.
- The researcher's nutritional interest for the choice of food components will be made known during presentation for easy replication.
- The audience will be acquainted with another angle of dietary diversification aimed at improving bioavailability of micronutrients in plant-based diets.
- Knowledge obtained from the research procedures and outcome will be of help to lecturers and researchers in nutrition and its allied fields.

Biography

Agugo Udodiri. A is a lecturer with Imo State Polytechnic, an external examiner, and a recourse person for Nutrition and Dietetics programs all in Nigeria.

She possesses an M.Sc and B.Sc degrees and currently enrolled in a Philosophy degree (PhD) program.

She is a member of editorial board and reviewer panel of national and internet based journals; co-author of several journal publications; a co-author of several conference and seminar papers and a sole author of "Handbook of Nutrition and Dietetics".

She has passion for scientific research and conferences and great desire in promoting healthy life style using food nutrients.

DAY 1

POSTERS

Euro-Global Conference on

Food Science, Agronomy
and Technology

SEPTEMBER 20-22, 2018
ROME, ITALY

Bioactivity of coffee substitute

Renata Zawirska-Wojtasiak^{1*}, Prof Ph.D., D.Sc., Paulina Piechowska¹, M.Sc., Elżbieta Wojtowicz², D.Sc., Krzysztof Przygoński², D.Sc., Sylwia Mildner-Szkudlarz¹, Ph.D.

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Neuroactive β -carbolines in food are recently the subject of many studies consideration, so on the basis of our previous research (Wojtowicz, Zawirska-Wojtasiak, Przygoński & Mildner-Szkudlarz, 2015, Food Chem., 175, 280-283) chicory was chosen from among the traditionally used ingredients of coffee substitutes as the one with the highest carbolines content; artichoke was chosen from the few newly proposed ingredients using the same criterion. β -carbolines have been ascribed neuroactive effects in humans, however their positive or negative effect has not been confirmed yet. Two selected material as well as their mixtures were considered both from the neuroactive point of view but also in relation to the bioactive compounds that result from their thermal processing because of their possible toxic properties: acrylamide (ACR), carboxymethyllysine (CML) and furanes. The addition of artichoke to chicory should not be higher than 30% from sensory point of view. Chicory and artichoke contained high levels of β -carbolines. Artichoke appears to be a richer source of β -carbolines than the traditionally chicory, and its addition increases the concentration of β -carbolines. Both materials contained high level of undesirable components, such as furan and its derivatives, ACR and CML, higher in artichoke. The values for this toxic components, reported in this study, however high, they are not in the case of furan exceeded those in coffee or in case of ACR are far below EU recommendation. The antioxidant properties, measured by TP, ABTS and DPPH tests and concentration of phenols, of both materials were good and rather similar.

This study being the first step of further actually going on research, are expected to help in clarifying the problem whether drinking coffee substitute in every day diet might be beneficial or harmful for human health.

Audience Take Away:

- To get some knowledge about food (coffee substitute) chemical constituents and their positive or negative effects on human health. Comparison to other published data on the subject till now. A stimulus to think about composition of every day diet.

Biography

Renata Zawirska-Wojtasiak is a Food technologist, biochemist. She Graduated as M.Sc., Ph.D, D.Sc. and professor at Poznań University of Life Sciences, Faculty of Food Science and Nutrition. She has been Teacher and researcher, from 2009 and associated professor on Poznań University of Life Sciences. Her Main scientific interests: food chemistry, food aroma, enantiomers - aroma authenticity, sensory analysis and olfactometry, food technology, also lipids (fatty acids).

Effect of addition of flours from the novel lupine variety AluProt-CGNA® and flaxseed expeller on the rheological and functional properties of wheat bread

Traudy Wandersleben, Ph.D., Eduardo Morales, M.Sc., César Burgos-Díaz*, Ph.D.,
Agriaquaculture Nutritional Genomic Center (CGNA) Temuco, Chile

There is a great interest worldwide on healthy food and in the search of ingredients that could improve the nutritional value of a widely consumed food as bread. The use of supplements derived of natural sources as legumes and other grains have attracted great interest and it is highly desirable that the products used are free of genetically modified organisms and low cost. However, due to the consumers' preference for refined white bread, it is necessary to find a balance between nutrition and palatability in order to reach a larger population, therefore we tested three ingredients: lupine grit flour of a novel variety with the highest protein content available (AluProt-CGNA®, 60% of protein, dry matter), lupine hulls flour and flaxseed expeller flour (Kallfu-CGNA®, good source dietary fibre). This work presents the results on the dough rheological properties of different combinations of the main ingredients with wheat flour and also a consumer's acceptability test, conducted on 259 volunteers using the bread estimated as the best by its balance between rheology and nutritional value. The final bread had 125% more fibre and 55% more protein than the control bread; these increments were very similar to the ones obtained by previous reports but with half the amount of raw materials, due to the enhanced features of the grains used. The bread presented acceptability over 90% in all the aspects surveyed. In this work it was possible to find the appropriate blend to attenuate the effect of foreign ingredients over the bread rheology, which normally interfere with the gluten network reducing the quality of the bread, and also enhance its nutritional value.

Audience Take Away:

- The work shows the effect of the incorporation of different flours on the rheology of the dough of wheat bread.
- In our work we were able to find a blend of flours that improves the protein and dietary fibre content of the wheat bread with minimal effects on rheology of the dough.
- The bread produced with the selected blend of flours presents a high consumer's acceptability.

Biography

Ph.D. Burgos-Díaz is a Researcher at CGNA-CHILE. He is a specialist in food science and technology, whose main areas of expertise are encapsulation of bioactive compounds, functional properties of plant proteins and development of emulsions for application in the food industry. He has led several research projects in the mentioned topics and the results of his work have been published in several scientific publications and book chapters. He is currently leading a research project on "Microencapsulation of astaxanthin in a new food-grade Pickering emulsion system for increasing its protection and stability"; and a project on "Developing a premium protein isolate as a functional food ingredient".

Synthesis and evaluation of molecularly imprinted membranes by photo-grafting polymerisation method for the multiresidue determination of beta-lactams in milk samples

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During the last decades, molecular printing technology has received considerable attention as synthetic polymeric materials capable of generating specific binding sites, which mimic to selective biological receptors, and which can be used as new extraction systems for drug determination in food samples. In particular, the application of molecular imprinted polymers (MIP) in solid phase extraction (MISPE) systems is a field of intense development.

In addition, currently, membranes have become increasingly attractive for simple and efficient affinity separations. However, common commercial membranes do not allow for the selective separation of substances, so new methodologies have been proposed to combine molecular imprinting polymers and membrane technologies by developing stable and selective affinity membranes capable of separate specific target analytes from a mixture of structurally similar compounds. These molecularly imprinted polymer membranes (MIMs) have some advantages compared to isolated MIPs, such as high capacity due to their large surface area, faster transport of substrate molecules and faster equilibrium of the binding cavities.

The objective of this study focuses on the synthesis and characterization of new polymeric molecular printing membranes for the quantitative extraction and selective analysis of beta-lactam multiresidue (BLA) from milk. The fiberglass membranes were functionalized by photo-graft technique. Initially, the glass microfiber filters were subjected to a surface functionalization treatment for the incorporation of sodium diethyldithiocarbamate photoinitiator (DTC-Na) onto the surface of the glass substrate. As a second step, the surface modified glass filters were incubated with the polymerization mixture containing two template molecules (cloxacillin and cephalexin) of the other structurally related BLA, the functional monomer (MAA) and the crosslinker (EDGMA) in acetonitrile. The polymerization was carried out under a UV lamp (365nm at room temperature, 10h). The non-printed polymer membranes (NIM), used as a control, were also prepared using an identical procedure without adding the templates. The weight of the grafted polymer membranes was determined by gravimetry, and the morphology of the membranes was examined by scanning electron microscopy (SEM). The binding capacity of the synthesized membranes was tested in both discontinuous and continuous filtration experiments. A series of experiments were carried out to optimize the specificity, the extraction capacity and preconcentration of BLA from samples of sheep's milk, and also the regeneration of the membranes. The beta-lactam drugs were separated and quantified by HPLC-DAD.

The results showed that the synthesized MIM has a great potential to extract 9 beta-lactam antibiotics from sheep milk samples at levels below the limits (MRLs) established by the EU. The functionalized membrane exhibited high stability and reuse characteristics in a continuous filtration process without loss of bonding capacity after reuse. The methodology developed offers an easy and reliable alternative procedure to traditional methods of extraction consuming low volumes of solvents, which provides an alternative to other polymers and commercially available materials used in SPE.

Audience Take Away:

- It is important to emphasise the developed methodology is a new sample treatment methodology for beta-lactams antibiotics analysis in an easy, quickly and effective way by the application of the molecular imprinting technology.
- The new extraction method offers an easy and reliable alternative procedure, which consumes low volumes of solvents, it is environmental friendly character that makes it suitable for current green chemistry trends and offers an alternative to other polymers used in MISPE and commercially available materials.
- The molecular imprinting technology allows obtaining the adequate selectivity necessary for certain analytical determinations.
- The developed methodology can be used by other authors to design efficient and selective methods whose allow the sample preconcentration and clean up for the determination other compounds in different types of environmental, clinical and food samples.

Biography

Gema Paniagua completed her Ph.D. in the Analytical Chemistry program of the Department of Analytical Sciences at the Nacional de Educación a Distancia University, Spain. She worked to undertake post-doctoral research on the development of new methodologies to ensure control of food quality and safety, at University of Alcalá de Henares. Currently, she is working as a technician specialist of laboratory at Department of Analytical Sciences (UNED) and she is a member of the Research Group “Techniques and Methods of Chemical Analysis, GTyMAQ”, participating in various competitive National Research Projects. Her research areas are focused on the development of new analytical methodologies for sample treatment and the determination of antibiotics, estrogens and organic contaminants in environmental and food samples. She has presented papers at national and international Conferences, and she has published scientific articles in various JCR indexed journals.

Production and characterization of gellan aerogel microspheres using supercritical CO₂ drying

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Aerogels are a class of new materials, which have high porosity and surface area, and low density. Polysaccharides based aerogels have potential application in food, biomedical, and pharmaceutical applications due to their biodegradability, loading capacity of target compounds and controlled release. Based on that, the purpose of this work was to produce and characterize gellan aerogel microspheres using supercritical CO₂ drying. Solutions of gellan were prepared at 0.5, 0.75 and 1% (w/w) and heated for 30 min at 90°C. CaCl₂ solutions were used as crosslinking agent ranging the ionic strength (0.03, 0.06 and 0.09 M). Then, the polymeric solution was pumped (1 mL/min) and dripped through a nozzle (0.58 mm) into the crosslinking solution. Once gelled the microspheres were collected and subjected to solvent exchange, in which they were progressively immersed into ethanol/water mixtures (10, 30, 50, 70, 90 and 100%, v/v) for one day, except the last step that was repeated three times. Finally, the microspheres were dried with a continuous supercritical CO₂ flow at 40±1 °C and 12±0.5 MPa. The surface and shape of the hydrogel, alcogel and aerogel particles were examined by electron microscopy, and the data were processed by ImageJ image software. The reduction of the particle size between the processes was calculated and expressed as relative shrinkage. The hydrogel microspheres presented drop shape, and the circularity was 0.81±0.04. The increase of gellan concentration increased the hydrogel microspheres size, which ranged from 2.30±0.03 to 2.90±0.03 mm. The overall shrinkage (0.69-0.79) decreased as the gellan content increased. The aerogel microspheres size ranged from 1.15±0.02 to 1.519±0.10 mm. Supercritical drying is considered the best option for obtaining aerogel. Nevertheless, the shrinkage was larger than the observed in aerogels from other polymers. So, the study of techniques to reduce the gellan aerogel shrinkage is considered perspective for further works.

Audience Take Away:

- The knowledge about aerogel will make the audience able to explore aerogel universe since production until the product application.
- This work will help future works that will design gellan aerogels because the work presents ways to overcome the challenges of gellan aerogel production.

Biography

Juliane Viganó is Food Engineer, Master in Food Science and Food Engineer, Doctor in Food Engineer, and currently is Post-doctorate at the University of Campinas, Brazil. Dr. Viganó has worked with supercritical technologies applied to food wastes in order to obtain rich compounds to use in food and pharmaceutical products, and recently, Dr. Viganó has developed in cooperation with the Institute of Thermal Separation Processes of the Hamburg University of Technology a project on aerogel production.

Antioxidant activity of phenolic extracts from wild Mediterranean edible plants before and after *in vitro* digestion

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Wild edible plants have represented an important food source for the communities of the Mediterranean basin providing a relevant role in Mediterranean diet. The recent interest in wild edible plants is largely associated to their potential health benefits related with the richness in antioxidant compounds mainly phenolics. Nevertheless, these compounds, particularly flavonoids and phenolic acids, are metabolized after ingestion and gastrointestinal absorption, usually being transformed into plasma metabolites with lower antioxidant activity than the precursor molecules. The knowledge about the bioactive properties of underutilized plants could provide feedback about their value and agro-industrial potential and could also be used by gastronomic companies interested in the exploitation of these plants as additives or natural ingredients.

The aim of the present study was to evaluate the total phenolic contents and antioxidant activity of extracts from four wild edible plants (*Beta maritima* L., *Plantago major* L., *Oxalis pes-caprae* L. and *Scolymus hispanicus* L.) used in Mediterranean diet before and after *in vitro* digestion. The *in vitro* digestion consisted of a gastric phase and an intestinal phase using simulated gastric and intestinal fluids (Ryan et al. 2008). Total phenolic contents (TPC) were determined by Folin-Ciocalteu assay and antioxidant activity by the ABTS, DPPH and FRAP assays (Gonçalves et al. 2018).

The TPCs of *P. major* and *S. hispanicus* extracts were not affected by *in vitro* digestion. On the other hand, TPCs significantly decreased in *B. maritima* after both phases of *in vitro* digestion process and in *O. pes-caprae* after the gastric phase only. The radical scavenging capacity of the four extracts was mainly affected by the acid conditions of the gastric phase and the ferric reducing power was not significantly affected by the digestion conditions. Results showed that *P. major* extract has the highest TPC and antioxidant activity in all the assays, with considerable values even after digestion, reinforcing the health benefits of this species.

Audience Take Away:

- Conference participants may have opportunity to learn about the importance of wild edible plants in Mediterranean diet.
- The potential nutritional and health benefits of wild plants.
- To understand the importance of evaluate the biological properties of food matrices after gastrointestinal digestion.

Biography

Sandra Gonçalves is pos-doc research at the Plant Biotechnology laboratory of the University of Algarve (MeditBio) and her main research interests are the biological and chemical characterization of plant matrices, namely wild medicinal and/or edible plants; the propagation of plant species through tissue culture techniques; the application of biotechnological approaches to the germplasm conservation of endangered species of the Portuguese native flora; and the physiological and biochemical response of micropropagated plants to abiotic stress and ex vitro transplantation.

Use of a mixture of vegetal (kernel meal) and animal (fish silage) by-products as protein source in shrimp diets

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This study evaluated growth responses of the white shrimp *Litopenaeus vannamei* testing different combinations of *Jatropha curcas* kernel meal (JCK) and tilapia waste silage (FS) as dietary protein sources under laboratory and pond conditions. A reference diet (RD) based on fish meal was elaborated to contain 35% crude protein and 434 kcal/g; then, five isoproteic and isoenergetic experimental diets were formulated from RD with different FS/JCK proportions as follows: 75% FS/0%JCK (D1); 56.25% FS/13.25%JCK (D2); 26.5%FS/30.89%JCK (D3); 18.75%FS/39.75%JCK (D4); 0%FS/53%JCK (D5). For the laboratory trail, shrimp (2.90 g) were stocked at 10 m² in an indoor recirculating system during 90 days. There were differences ($P < 0.05$) among the growth parameters of diets. Mean weight gain fluctuated from 6.71 ± 0.61 g observed for the D1 diet, to 9.70 ± 0.61 g for the RD group. The RD and D4 diets obtained the highest mean final weight (above 12 g), weight gain (above 9 g) and specific growth rate values (above 1.6 %/d). Average final survival was 90.97%. The RD and D4 diets were used for the pond trail. Shrimps (0.49 g) were stocked at 10 m² within 1m³ cages into the pond for 35 days. Weight gain (3.47 g) and survival (93.33%) of shrimps were similar ($P > 0.05$) between the diets. Quadratic equations with the laboratory data indicated that the maximum responses for growth parameters correspond to FS and JCK inclusion levels of in the range of 27.83 to 29.00%, and 32.25 to 33.64%, respectively. A combination of 18.75% FS/39.75%JCK meals as protein source is a potential alternative to effectively substitute FM in practical diets for *L. vannamei* at the studied ages under both laboratory and pond conditions.

Audience Take Away:

- The audience may know an alternative for the use of agricultural by-products.
- It provides a practical solution to waste.
- The research provides new information on animal feed.

Biography

Hervey Rodríguez González is a Professor at Instituto Politecnico Nacional, Department of Aquaculture. He has over 10 years of applied research. Dr. Rodríguez has over 30 publications on aquaculture, including publications on aquaculture nutrition and feeding, and reproduction. Dr. Rodríguez has a B.Sc. in Biotechnology Engineer (specializing in aquaculture) from the Autonomous University of Guadalajara in 1997. Dr. Rodríguez earned his Ph.D. in 2006 from Northwestern Center of Biological Research.

Quantitative measurements of lead and cadmium in select street foods sold in Taft Avenue, Manila

Claire Pike Balubal

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Heavy metals are toxic substances which can be transmitted through air and can pollute bodies of water. They may contaminate a variety of products, including street foods. In this study calamares (fried squid rings) and isaw (grilled chicken intestines) samples were obtained from two (2) separate stalls in different locations along Taft Avenue, Manila. One kilogram of each sample was analyzed for lead (Pb) and cadmium (Cd) content using Inductive Coupled Plasma- Atomic Absorption (ICP-OES) Spectrophotometry. The results showed that the level of cadmium (Cd) present in the calamares samples exceeded the provisional tolerable weekly intake of 0.025 ppm set by the World Health Organization (WHO) in 2010. On the other hand, the level of lead (Pb) from the same samples was below the provisional tolerable weekly intake of 3 mg of lead/person, equivalent to 0.05 mg/kg b.w. for adults, set by IPCS INCHEM Organization, the Joint FAO/WHO Expert Committee on Food Additives. The lead content for calamares from both Estrada Street and Pedro Gil was lower than the provisional tolerable weekly intake. For future researcher it is recommended that other heavy metals should also be studied. Nowadays, pollution along area where vehicles are numerous is getting worse despite measure done by the government such as anti-smoke belching law. It is also recommended that leaded gasoline be totally banned, thus minimizing lead contamination of food sold along streets. Other streets or places where there are many street vendors that sell different kinds of food should also be studied. The results of these studies done and still to be done should serve as a basis for information campaign on heavy metals contamination of food.

Audience Take Away:

- This study can be an eye opener to the people for them to be aware on what the heavy metals are, how it can be accumulated in our body and also how to prevent it.

This study would benefit the following sectors:

Street Food Consumers: The study would help the street food consumers to become more aware of the possibility of the presence of heavy metals in street food. Thus, they would be more cautious when they buy street food.

Street food vendors: The study would help the street food vendors to become aware that heavy metals might be present in the food that they purchase and sell. Knowing this possibility would help them make necessary changes and decisions as to where they should purchase what they sell and where and how to sell them in such a worry that contamination of heavy metals is avoided.

Schools: The study would help Schools in monitoring the food sold in their canteen for the possible heavy metal content and other factors such as cooking oil, utensils and even the ingredients used since food contaminated with heavy metals is not restricted to street food.

Researcher: The study would help enhance the research skills of the researcher and become more aware of the heavy metals present in the street foods as well as the level of these heavy metals.

Biography

Claire P. Balubal was born and raised in a poor neighborhood in Manila, Philippines on April 13, 1994. She graduated from St. Scholastica's College, with a bachelor's degree in Biology and proceeded to work as a Quality and Safety Inspector in Cebu Pacific Air, an established local airline. She's been working for the airline for two frenetic, nonetheless, enjoyable years. Her graduate thesis was acknowledged among the scientific community due to its focus on the quantitative measurements of lead and cadmium in the street food sold along Taft Avenue, Manila. It exhibited the possible inclusion of heavy metals as a health risk in street foods, which can have insidious side effects, beside harmful microorganisms. Though she is a Biology major, the Filipino culture were more frightened of these microorganisms that she thought brining awareness to other detrimental factors is paramount. In her free time, Claire loves to pole dance and enjoys going out with friends. She plans to further her studies by taking Medicine and she also dreams of running her own pole dancing studio, Make up line and a Restaurant one day. She was grateful for growing up in a God-fearing family which she credits for her future and current success.

Effects of ginseng extracts on nicotine dependence

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Ginseng has been used widely as an herbal medicine across the world. Many studies have reported its chemical and pharmacological properties and the ginsenoside, a class of natural product steroid glycosides, was thought to be responsible for most of the pharmacological effects of ginseng. Because of these beneficial and functional effects of ginseng, the functional ingredients of ginseng were processed into various health functional foods in South Korea. Recently, some studies demonstrated that treatment of ginsenoside such as Rg1, Rb1 significantly attenuates cocaine-, morphine- or methamphetamine-induced increases in behavioral changes induced by dopaminergic neurotransmission in the brain reward system. However, its beneficial pharmacological effects on tobacco dependence have not been investigated. In this study, we will investigate neuropsychopharmacological mechanisms underlying the effects of ginsenoside in various ginseng extracts on the nicotine dependence using *in vitro* and *in vivo* study. Firstly, we will analyze the contents of ginsenosides in extracts from ginseng like plants using UPLC-MS/MS. Secondly, to select candidates of the ginseng extracts for *in vivo* study, we will evaluate dose- or time- dependent pharmacological effects of the ginseng extracts on dopamine-related protein expression in PC 12 cells using western blotting and immunocytochemistry. Thirdly, we will evaluate functional effects of the ginseng extracts on attenuating nicotine-induced psychomotor behaviors using open-field behavioral assessment, conditioned place preference, and self-administration. Finally, based on scientific evidence, we will develop and manufacture a health functional food including the ingredients of ginseng like plants to help quitting tobacco smoking. We also expect that the discovery of new functional effects of ginseng contributes to the development of the herbal science and food processing industry.

Biography

Joungwook Seo, Ph.D. is Group manager for substance abuse pharmacology group of Korea Institute of Toxicology. He previously served as Chief for Safety pharmacology center from 2013 to 2016. He received Bachelor's and Master's degrees in Biology and his Ph.D. in Pharmacology from Chungnam University. His research activities include cardiac toxicity, drug abuse and pharmaco- or toxicology for functional foods. He has interesting of cocaine and nicotine dependence and these modulation using functional foods now.

Natural compounds from grape by-products enhance nutritive value and reduce formation of CML in model muffins

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This study had the objective of determining the effects of the addition of different ingredients and grape by-products to muffins on CML content. It was found that ingredients, such as salt, baking powder and protein-rich components, reduced CML from 50% to 86%. The use of all ingredients simultaneously caused the highest reduction in CML, suggesting synergistic effects in the muffin formula. Raw cane sugar produced higher amounts of CML than refined sucrose, probably due to metal-ion mediated degradation of fructoselysine. The CML content was correlated with the level of oleic acid at 0.829 and with the level of linoleic acid at 0.913. Muffins enriched with appropriate levels of grape by-products (20%) showed a lowering of the CML level and no significant changes in the sensory profile. Grape by-products added to the model system with protein rich ingredients resulted in the weakest inhibitory effects, probably due to the polyphenol–protein binding mechanism.

Audience Take Away:

- Fruit by-product has potential as a bioactive food ingredient which can also increase the profits for grape growers while acting as a value-adding by-product of wine production.
- The exploration of ways of incorporating by-products as a health-food ingredient in the human diet could provide many health benefits.
- So far, there have been no reports on the addition of grape by-products to cereal-based products, which are consumed daily, or proving their protective effect against CML formation.
- Grape by-products might be successfully incorporated as AGE inhibitors.

Biography

Sylwia Mildner-Szkudlarz has a degree in Food Technology and Human Nutrition. She completed her Ph.D at Poznan University of Life Sciences in Poland, in 2005, and her habilitation in 2015. Her scientific interests focus on designing different cereal-based product with improved functionality and superior health effects using grape wastes, as well as the influence of food processing wastes on the rheological, nutraceutical, physical and sensory properties of cereal-based product. Since 2014 she has been focused mainly on the research into regulating the level of potentially harmful Maillard and caramelization reaction products in model cereal products fortified with fruit pomace as well as gluten-free bread. She has authored numerous publications in JCR journals. She was, also, head of several national projects. She is reviewer of international scientific journals.

Influence of oil and protein type on the stability of model infant formula emulsions

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Considering the frequent need to develop new formulations that contain functional appeal to meet the scientific and technological demands, the objective of this study was to evaluate physical properties and stability of model infant formula emulsions composed of different types of oils and proteins. Formulations containing 20, 30, 30 and 40 g L⁻¹ protein, oil, lactose and maltodextrin, respectively, were prepared using either whey protein isolate (WPI), whey protein hydrolysate (WPH), WPI+Lactoferrin (LF) or WPH+LF. The oil phase was composed of high oleic sunflower oil (HOSO), or a mixture of HOSO with medium chain triacylglycerols (MCT) or coconut oil (CO). Water soluble components were dissolved in deionized water, then emulsions were previously homogenized in a rotor-stator followed by passage through a double stage high pressure homogenizer (30/5 MPa), for 2 cycles. Droplets size, microstructure, viscosity and creaming stability of emulsions were evaluated. Regardless of the type of oil, all WPI emulsions remained stable for 1 day of storage. WPH emulsions were completely unstable from the first minutes, however, WPH + LF mixture allowed to obtain stable emulsions during the first hour. The good stability of the systems containing WPI was related to the smaller droplet size and the monomodal size distribution. LF addition may have promoted a greater interaction between droplets, reflecting in systems with higher viscosity. These stable emulsions could be further spray dried to be used as functional infant formulas.

Audience Take Away:

- It is intended to make clear which factors influence the stability of emulsions of model infant formulas.
- This work will help the public that works with emulsion stabilization. The context of this work may provide information for the development of infant formulas.

Biography

I'm Ph.D. in Food Engineering working mainly in the development of emulsification processes containing biopolymers and in the digestibility of these systems. I also work with rheological characterization of lipid gels, development of nanoparticles and demulsification processes.

Reduction of cholesterol and phospholipids profile in ewe's milk cheese by beta cyclodextrin

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Introduction: For the past 20 years, consumers have been reducing their fat consumption due to health concerns surrounding animal high fat diets. This trend has affected several food products. Dairy, egg and meat products have been considered to increase the risk for cardiovascular diseases in humans because, in comparison to other lipid sources, they contain a high proportion of cholesterol.

Objective: The aim of this work was the use of beta cyclodextrin (β -CD) with pasteurized ewe's whole milk for making cheese with the purpose of manufacturing low cholesterol food products.

Material and methods: I) Ewe's pasteurized milk was treated with β -CD II). Lipids were extracted from samples following a procedure described by an International Standard Method. III). Analysis of cholesterol was as described by Alonso et al. (J. Dairy Sci. 2009. Gross composition were determined by Alonso et al. (European Food Res. Technol.,185, 481, 1987). The PL content of the lipid extract was further analyzed by HPLC-ELSD (J. Dairy Sci. 2014).

Results and discussion: The cholesterol reduction in three months ewe's cheese was $91.31 \pm 2.35\%$ comparing with the control cheese with a percentage of reduction of 97.29 ± 4.56 . No difference ($P < 0.05$) were found for the different classes of phospholipids: Phosphatidylcoline; Sphingomyelin; Phosphatidylethanolamine; Phosphatidylinositol; Phosphatidylserina and total phospholipids between control milk and β -CD milk. Gross composition (fat, moisture and protein) did not show differences ($P < 0.05$). Nitrogen fraction (soluble nitrogen and non protein nitrogen) shows slight differences ($P < 0.05$).

Results from the present study suggest that the treatment with β -cyclodextrin can be applied to ewe's milk for making low cholesterol cheeses without altering the nutritional fatty acid properties.

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Biography

Leocadio Alonso, earned his PhD at Biochemistry department from the University Complutense of Madrid. He is scientist of the Spanish Council of Scientific Research (CSIC) in Spain. His research focused in the area of Food Science and Technology in the line of chemistry and biochemistry of milk fat (fatty acids, polyunsaturated fatty acids, conjugated linoleic acids, trans fatty acids, bioactive lipids compounds and cholesterol) in milk and dairy products. His scientific contributions include over 70 refereed scientific journal (SCI) and more than 10 technological Spanish journal (no SCI), monographs and chapter of books.

Differences in furanic and phenolic composition of *Ceratonia siliqua* L. liquors according to the roasting degree and variety of carob

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Carob liqueur is a traditional beverage made from crushed carob pods in different Mediterranean countries such as Portugal. The determination of the phenolic (gallic acid) and furanic (5-hydroxymethyl furfural and furfural) composition in different varietal roasted or unroasted carob liquors was assessed in this work by high performance liquid chromatography coupled with photo-diode array detection (HPLC-PAD). Three Portuguese *Ceratonia siliqua* L. varieties were used for the experiments, AIDA, Mulata and Galhosa, and these unroasted or roasted (at 120 °C and 150 °C) raw materials were macerated in fig spirit to produce the corresponding liquors. Gallic acid was the main phenolic compound found in samples and was in greater amount in the unroasted AIDA liquor. In the case of Galhosa and Mulata liquors, the roasting step was necessary in order to obtain higher quantities of gallic acid. However, the liquors elaborated with carob roasted at 150 °C presented concentrations of 5-hydroxymethylfurfural above the threshold of concern established by the European Food Safety Authority (EFSA). On the other hand, the content of furfural came from both raw materials used, the fig spirit and the carob pulp, mainly from the roasted fruit. Therefore, the present study indicates that different approaches must be taken into account when using different varieties on liquor elaboration. In addition, although the roasting step favors the organoleptic characteristics of the carob fruit, it should be borne in mind that it also increases the concentration of certain compounds that can become harmful to human health.

Audience Take Away:

- This is the first study carried out on the furanic and phenolic composition of carob liquors. The different chemical profile found in the carob varietal liquors studied highlights the fact that different approaches must be taken into account during the production of carob liqueurs depending on the variety of *Ceratonia siliqua* L. used in the elaboration. On the other hand, the roasting process of the carob fruit is a widespread practice to improve its organoleptic characteristics and acquire a cocoa-like aroma. However, the use of certain temperatures during the carob roasting process leads to the production of high amounts of compounds considered toxic at high concentrations. These results imply the establishment of protocols in the elaboration of these beverages, where the carob roasting would be included as one of the critical control points in the carob liqueur industry.

Biography

My name is Raquel Rodríguez Solana; I am currently a Postdoctoral researcher at the laboratory of Plant Biotechnology from University of Algarve (Portugal). My work is essentially focused on the study of the traditional Algarvian fruit (mainly fig and carob) spirits and liqueurs: from the raw materials, through the process of elaboration to the final product. Previously, during my thesis work, I also studied the elaboration process of traditional aged grape marc distillates and herbal spirits and liqueurs from Galicia (Spain).

Phenolic compounds and antioxidant activity of exotic fruits from Cerrado

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The excess of free radicals in the human body can result in pathological processes. Because of its chemical composition that presents bioactive compounds, among them polyphenols, fruits can be considered potential antioxidants against free radicals. The biome Cerrado (Brazilian savannah) presents exotic fruits with high concentration of bioactive compounds, due to their stressful conditions. Then, the fruits Pitanga (*Eugenia uniflora* L.) and mulberry (*Morus sp.*) grown in this biome were studied about their phenolic composition and antioxidant activity. The fruits were collected in the municipality of Luziânia, Goiás, Brazil. The total polyphenols (TP) contents and the scavenging capacity of the DPPH radical were determined. Pitanga presented TP of ~ 900 mg/100g of edible portion while mulberry showed ~ 3500 mg/100g. Radical capture capacity test showed a value for the pitanga of ~ 450 μ M TEAC/100 g and for mulberry of ~ 1900 μ M TEAC/100 g. High levels of phenolic compounds and antioxidant activity were found. Thus, we verified the fruits pitanga and mulberry from Cerrado of Goiás present high content of phenolic compounds and high antioxidant activity. The results of this work present the first description of phenolic composition and antioxidant activity of these fruits grown in the Cerrado of Goiás.

Audience Take Away:

- Mulberry and pitanga cultivated in the Cerrado of Goiás has interesting content of polyphenols and antioxidant activity.
- These fruits can be basis for future projects that can use the bioactive compounds and their advantages to development sustainable products.
- These results can provide data and stimulate other researches for the knowledge of native fruits of Cerrado, as well as stimulate the dissemination of fruits in other parts of Brazil.
- The knowledge of these Cerrado's fruit can increase the use and production of natural products.

Biography

He holds a Ph.D in Pharmacy from the Federal University of Santa Catarina (UFSC) (2002), a Master in Pharmacy (UFSC - 2005) and a Ph.D in Pharmacy (UFSC - 2010). Currently Professor of the Pharmacy Course at University of Brasília (UnB)/Faculty of Ceilândia (FCE). He has experience in the field of Pharmacy, with emphasis in Pharmacy, Biochemistry and Clinical Biochemistry, acting mainly in research, teaching and extension, in the following subjects: Phytochemical Studies; Biological effects of natural and synthetic products; antioxidant activities; hepatoprotection and hypolipidemic effects.

Fatty acid profile of cold-pressed camellia seed oil by ¹H-NMR and GC/MS

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Fatty acid (FA) and triacylglycerol (TGA) profiles of Camellia oils from the most cultivated species harvested in NW Spain were determined. High quality oils were obtained from *Camellia japonica*, *Camellia reticulata* and *Camellia sasanqua* by mild cold-pressed extraction. The unsaturated and saturated fatty acids were quantitated directly in the ¹H-NMR spectra through the relationship between the areas of a characteristic signal of each fatty acid by nuclear magnetic resonance spectroscopy (400 and 600 MHz). The results were compared with traditional methodology based in gas chromatographic (GC/MS). We discussed how the ¹H-NMR methodology rendering a simpler and faster analysis than conventional method based in GC/MS. The other aim of this work was the study of the advantages and disadvantages of the use of the NMR as an analytical tool.

Audience Take Away:

- Free and total fatty acid profiles of Camellia seed oil can be determined by ¹H-RMN and GC/MS.
- ¹H-NMR methodology; do not pre-treatment sample is necessary; analysis are simple and faster. Standard for calibration is not required. Short times and low reagent consumption. Don't derivatization process is applied. No waste production. Currently the costs are affordable.
- Magnetic field equal to or higher than 14.1 MHz (600 MHz) allow separated integrations of the signal from the tertiary glycerine H, and the vinylic ones.
- Magnetic field equal to or higher than 9.4 MHz (400 MHz) are essential to obtains optimal results analogous to GC/MS.

Biography

Efrén was born on 1976 (Spain). He completed his Ph.D. in 2006 graduated in Organic Chemistry from University of Vigo. He joined the research group lead by Prof. Angel de Lera to develop novel design of RAR-RXR receptor nuclear modulators. In 2008 reached the fellowship "Angeles Alvariño" that allowed to collaborate with the Instituto de Ciencia y Tecnología de Alimentos y Nutrición (CSIC-Madrid) on food research. He worked in pharmaceutical industry in quality control department (2012). Also in the European Reference Laboratory of Marine Biotoxins (2014) as responsible person. He is currently associate professor at Universidad Internacional de La Rioja.

The application of adsorption isotherms with proper fitting to interpret polyphenol bioaccessibility *in vitro*

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One of the ways of studying these complex reactions *in vitro* is to study the adsorption of polyphenols onto dietary fiber. The experimental results (the amount of polyphenols adsorbed onto dietary fiber q_e , and the amount non-adsorbed c_e) can be modelled with adsorption isotherm equations. Parameters obtained from these equations can help in the attempt to interpret adsorption process and by that to interpret bioaccessibility *in vitro*. But, adsorption isotherms require proper fitting to lower the error of models and to obtain correct parameters of adsorption equations.

The aim of this work was to study the adsorption between apple polyphenols and b-glucan, to model the experimental data with Langmuir, Dubinin-Radushkevich, and Hill adsorption isotherms with improved fitting, and to use corrected parameters from adsorption isotherms to interpret the adsorption process. Polyphenols were extracted from the flesh and peel of apples by using ultrasound assisted extraction and adsorbed onto b-glucan until the adsorption reached the equilibrium. The amount of total free polyphenols before and after adsorption were determined by using Folin-Ciocalteu method. The q_e (adsorption capacity, mg g⁻¹) and c_e (polyphenol concentration in equilibrium, mg l⁻¹) were modelled with equations of adsorption isotherms. Experimental data fitting (q_e and c_e) was conducted by using improved minimization of the sum of square errors. According to the results, polyphenols from peel adsorbed in a higher amount onto b-glucan than flesh polyphenols. Adsorption isotherms fitted according to the new, improved fitting, showed lower standard error and can be considered more accurate and precise for the interpretation of adsorption. According to new parameters, peel polyphenols showed higher theoretical, maximal adsorption capacity (q_m) and theoretical capacity of saturation (q_s). Parameter n_H points to the negatively cooperated bonding for almost all polyphenols. New, more accurate fitting allows safer insight into the bonding between polyphenols and dietary fibers and accordingly into the bioaccessibility explanation, *in vitro*.

Audience Take Away:

- The audience will understand the importance of proper fitting of data from adsorption process.
- The results of this study are interesting for many areas in which adsorption isotherms can be applied (like in chemistry, ecology, biochemistry etc.).
- The presentation will also give an insight into the bioaccessibility process and its importance in polyphenol bioactivities.

Biography

Lidija Jakobek is an associate professor at the Department of Applied Chemistry and Ecology, Faculty of Food Technology, Josip Juraj Strossmayer University of Osijek, Croatia. She has a Ph.D in food technology from Josip Juraj Strossmayer University of Osijek. Her research interests are food science, particularly polyphenols, their bioaccessibility and health effects, and polyphenol characterization.

Bioactive compounds and antioxidant activity of exotic fruits from Cerrado

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Cerrado is a biome known worldwide for its great biodiversity, which includes a wide range of fruit species such as hog plum and “jabuticaba”. Hog plum (*Spondias purpurea*) is a fruit native from Central America, belonging to the Anacardiaceae family. *Plinia cauliflora* (jabuticaba) is a Brazilian species cultivated throughout the country. These fruits have in its composition a content of bioactive compounds, which confer antioxidant properties, and consequently health benefits. This research evaluated the phenolic content and antioxidant activity of hog plum and jabuticaba, grown in Luziania-GO and Brasilia-DF, respectively. The appreciation of phenolic contents and antioxidant activity was performed from the extracts obtained from the skin of both the fruits using methanol and ethanol. The methanolic extract of jabuticaba presented the higher values of antioxidant activity (~ 9.600 and 5.500 $\mu\text{mol TEAC}/100$ g fresh skin by DPPH and ABTS, respectively) and also presented higher content of phenolic content (~ 11.500 mg GAE / 100 g fresh skin). The same profile was verified by hog plum where the methanolic extract obtained higher antioxidant activity than ethanol extract (~3.800 and 5.100 $\mu\text{mol TEAC}/100$ g fresh skin by DPPH and ABTS, respectively). The methanol extract of hog plum also presented higher levels of total polyphenols. All the jabuticaba extracts were more antioxidant and presented higher levels of phenolic components when compared to hog plum extracts. These data confirm the presence of antioxidants and phenolic compounds in hog plum and jabuticaba that can be used in research to generate new bioactive molecules as well as research on the beneficial effects of consumption of these fruits.

Audience Take Away:

- The knowledge of these Cerrado's fruit can increase the use and production of natural products.
- The fruits of these plants are basis for future projects that can use the extractions of the fruits in sustainable products.
- A description of the characteristics of the Cerrado's territory can promote this region and disseminate its biodiversity.
- In general, the knowledge of our biome is so important to know our nature and its potentials.

Biography

Author holds a degree in Pharmacy and Food Technology from the Federal University of Santa Catarina (2001); Master of Science in Food Science from the Federal University of Santa Catarina (2005); PhD in Food Science from the Federal University of Santa Catarina (2010). Currently Adjunct Professor at the University of Brasília (UnB), Campus Ceilândia (FCE). Experience in the area of Pharmacy and Food Science and Technology, with emphasis on Food Science and Technology, working mainly on the following topics: antioxidant activity, phenolic compounds, chromatographic analysis, fruits, maturation.

Using the ellagic acid-borax fluorescence interaction with cyclodextrin in a food samples nanosensor

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The food industry needs cheap, fast and sensitive methods to increase the number of analytes that are routinely made; for which reason, new methods are constantly being sought. This work describes a novel fluorescence nanosensor based on cyclodextrin (CDs) to determine ellagic acid (EA, a potential bioactive compound with biological benefits) tested in a blueberry extract.

The encapsulation of EA in the presence of borax was studied using a novel UV/mathematical method. Firstly, the complexation of EA-borax was tested to determine a concentration where EA was totally complexed. Moreover, the stoichiometry of the EA-borax complex showed a 1:2 (one EA per borax) complex, with a $K_{F1} = 2548 \pm 127 \text{ M}^{-1}$ and a $K_{F2} = 302 \pm 15 \text{ M}^{-1}$. Furthermore, when one borax is only presented, no fluorescence was shown. Different CDs (α -, β -, γ -, 2-Hydroxypropyl- β CD [CIDs 44134771] and Methyl- β CD [CID 10171019]) were used to obtain a 1:1:1 CD-EA-borax (one borax is released to enter a CD) complex and γ -CD provided the best complexation constant ($K_{F3} = 364 \pm 18 \text{ M}^{-1}$).

Furthermore, when the accuracy and sensitivity of the nanosensor were tested using a crude blueberry extract, the CD/borax mixture provided an 18 times stronger signal than the crude extract alone and 7 times stronger than the obtained by borax alone without any signal interferences. These results can be used to create novel methods to measure EA in different food samples, and, moreover, increases of knowledge of the EA-borax interaction.

Highlights:

- An exhaustive study of the fluorescence of Ellagic acid were carried out.
- The possibility to use this behavior as a sensor was successfully demonstrated.
- Novel UV/mathematical system was created to study its equilibrium.

Biography

Researcher, Professor and Popular Scientific. Dr. José Manuel López-Nicolás studied Chemistry in the University of Murcia where obtained a Ph.D in Biochemistry. With more than 100 scientific articles, his research currently focus on the field of Food biotechnology, where is specialist, among others, in encapsulation of bioactive compounds. Furthermore, he is one of the most famous Popular Scientifics in Spain where has published recently <<Vamos a comprar mentiras>> and has been awarded with practically all the Spanish-speaking prizes on popular science.

A safety survey on pesticide residues in tropical fruits depending on implementation of Positive List System (PLS)

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Purpose: As part of the safety management of residual pesticide in agricultural products, Positive List System (PLS) was newly introduced in Korea on December 31, 2016. With the application of PLS, uniform limit 0.01 mg/kg is applied as Maximum Residue Level (MRL) if MRL is not established. We performed a safety investigation of pesticide residues in tropical fruits under altered safety management system.

Materials and Methods: The total 120 samples of tropical fruits, which were distributed in GyeongGi-Do in 2017, were analyzed for 220 pesticides by multi-class pesticide multi-residue methods by using gas chromatograph and liquid chromatograph. Also, we conducted a validation study for analysis method.

Results: The 6 residual pesticides were detected from 7 samples; banana, mango and kiwi. The detected residual pesticides were azoxystrobin and chlorpyrifos in banana, chlorfenapyr in mango, and chlorothalonil, iprodione and procymidone in kiwi. Among them, chlorfenapyr in mango and chlorothalonil in kiwi were judged to unsuitable due to excess of MRL by applying PLS and all of them were domestic agricultural products. In the validation study, the values of limit of detection (LOD), limit of quantification (LOQ) and recovery were in the range of 0.003~0.01 mg/kg, 0.009~0.03 mg/kg and 72.0~114%, respectively.

Conclusion: The judgement to unsuitable of residual pesticides in agricultural products was increased by implementing PLS, so this system could be a burden to the farmers and those who import agricultural products. On the other hand, PLS that applied stricter criteria, can secure the food safety more clearly. In order to reduce the problems that can occur with PLS implementation, more guidelines for using pesticides and MRLs for agricultural products should be provided as well as promotion of the PLS policy, especially for farmers.

Audience Take Away:

- The audiences can learn about Positive List System (PLS), which is the one of the safety management system for residual pesticide in agricultural products.
- We conducted a safety investigation of pesticide residues in tropical fruits for 1 year and based on this research, we will share the effects on PLS that may be helpful for those who are considering instruction of PLS as a food safety policy for their countries.
- We will report the detection frequency of residual pesticide in tropical fruits, so the audiences can utilize these results to their research that is related with residual pesticide in agricultural products, especially tropical fruits.
- The audiences can understand the analysis method of pesticide residues in agricultural products.

Biography

Hyang-Ri Kang received a Bachelor's degree in Food Science and Technology from Pusan National University in 2014 and Master's degree in Pharmacology from Ajou University in 2016. She is currently working at Suwon Agro-fishery Products Inspection Center of GyeongGi Province Institute of Health and Environment as a research scientist.

Putgyul (unripe citrus) improved skin wrinkling and moisture content in a double-blind randomized clinic trial

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Owing to the increasing demand of products that delay or prevent skin aging, various products are currently being developed. Recently, the importance of skin care from both inside and outside the body, skin condition, and influence of external environment on the skin have been emphasized, and research on functional foods that can help maintain a healthy skin is actively conducted. In this double-blind, randomized clinical trial, we evaluated skin wrinkles, water content, glossiness, elasticity, and dermal density of the skin, which change as the skin ages, to investigate the effect of putgyul (unripe citrus) in improving skin condition. The subjects who were eligible for this study were asked to take test product containing putgyul extract (PE) once daily for 12 weeks. The parameters related to skin aging were measured in the PE and control groups after 0 (no consumption), 4, 8, and 12 weeks of PE ingestion. Skin wrinkle analysis using three-dimensional images showed that wrinkles improved significantly in the PE group after 12 weeks of PE ingestion compared with that before consumption ($P<0.05$). In addition, skin wrinkles significantly improved in the PE group compared with the control group ($P<0.05$). Moisture analysis of the skin epidermis and dermis showed that the moisture content of the cheek increased significantly in the PE group after 12 weeks of PE ingestion ($P<0.05$). The water content in the cheek epidermis significantly improved in the PE group compared with the control group ($P<0.05$). However, the water content in the cheek dermis showed no significant differences between the PE and control groups. Furthermore, the PE group tended to show an increase in skin gloss at 4, 8, and 12 weeks after ingestion compared with that before ingestion. No significant differences were observed between the PE and control groups. Dermal density analysis also showed similar results to skin gloss measurement. Analysis of skin elasticity (R2 parameter) revealed that skin elasticity in PE group significantly improved at 12 weeks of PE ingestion compared with that before consumption, but there was no significant difference between the PE and control groups. All participants in the PE and control groups responded positively to the five measures of effectiveness (increase in skin moisture, increase in skin gloss, improvement of skin firmness, reduction of crow's feet, and improvement of overall skin condition) and four measures of usability (color, ease of intake, satisfaction, and purchase intention). Nevertheless, there were no significant differences in all parameters between the PE and control groups. The analysis of skin adverse reactions revealed that erythema with itching occurred in one participant among the total 58 subjects, However, this was an isolated case and not considered a problem to skin safety as a whole, because no adverse reactions were observed in other subjects. Taken together, the findings of this study reveal that putgyul has the potential to serve as an anti-wrinkle and skin moisturizing ingredient in functional foods.

Audience Take Away:

- Putgyul (unripe citrus), a citrus fruit native to Jeju island in Korea, is highly valued as a new and functional food ingredient.
- Since putgyul has rarely been studied, research on a variety of functional food is possible for their professional research.
- Owing to the introduction of different methods for measurement of skin parameters related to aging, various equipment and experimental techniques can be learned and utilized in new research.
- In addition, the findings of this study will be of interest in cosmetic researches on functional food products that can enhance inner beauty through ingestion, rather than products enhancing beauty through external application.

Biography

Seona Yoon is currently the researcher of Jeju Biodiversity Research Institute (JBRI) in Jeju Technopark (JTP), Korea. She earned her master's degree from Jeju National University, where she performed researches on molecular biology related to metabolic diseases. She participated in various research projects using Jeju biological resources since starting studies. Yoon has published 15 papers and 5 patents, and she annually makes academic presentations in the field of food and cosmetics. In recent years, she has been focusing on putgyul (unripe citrus fruit) as an "inner beauty" product.

Bioactive compounds of yellow mombin (*Spondias mombin* L.) from the Cerrado (Brazilian savannah)

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S*pondias mombin* L. (Anacardiaceae), commonly known as “yellow mombin”, it is a fruit found in the tropical areas, and it has bioactive compounds that confer antioxidant activity. Thus, the aim of this work was to determine the concentration of the main phenolic compounds carried out from the extracts of the peel and the pulp of the yellow mombin, native to the Cerrado (Brazilian savannah) of the Federal District, Brazil. Total polyphenols, tartaric esters and flavonols were quantified applying spectrophotometric methods. Experimental results showed that the total polyphenol content was higher in the peel extract (~ 1,900 mg EAG/100 g fresh peel) than in the pulp extract (~ 1,700 mg EAG/100 g fresh peel). The results of polymerized polyphenols content showed the peel extract (~ 1,700 mg of catechin/100 g fresh peel) was higher than the extract of the pulp (~ 1000 mg of catechin/100 g fresh peel), and the opposite was observed for unpolymerized polyphenols (~ 170 mg and ~ 700 mg of catechin/100 g fresh peel, peel extract and pulp extract, respectively). Content of tartaric esters and flavonols quantified on the extracts showed that the peel extract content was higher values than pulp. The results obtained suggest that peel extract and pulp extract of *S. mombin* has a peculiar and interesting composition of bioactive compounds, that can be used in research to generate new bioactive molecules as well as research on the beneficial effects of consumption of these fruits.

Audience Take Away:

- The knowledge of these Cerrado's fruit can increase the use and production of natural products from this biome.
- The fruits of these plants are basis for future projects that can use the extractions of the fruits in sustainable products.
- These results can contribute at the further growth of exotic fruits and to help further the promotion of agro-regional development.
- A description of the characteristics of these fruits from the Cerrado's territory can promotes this region and disseminates it biodiversity
- In general, the knowledge of our biome is so important to know our nature and its potentials.

Biography

He holds a PhD in Pharmacy from the Federal University of Santa Catarina (UFSC) (2002), a Master in Pharmacy (UFSC - 2005) and a PhD in Pharmacy (UFSC - 2010). Currently is Professor of the Pharmacy Course at University of Brasília (UnB)/Faculty of Ceilândia (FCE). He has experience in the field of Pharmacy, with emphasis in Pharmacy, Biochemistry and Clinical Biochemistry, acting mainly in research, teaching and extension, in the following subjects: Phytochemical Studies; Biological effects of natural and synthetic products; antioxidant activities; hepatoprotection and hypolipidemic effects.

Investigation of whey protein-based side-streams as potential source of polar lipids-enriched dairy ingredients

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The increasing global demand for dairy-based products, paediatric foods and trends in health and wellness, are driving the growth of high-protein whey-based ingredients, such as whey protein isolate (WPI). However, production of WPI from liquid cheese whey generates a significant amount of a lipid-enriched co-product, known as whey protein phospholipid concentrate (WPPC). While the commercial potential of this co-product is not fully realised, WPPC contains significant proportions of the major (e.g., β -lactoglobulin and α -lactalbumin) and minor (e.g., lactoferrin) whey proteins, in addition to other valuable nutrients such as milk fat globule membrane (MFGM) proteins and polar lipids (PL). Previous studies have shown that PL (phospho- and sphingo lipids) derived from the MFGM have unique bioactive properties and beneficial health effects, (e.g., lowering blood cholesterol levels, brain development, immunity and gut physiology). Moreover, WPPC's techno-functional properties, (e.g., emulsifying properties and heat stability enhancement), make it interesting for use in numerous food applications, e.g., ice cream and bakery products. Nonetheless, WPPC's potential is still poorly exploited and the majority of the existent PL-enriched products available commercially are predominantly extracted from buttermilk. Therefore, driven by the need of understanding how the feed-process-composition interplay, the PL and protein partitioning of a non-commercial WPPC during WPI manufacturing was studied and compared with a commercially available buttermilk powder (BMP). The protein profile was assessed by SDS-PAGE. The PL and fatty acid profiles were determined using HPLC with ELSD and GC with FID respectively. Results have shown, that the WPPC sample contains 5 times more total PL (including sphingomyelin) as percentage of total fat, and 5 and 7 time more β -lactoglobulin and lactoferrin, respectively, when compared with BMP. Therefore, WPPC may be considered as an added-value ingredient and a potential PL-enriched ingredient, for future use in the formulation of new nutraceutical and functional foods.

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Biography

Leocadio Alonso, earned his Ph.D at Biochemistry department from the University Complutense of Madrid. He is scientist of the Spanish Council of Scientific Research (CSIC) in Spain. His research focused in the area of Food Science and Technology in the line of chemistry and biochemistry of milk fat (fatty acids, polyunsaturated fatty acids, conjugated linoleic acids, trans fatty acids, bioactive lipids compounds and cholesterol) in milk and dairy products. His scientific contributions include over 70 refereed scientific journal (SCI) and more than 10 technological Spanish journal (no SCI), monographs and chapter of books.

Encapsulation of bioactive compounds from *Plinia cauliflora* (jaboticaba) fruit peels extract

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Plinia cauliflora, popularly known as “jaboticaba”, is a Brazilian species cultivated throughout the country. Fruits of jaboticaba are a rich source of polyphenols, resulting in a potent antioxidant activity. As even the residues of the fruit contain high concentrations of polyphenols, use of the peel as a font of antioxidants is a sustainable alternative, but the instability of these compounds limits their application. The microencapsulation is a technique has been extensively used for the protection and controlled release of bioactive compounds. Then, microencapsulation of ethanolic extract of jaboticaba peels was conducted. The microparticles (MPs) were obtained by the spray-drying method using the chitosan polymer, with varying amounts of polymer and extract, and different drying conditions. After production, all MPs were characterized basing on the yield, encapsulation efficiency and morphology. From these results, we selected the best systems for characterization of size distribution, total phenolic content and antioxidant activity. The MPs presented an equivalent yield that ranged from 29.63% to 37.65% and it was observed a trend of yield increasing with the increase of the extract to the polymer ratio. The encapsulation efficiency ranged from 52.71% to 89.74%, and the highest encapsulation efficiency values were obtained in MPs with more concentrated extract ratio. Besides that, spherical morphology, with a smooth surface, mean diameter of ~ 9 µm. The best MPs selected presented highly efficient encapsulation of total polyphenols (~ 79%), significant antioxidant activity, zeta potential + 3.21 mV. It was possible to develop microparticles of jaboticaba peel extract, and these were able to protect the total polyphenols in the extract.

Audience Take Away:

- Our results can be used for application of these microparticles in products for the purpose of using the benefits properties of jaboticaba.
- Our studies show an efficient encapsulation technique for jaboticaba extract with quitosan. This research provides new information regarding an encapsulation technique of jaboticaba extract that provided stable and efficient microparticles
- Our results provide a practical solution to the difficulty of applying extracts of jaboticaba, since they have highly unstable active substances.
- This technique can be used to expand researches about natural products encapsulation.

Biography

Author holds a degree in Pharmacy and Food Technology from the Federal University of Santa Catarina (2001); Master of Science in Food Science from the Federal University of Santa Catarina (2005); PhD in Food Science from the Federal University of Santa Catarina (2010). Currently Adjunct Professor at the University of Brasília (UnB), Campus Ceilândia (FCE). Experience in the area of Pharmacy and Food Science and Technology, with emphasis on Food Science and Technology, working mainly on the following topics: antioxidant activity, phenolic compounds, chromatographic analysis, fruits, maturation.

A study on the Methylmercury (MeHg) analysis in marine products

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Gyeonggi Province Institute of Health and Environment

Purpose: Existing methylmercury analysis has the following defects: it requires a lot of time for pre-processing and solution must be prepared for every analysis. To improve these defects, we used microwave extraction method and acid-base refinement process.

Materials and Method: Analyzing methylmercury content in 670 marine products distributed in Gyeonggi province. We used the samples that contain more than 0.1 mg/kg of methylmercury to compare the effectiveness of the existing method and the new one.

Result: The optimal conditions for the microwave-assisted extraction was developed by using 10% NaCl solution as an extraction solution, setting extraction temperature at 50°C, and holding 15 minutes extract methylmercury in marine products. And NaOH solution was selected as clean-up substitute instead of L-cysteine solution which is unstable in room temperature. Finally the concentration of the solution was optimized to 2.0 N. Methylmercury was analyzed and compared by the current food code and the proposed method. Detection range of methylmercury were 75.25 (ND ~ 516.93) µg/kg for method of Korea Food Coded and 142.07 (100.14 ~ 244.55) µg/kg for proposed method. The total sample preparation analysis time of proposed method was reduced by more than 25%.

Conclusion: Reproducibility was found to be relatively good in the current method. The proposed microwave-assisted method is expected to be useful as a screening method in methylmercury analysis considering rapidity and economical efficiency. Deep-sea fish, the content of the methylmercury were high, indicating the need for the application of the new test method and continue monitoring of methylmercury content within deep-sea fish products.

Audience Take Away:

- We implemented acid-base refinement process and microwave extraction to improve complex preprocessor phase of existing food code research method when identifying methylmercury in marine products.
- The audience can learn about suggested method for pre-processing the specimen was more efficient in detection and saved more time than the existing method(Korea Food Code).
- The proposed test method will be useful as screening analysis method for overall marine poroducts considering its economics and speed.

Biography

Shin-hye Kwak is a research scientist of Ansan Agro-fishery Products Inspection Center of Gyeonggi Province Institute of Health and Environment. She received her Bachelor's degree and Master's degree of Food and Nutrition in 2014 and 2016 respectively. The focus of her graduate work has been in Food toxicity.

Production of gluten-free cookies with black mulberry (*Morus nigra*) paste

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Celiac (gluten intolerance), a disease caused by the consumption of gluten-containing foods, is now increasingly recognized by people with awareness and widespread among the people. The only effective treatment for this disease is the patient's lifelong gluten-free diet. Functional foods are healthful foods that provide essential nutrients. Ranging from bread through to biscuits, cakes and pastries; bakery products are consumed all over the world and an ideal matrix by which functionality can be delivered to the consumer in an acceptable food. The consumption of dark-colored fruits is important for human health. The pigments found in these fruits have positive effects on improving human health or reducing the risk of disease. Mulberry is a fruit that belongs to the genus *Morus* of the Moraceae family. The mulberry production is also significant in Turkey. The most common breeding species are *Morus alba* (white), *Morus rubra* (red) and *Morus nigra* (black). The aim of this study is to investigate the utilization of black mulberry (*Morus nigra*) paste in order to enhance phenolic content and antioxidant activity of gluten-free cookies produced by quinoa or buckwheat flour. In this study, gluten-free cookies contained paste of black mulberry that naturally grown in the Eastern Black Sea Region at 3 different rates (0, 10 and 20%) were produced. Quality parameters of cookies were evaluated by determining moisture, ash, crude fibre, protein, lipid, mineral, total phenolic content and antioxidant capacity. The moisture, crude fiber and ash content of cookies were increased with the increasing level of fruit paste addition. However, no significant differences among fruit paste concentration with regard to protein and lipid content were observed. It was determined that quinoa flour had higher value of macroelements (Ca, K) and microelements (Fe, Mn, Zn, Cu) than buckwheat flour. However, no significant difference among fruit paste concentration with regard to mineral content in cookies, except K, was observed. This could be attributed to the high K content of black mulberry paste. Both phenolic content and antioxidant activity values increased with increasing fruit paste concentration in cookies. According to the results, when the concentration of fruit paste was increased from 0% to 20%, the phenolic content of buckwheat cookies and quinoa cookies increased 32% and 43%, respectively. Additionally, the antioxidant capacity of cookies increased as well 64% and 254%, respectively.

Biography

Ulgen I. Konak was born on May 16, 1984 in Trabzon. She graduated from Ankara University Department of Food Engineering in 2007. She completed her M.Sc. in 2009 and Ph. D. in 2016 at the same department in Akdeniz University. She specializes in food analytical methods and functional foods. She has been working at Avrasya University, Department of Food Engineering as an Assist. Prof. Dr. since February 2017.

Phytochemical composition of fermented *Sorghum bicolor* extract

Young-Min Ham^{1*}, M.S., Seon-A Yoon¹, M.S., Ho-Bong Hyun¹, M.S., Dae-Ju Oh¹, Ph.D., Se Chan Kang², Ph.D., Weon-Jong Yoon¹, Ph.D.

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Sorghum (*Sorghum bicolor*) is an important cereal crop as it is generally more stress resistant than other crops, and thus more economical to produce under various environments. Sorghum plants contain various phytochemicals as secondary metabolites or integral cellular components. Our previous study showed that fermented Sorghum extract (FSET) has better antioxidant activity than non-fermented Sorghum extract (SET). Fermentation increased DPPH radical scavenging activities from IC_{50} ($\mu\text{g}/\text{Mg}$) 481.9 to 28.7 compared with non-fermented condition, with *Aspergillus oryzae* NK. This study investigated the differences in phytochemical components between SET and FSET caused by fermentation by *A. oryzae* NK. High-performance liquid chromatography with UV detection and liquid chromatography coupled with electrospray ionization tandem mass spectrometry were used for chemical fingerprinting and the identification of the compounds in SET and FSET. Quercetin-hexose was detected as the major compound in SET, but not in FSET. Fermentation significantly (840%) increased the content of ferulic acid, which was the major compound in FSET. The concentrations of quercetin, apigenin, and luteolin were decreased, whereas the taxifolin content was four times higher in FSET than in SET, and several flavonoids were newly detected after fermentation. In addition, changes in various phytochemicals were detected in FSET compared to those in SET. These results indicate that the increased DPPH radical scavenging activity in FSET is caused by changes in ferulic acid content, which is known as an effective radical scavenger. Thus, fermentation by *A. oryzae* NK increases DPPH radical scavenging activities in Sorghum extract and greatly affects the chemical composition. This study paves the way for further studies on the various biological activities of FSET and for the application *A. oryzae* NK-based fermentation systems in health food production.

Audience Take Away:

- Fermentation with *Aspergillus oryzae* NK changes the chemical composition of *Sorghum bicolor* extract.
- Specially, fermentation substantially increases the concentration of ferulic acid.
- Ferulic acid is well known as an effective radical scavenger and thus, this result correlates well with our previous finding that fermentation increases the antioxidant activity of Sorghum extract.
- Fermentation by *A. oryzae* NK is highly suitable to produce ingredients for health foods from sorghum.

Biography

Young-Min Ham is a researcher at the Jeju Biodiversity Research Institute at Jeju Technopark (Korea) since 2007. She obtained her M.S. in Chemistry at Jeju National University. Before she joined the JTP, she worked as a research scientist at COSMAX for two years. Ham has authored 30 scientific research papers and 43 patents. Her major research interests are natural product chemistry of plants from Jeju Island, chemical spectral profiling of natural product extracts, and the development of ingredients for healthy foods.

Antioxidant activity and protective effect of *Lindera glauca* Blume stem extracts on *t*-BHP-induced oxidative stress *in vitro* and *in vivo*

Yon-Suk Kim*, Xin Dong, Woen-Bin Shin, Jin-Su Park, Pyo-Jam Park

Department of Biotechnology, Konkuk University, Chungju, Chungbuk 27478, Korea

In this study, we investigated the antioxidant and protective effect of *Lindera glauca* (L. *Glauca*) stem (LGS) extracts. We compared antioxidant properties of water extract (LGSW) with ethanol extract (LGSE) by determining the contents responsible for antioxidant activities such as polyphenols and flavonoids. Antioxidant properties were also determined by ferric reducing antioxidant power (FRAP), and 2,2'-azinobis-(3-ethylbenzothiazoline-6-sulfonic acid) (ABTS) radical scavenging activity. Both LGSW and LGSE showed a strong inhibitory effect on lipid peroxidation measured by ferric thiocyanate (FTC) and thiobarbituric acid (TBA) values. Especially, LGSE showed a protective effect by increasing cell viability, decreasing intracellular reactive oxygen species (ROS) against tert-butyl hydroperoxide (*t*-BHP)-induced oxidative stress in Chang cells. Furthermore, LGSE showed the increased antioxidant related enzyme such as catalase, GST, GPX, and SOD gene expression against oxidative stress in zebrafish model. Our findings suggest that LGSE could be useful to develop potential therapeutic agents with protective antioxidant effects against oxidative stress.

Audience Take Away:

- Antioxidant and protective effect of *Lindera glauca* stem extracts on *in vitro* and *in vivo* model.
- Various antioxidant measurement methods.

Biography

Dr. Yon-Suk Kim is working as postdoctoral fellow in the Department of Biotechnology, Konkuk University, Chungju, South Korea. Her current area of research is to elucidate the role of bioactive compounds found in bio-resources. She received her Ph.D. degree from Konkuk University, South Korea, in understanding the importance of antioxidant and anti-inflammatory effects of plant extracts and their bioactive compounds. She has published more than 51 research papers in SCI journals.

Regulation and current status of temporary approval of novel food ingredient in the Republic of Korea

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Since 2010, Ministry of Food and Drug Safety (MFDS) has conducted the safety evaluation of novel food ingredients according to the regulation 'Temporary Standards and Specifications for Food Ingredient'. Novel food ingredients mean the ingredient which is no history of taking it as a food in Korea, and include the agricultural, livestock, marine products and microorganisms newly used in Korea not only that the ingredients produced by extraction, separation and cultivation of those raw materials.

Applicants could be anyone wants to approve as novel food ingredient including food processors, food importers, researcher and so forth. Data required for submission to approval of novel food ingredient are the scientific name, development details of original substances, domestic/overseas approval/use situation, method of manufacture, characteristics of applied ingredient and safety information (toxicity test data, safety and allergy information data and dietary exposure data, etc.).

By 2017, a total of 24 ingredients, including 10 cases of plant origin, 4 cases of insect, 6 cases of allulose, and 3 other cases, are approved as novel food ingredients. And, the approved ingredients are only available to those who are approved until those ingredients are registered in Food Code.

Of 24 ingredients, 4 cases of insect are available to anyone wanting to produce, process and manufacture, because of registration in Food Code.

In order to provide convenience and efficacy to applicants, MFDS issued the 'Safety Evaluation Guidelines for Novel Food Ingredients and has operated the prior consultation system.

Audience Take Away:

- Among the approved novel food ingredients, insects are Mealworm (*Tenebrio molitor Linne.*) larva, White worm (*Protaetia brevitarsis*) larva, Dynastid beetle (*Allomyrina dichotoma*) larva and Two-spotted cricket (*Gryllus bimaculatus*) and all sugars (8 cases) are allulose (liquid, powder) that is commercialized in Japan and the U.S.A.
- As a substance that exists in nature, allulose is found in small quantities figs and raisins, etc. Allulose has 70% relative sweetness to sucrose.
- The calorie of allulose is 0.2 kcal which is 5% lower than sucrose (4 kcal). Since 2017, Korea has continuously carried out national sugar intake reduction project and allulose will help reduce sugar intake as a low-calorie alternative sweetener.

Biography

I received a master's degree in food engineering from Pukyong National University. I have been working at the MFDS (Ministry of Food and Drug Safety) since 1996. In the past, food analysis (mycotoxin, heavy metals etc.) was done, and now the safety evaluation of novel food ingredients is being conducted.

Use of dietary fibers to develop bitter chocolates by reducing their fat and sugar content

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Nowadays more and more the consumers look for ingredients that when being incorporated in different types of products contribute nutritional properties; and especially low in calories, fats and sugars. Changes in people's habits have allowed to innovate in products in which traditionally the use of fibers has not yet been possible due to the impact that these can probably have on the technological and sensory properties; however, research has shown that these fibers have worked very well in bakers, snack and breakfast cereals. In Chile 47% of the population has added more fiber foods to their diet, despite this, only 2% of the new foods and drinks marketed worldwide in the last five years indicate as a differential value, their fiber content, inulin being the main fiber in 19% of foods, such as dairy products, snacks, bakery products, baby food, beverages or desserts and ice cream; in the USA the number of new products launched with inulin has decreased by 10%, however in Europe, inulin is added in almost 40% of the new products offered. The research carried out with mixtures of bamboo/soy fibers using sucralose as a sweetener in Bitter type chocolates will allow to deliver to the market alternative and healthier products satisfying the requirements of the consumers, due to the nonexistence of these in other markets of the world. The determination of insoluble fiber incorporated in the chocolates under study allowed to prove the existence of these in 19% in the product; as it also allowed reducing the percentage of total fats by 16%. The sensory study of acceptability and preference applied to 25 consumers at the pilot level indicated that the sample with 14% dietary fiber did not modify the sensory properties of the final product. This study will allow small companies to use ingredients with functional and nutritional properties in the area of chocolate contributing to the nutrition of consumers, because cocoa has a number of health benefits, such as polyphenols, stearic acid, epicatechin and flavonoids among others.

Audience Take Away:

- Muhammad Shoaib, A.S., et al. 2016. Inulin: Properties, health benefits and food applications. *Carbohydrate Polymers*, 147, 444 – 454.
- Vanja Todorovick, I. R. R., et al. 2015. Polyphenols methylxanthines and antioxidant capacity of chocolates produced in Serbia. *Journal of Food Composition and Analysis*, 41, 137 – 143.
- Yu Jin Kim, S.K., et al. 2017. Calorie reduction on chocolate ganache through substitution of whipped cream, *Journal of Ethnic Foods*, 4, 51 -57
- The audience as consumers will be able to use the information of these studies in their own benefit, since they will be even more informed of the benefits that the introduction of new ingredients entails in products that do not yet incorporate them, such as dietary fibers. On the other hand, when comparing they will be more informed of the nutritional labeling and their contributions.
- The audience will be able to help in this work by contributing with bi-directional feedback, and their contributions will be fundamental to know their perception of the world of chocolate and how to innovate with non-traditional ingredients without affecting their sensory acceptability. To expand the research it would be very auspicious to have the support of the Nutrition Faculty. This research provides a practical solution to a problem detected in the area of chocolate because the packaging materials and types of packaging used for this product should help to avoid damage to the environment being increasingly degradable; Therefore, given the characteristics of current markets, the strategic management of industrial design is an essential source of competitive advantages for companies in the medium and long term, therefore, it has a preponderant role in this field and could do more. Efficient your work knowing the competitiveness of the markets where the healthiest products are positioned. Other benefits are that through the design a social value is given to the products, such as: Produce satisfaction in use, be easily recognizable, fit well in the environment, be interesting and striking, meet high demands and be reliable as well have the ability to communicate.

Biography

I am a Food Engineer from the University of Santiago of Chile and Master in Agricultural Sciences with a major in Food Science and Technology from the University of Chile. My research has focused on applying innovation in bakery products, fruits and vegetables as well as in the area of chocolate and pastry products. All the innovations have been for example to use modified atmospheres in precooked and refrigerated "marraqueta" bread as well as the use of different types of dietary fibers to improve the nutritional and functional properties of the products.

Impact of herbicide use on the socio-economic conditions of the population and the environment

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In Côte d'Ivoire, the use of chemical herbicides tends to be widespread throughout the country and in all cultures. A survey of the users of these products revealed that their use has certain socio-economic and agricultural advantages. At the social level, Côte d'Ivoire experienced an increase in the school enrollment rate of children who left the fields for classes. At the economic level, it has been noted a reduction in the cost of production of agricultural products resulting in an increase in the profit of producers. On the agricultural side, the areas planted and yields have increased, conversely, the number of plots abandoned under the pressure of weeds has decreased. The introduction of herbicides in agricultural technical routes also has negative aspects. The low level of literacy of producers does not allow the efficient use of these products. Failure to adhere to recommended doses is common practice. Herbicide accidents are often noted. Several cases of intoxication of the populations were noted. In addition, the limiting measures of environmental and biodiversity impacts are almost non-existent. Actions at the state level to limit the risks associated with the use of herbicides are therefore highly recommended.

Audience Take Away:

- This presentation raises the issue of the use of herbicides in Côte d'Ivoire. It presents the advantages of using herbicides but emphasizes the health, biodiversity and environmental problems that these products may cause. It aims to sensitize decision-makers on the need to train users on good phytosanitary practices.

Biography

Joseph Ipou Ipou is Professor of weed science at the University Felix Houphouet-Boigny of Ivory Coast. He has done several works in the field of weed control. Its main results have been promoted through publications and communications in national and international symposium. He has participated in the implementation and execution of several research projects in his discipline and in other field of botany. He is currently a consultant to the Ivorian Ministry of Agriculture about the problems of phytosanitary products in general but especially for the evaluation of the biological efficiency and the selectivity of herbicides.

Effects of the levels of soil water deficit, duration of soil water shortage on different rice cultivars

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The main factors affecting the drought of rice include the levels of water deficit in paddy soil, the duration of soil water shortage, and the drought resistance of rice varieties. In order to clarify the effects of the above drought factors on the growth characteristics and yield traits of rice, and the stable yield mechanism for it, the pot experiment with 3 factors (2 drought resistant rice varieties × 4 soil water deficit levels × 3 soil water shortage duration times) were implemented during the rice growing season in 2017. Among them, 2 varieties were adopted as: C1 (Nanjing 9108) and C2 (Huaidao 5#); 4 soil water deficit levels were treated as: T1 (light drought with mild soil water shortage at soil relative humidity 90% + 5%, LD), T2 (medium drought with medium soil water shortage at soil relative humidity 80% + 5%, MD), T3 (severe drought with soil relatively heavy water shortage at soil relative humidity maintained at 70% + 5%, SD), and T4 (extreme drought with soil severe water shortage at soil relative humidity of 60% + 5%, ED); 3 soil water shortage duration treatment, respectively: W1 (drought 10d), W2 (drought 20d), and W3 (drought 30d). A total of treatments were 24 with 5 repeated. The growth characteristics (rice plant height, tiller number, ear number, stem weight, dry weight of leaf, dry weight of ear, and SPAD value of chlorophyll content) and yield traits (grain number per spike, empty shrunken rate, and 1000 grain weight) were measured by sampling at different growth stages. The water deficit levels effect, times effect, and variety effect of rice drought were preliminarily analyzed. The results showed that: 1. With the increasing of soil water deficit levels and the increase of soil water shortage duration, the index of growth characteristics and yield traits of rice decreased obviously. 2. In general, the effects of soil water shortage duration on rice were generally greater than that of soil water deficit levels; 3. The SPAD values for various cultivars had a general response to only under the severe drought and extreme drought with the longer soil water shortage duration, and that of under the mild drought and moderate drought treatment in short soil water shortage were not obvious. 4. Compared with C1 (Nanjing 9108), C2 (Huaidao 5#) in the mild drought with short soil water shortage duration had a better stable yield effect, while there was no significant different from C1 (Nanjing 9108) on the stable yield effects for the long duration of the severe drought.

Audience Take Away:

- Based on this study, it can be used in answer drought stress and rewatering in rice production, selection of irrigation practices, and selection of drought resistant varieties.
- The approach will attempt to improve agronomic techniques for rice cultivation in most of the world's seasonally dry countries, and it will help the audience in their job.

Biography

Ge Dao-kuo received a bachelor's degree from Nanjing Agricultural University in 1992. Currently, he is a professor at the Institute of Agricultural Information of the Jiangsu Academy of Agricultural Sciences. In the past 10 years, he has undertaken more than 20 national and provincial-level projects, presided over or participated in 6 national patents, 8 national computer software copyrights, and published more than 40 Chinese and English papers in core journals. His research interests include agricultural big data, crop growth simulation models, and hyperspectral diagnostics.

Protein-based edible coating minimizes fat-uptake during deep-fat frying

Reza Tahergorabi, Ph.D.

NC A&T State University

During deep-fat frying, oil not only serves as a heating medium but also is absorbed by food, increasing the total fat content. For example, lipid content in fish increases from 1.4% to 18% after frying; lipid content of French fries increases from 0.2% to 14% after frying; and lipid content may reach 40% in potato chips. High consumption of fried foods has been associated with health problems such as coronary heart disease, obesity, type 2 diabetes and cancer. Therefore, there is great interest in reducing fat uptake during deep-fat frying. Water evaporates rapidly during deep-fat frying and is replaced by oil. If we reduced water loss, oil uptake would also be reduced. Edible coatings can act as barriers to moisture loss, which is important commercially, and thereby reduce fat uptake during frying. Filleting fish for frying generates large quantities of by-products (frames, heads and meat left over on the bones and skin). These by-products are good sources of proteins that could be recovered and used as coating materials. Further, these proteins could function as a fat blocker to reduce the fat uptake. Application of fish proteins as a coating for fried fish, which are rich in these proteins, is novel and product friendly. In this presentation, impact of an edible coating prepared from fish protein on fat-uptake reduction of deep-fat fried fish will be discussed.

Audience Take Away:

- The audiences will learn about new techniques and state-of-art of knowledge in development of low-fat fried food products.
- This work is reproducible and other faculty could use it to expand their research and teaching
- it will benefit the food industry to reduce the fat uptake in fried foods particularly fried muscle foods which are very popular in Western countries
- The current edible coatings used for reducing fat uptake are not product friendly. However, the newly designed edible coating is novel and product friendly.

Biography

Dr.Tahergorabi is an Assistant Professor in Food and Nutritional Sciences at NC A &T State University (USA). His main research interest includes seafood by-product utilization and functional food product development. He is a professional member of Institute of Food Technologists (IFT) and a lifetime member of Phi Tau Sigma. He received his Ph.D. from West Virginia University. He has completed his first post-doctoral work at Oregon State University's Seafood Research and Education Center and a second post-doc at Purdue University. He has been PI Co-PI of more than 10 research projects and he is author or co-author of more than 40 publications, and he has 60 professional presentations and one webinar in his publication and presentation list.

DAY 1

E-POSTERS

Euro-Global Conference on

Food Science, Agronomy
and Technology

SEPTEMBER 20-22, 2018
ROME, ITALY

Health risk assessment for peri-urban grown food crops in Kibra slum, Kenya

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Peri-urban farming in Kibra slum, Nairobi is observed to use contaminated water or growing food crops alongside contaminated water sources. The alarming levels above the European Union limits for elements in kales, amaranthus, arrowroots and spinach from the area have been reported as a concern to human health. The daily intake of metals (DIM), Target hazard quotient (THQ) and incremental lifetime cancer risk (ILCR) were employed as indices for health risk assessment for selected essential (Mn, Mg, Cu, Fe, Zn and Al) and non-essential (Cr and Pb) elements of food crops grown in Kibra slum. A randomized block design was used to obtain samples of arrowroots, amaranthus, kales and spinach from six farms. Analysis of the elements was done using AAS. While only Cr and Pb in the foods were above the EU limits, the DIM of Fe and Mn and THQ for Mn and Fe implied health risk according to FAO/WHO. Consequently the ILCR index for Pb showed 0.043% of Kibra slum populations were likely to develop cancer in a lifetime.

Audience Take Away:

Knowledge on health risks associated with consumption of foods will be exposed

- Research gaps in the field of study will be realized.
- An avenue for collaborative research will be presented.

Biography

Dr Nawiri Mildred is a female analytical chemist, senior lecturer, mentor, and Director of University Industry Partnerships- Kenyatta University, Kenya. Her expertise is in food analysis with passion to improve health of children and general public in developing countries facing challenges from non-communicable diseases and malnutrition. She has 10 years' research experience, more than 20 publications and attended numerous local and international conferences. She embraces networking and collaborations and is focused to seek long term solutions through shelf products of vital carotenoids from available indigenous species of fruits and vegetables. She aspires to be a visionary leader that embraces entrepreneurship.

Extraction of Anthocyanins from grape skin

Zar Zar Oo

Industrial Chemistry Department, Yadanabon Univeristy, Mandalay, Myanmar

Color is one of the most important quality attributes on the consumer's acceptance of food since it gives the first impression on food quality. Natural colorants are usually extracted using either water or lower alcohols for water soluble pigments and organic solvents for lipophilic pigments.

In this research, anthocyanins were extracted from grape skin by using 95 % ethanol solution. The effects of extraction time, extraction temperature, ratio of material to solvent on yield of product were investigated. Phytochemical tests were also conducted on the resultant anthocyanins. They were also identified by Thin layer Chromatography Ultraviolet Spectroscopy (UV), and Infrared Spectroscopy (IR). The optimum conditions for extraction of anthocyanins from grape skin are 50 °C extraction temperature, 4 hours extraction time and material to solvent ratio 1:5 (w/v).

Biography

Zar Zar Oo is an assistance lecture at the Yadanabon Univeristy. She recieved her B.Sc (qualified), M.Sc (Credit) from the Yadanabon Univesity. She completed her M.Res (credit) and ph.D (credit) in the Department of Industrial Chemistry from the University of Yangon, Myanmar. She is the author of American journal of food science and technology (2017), American Scientific Research journal for Engineering Technology and Science (2017), Engineering publication house (2017), International Journal of Development Research (2017) and International Journal of Information Research and Review (2107). She has published e-book at the Lambert Academic Publishing from Germany (2018), 6 articles, one conference paper: International Postgraduate Symposium on Food, Agriculture and Biotechnology (2107) in the domains of food science and technology.

DAY 2

KEYNOTE FORUM

Euro-Global Conference on

Food Science, Agronomy
and Technology

SEPTEMBER 20-22, 2018
ROME, ITALY



Biography

Dr. Nfor has a PhD in higher education and administration from University of the Incarnate Word, and two master's degrees in Biotechnology (University of Texas at San Antonio) and Zoology (University of Buea), he is also a nurse and a medical laboratory technologist. He is the founder and coordinator of St. Philip's college Jessica's Project, a civic engagement organization geared at educating students on current diseases. Founder and president of Past Present Future Africans (PPFA) Foundation, a non-profit organization that builds libraries and donates books as well as provides adult education at the libraries in Africa. Dr. Nfor is also the owner of the Kafe Kora, a fine neighborhood pub for working people in San Antonio.

Using civic engagement learning model to tackle serious issues in our local communities at an HBCU/HSI college

Dr. Solomon Nfor

St. Philip's College, 1801 MLK DR., San Antonio, TX 78203

Jessica's project is a non-profit organization affiliated with the with St. Philip's College in San Antonio, Texas. It is a civic engagement program that brings faculty, staff, and students together impact change on various topics including education into diseases associated with diet, teenage and unplanned pregnancy, the operation of community gardens, hunger banquets, educational disparities. It also has an international footprint through the building of libraries in Cameroon, and the donation of used textbooks. My talk is going to be focused on our journey as an organization and the importance of tackling important issues affecting our local communities and getting students and faculty involved.

Because of their low-income status, many east side citizens resigned on healthy lifestyle as being associated with the rich and affluent. A notion we are intent to erase by the special collaborative program engineered by our team at St. Philip's College.

1. Encourage healthy eating habits through lunch and learn workshops at the garden or various nutrition programs hosted by the churches.
2. Educate the community on related diseases through active research by students and poster presentation.
3. Encourage a culture of giving even when you think you don't have.
4. Increase routine medical check ups for adult and teenagers by hosting wellness week on campus with free medical check up.
5. Increase our college's footprint internationally.

Audience Take Away:

This presentation will give the participant an opportunity to understand what it takes to get a civic engagement project off the ground.

Participant Outcomes:

- design a community based project
- integrate learning assessment into civic engagement
- Critical reflection on progress of project



Organic egg production in the USA

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Eggs are one of the cheapest and most commonly consumed commodity in human nutrition. They are rich in high-quality protein, vitamins and trace minerals. Egg quality is very important for consumers. Hence, egg quality can be used as reference promotional strategy in global marketing. The term “Organic” refers to the way livestock and agricultural products are raised and processed avoiding the use of chemicals and pesticides. Since the USDA implemented the National Organic Program (NOP) in 2002, the growth of organic food market increased as much as 20% annually with organic poultry products. Organic livestock husbandry practices focus on living conditions that allow natural animal behaviors and provide outdoor access. Moreover, the use of antibiotics and other drugs is strictly regulated. Additionally, birds raised in organic system are fed organic feed and pasture raised without synthetic fertilizers and pesticides only. Egg yield and quality parameters can be affected by the rearing system. Different husbandry systems are available in commercial egg production such as cage, free range, and furnished cage. The cage system is the most common. However, it’s been a controversial subject among advocates for animal welfare and animal rights. As consequence, the EU banned battery cage husbandry of chickens in January 2012 for welfare reasons. In the USA, battery cages are also banned in few states, i.e. California in 2008, Michigan in 2009, and Ohio in 2010. Oregon also banned battery cages in 2011 and set for a transition to enriched colony cages, doubling the space per egg-laying hen. Still approximately 95% of eggs in the USA were produced in battery cages. Cage-free shell egg production accounted for 9.9% of the current table egg layer flock (30.0 million hens). Of this, 4.5% are organic (13.5 million hens) and 5.5% are cage-free (16.6 million hens). Currently, the top ten egg (table and hatching) producing states (ranked by number of layers represented in thousands) in the USA are: (1) Iowa – 45,459; (2) Ohio – 32,604; (3) Indiana – 28,437; (4) Pennsylvania – 25,841; (5) Texas – 19,302; (6) Georgia – 18,773; (7) North Carolina – 14,459; (8) Arkansas – 13,375; (9) Michigan – 12,951; and (10) California – 11,870. Among these states, the highest organic poultry-producers were California, Pennsylvania, and Nebraska. Commercial organic poultry production in the USA is raised under intensive, large-scale conditions similar to those in the conventional industry. However, producing organic food tends to be costlier along every part of the supply chain — including farming practices that usually require greater labor inputs and segregating organic ingredients from conventional ones. Organic eggs, milk and salad greens can cost upwards of 60% more than conventional alternatives, while items like apples, carrots, granola and spinach carry premiums of between 7 and 30%. Although there may be logical reasons for the heftier price tag, does it really make sense as a consumer to pay more for organic food? In a survey conducted by Synovate for Whole Foods Market Inc. In the USA in 2004, for example, consumers ranked their rationale for

purchasing organics as being environmentally friendly, locally produced, healthier, high quality, and better tasting. From an economic point of view, consumers are willing to pay more for organically produced eggs compared to conventional ones. The comparison of egg prices of a dozen large white eggs between organic price vs conventional price in the eight top supermarkets in the USA as follows: (1) Safeway (\$4.99 vs \$4.39); (2) Amazon Fresh (\$5.69 vs \$3.59); (3) Peapod (\$4.89 vs \$ 3.29); (4) Fresh Direct (\$5.49 vs \$3.19); (5) Whole Foods (\$3.99 vs \$2.29); (6) Walmart (\$4.68 vs \$2.68); (7) Price Chopper (\$4.49 vs \$2.49); and (8) Harris Teeter (\$6.49 vs \$2.19). In other countries like the UK, for example, hens in enriched colony systems account for 52% of the total throughput whilst organic or free range eggs account for 43% of the total. Furthermore, of the total Australian hen production about 43 million dozen free-range eggs are sold in supermarket each year, from which 34 % are organic free-range eggs from hens housed in sheds with access to outdoor range and similar to the USA these speciality eggs are sold higher than the conventional cage eggs (\$ 4.99 vs. \$ 3.59). In conclusion, organic poultry in the USA are raised according to the USDA NOP livestock requirements in 2002. Organic eggs produced by n organic cage-free hens have long been a more expensive choice compared with conventional eggs from hens raised in cages. There is no influence of housing environment (organic or cage) on nutritive value of eggs. Organic eggs are heavier in egg weight and β -carotene levels were also higher in organic eggs which may have contributed to the darker colored yolks compared to the cage eggs. Eggs from an organic production did have higher levels of total fat than eggs produced by caged hens, but they did not have higher levels of cholesterol. Consumers ranked their rationale for purchasing organics as being are environmentally friendly, locally produced, healthier, high quality, and better tasting and they attribute those characteristics to the following: (1) fertile eggs are more nutritious than infertile eggs; (2) brown shell eggs are more nutritious than white shell eggs, or vice versa; (3) an egg with a deep yellow yolk colour is higher in nutritive value than those of a lighter shade; and (4) organic free-range eggs are higher in nutritive value than eggs from cages. Although a tasting panel indicated a preference for organic free-range eggs when they were fresh and they could see what they were eating, blindfolded they could not tell the difference between those produced on range or in cages. But none of the tests carried out by Department of Catering and Domestic Studies, Stafford College of Further Education, showed a statistically significant difference in preference. Thus, the preference for eggs laid by hens kept on organic free range or eggs laid by hens kept in cages is still a matter of debate within consumers.

Biography

Yusuf Leonard Henuk is a Professor in the Department of Animal Science, Faculty of Agriculture at University of Sumatera Utara (USU), Medan, North Sumatera, Indonesia. He received a Bachelor's degree (S1: 'Sarjana') from the Faculty of Animal Science, the University of Nusa Cendana from 1980-1984. He obtained Master in Rural Science (M.Rur.Sc.) from the University of New England from 1991 – 1995 and continued Doctor of Philosophy (Ph.D) from the University of Queensland from 1998 – 2001.

He participated in the courses of "Arabic Language" and mainly "Poultry Production and Health" from 15 January – 31 March 2008 organized by the Egyptian International Centre for Agriculture (EICA), Cairo, Egypt. He was a twice Visiting Professor to the Department of Poultry Science, Texas A&M University, College Station, USA (September – December 2010 & 2017). Prof. Henuk was a prolific writer and has published many articles in international journal and mainly poultry science, e.g. World's Poultry Science Journal as well as international scientific meetings as such as 1st International Conference on Native Chicken ("Invited Speaker": Khon Kaen-Thailand, 23-25-02-2015); 5th International Conference on Sustainable Animal Agriculture for Developing Countries ("Invited Speaker": Pattaya, 27-30-10-2015); The 37th Malaysian Society of Animal Production (MSAP) Annual Conference ("Plenary Speaker": Hatten Hotel, Mallaca, 1-3-6-2016); The 1st International Conference on Tropical Animal Science and Production ("Invited Speaker": Ambassador Hotel, Bangkok, July 26-29, 2016; 25th World Poultry Congress) ("Invited Speaker": China National Convention Center, Beijing, 05 – 09 September, 2016); The 3rd Animal Production International Seminar & The 3rd ASEAN Regional Conference on Animal Production 3rd APIS & 3rd ARCAP ("Keynote Speaker": Royal Orchids Garden Hotel, Batu Malang, Indonesia, 19-21 October 2016); 2nd International Conference on Plant Science & Physiology ("Keynote Speaker": Avani Atrium Hotel Bangkok, Bangkok, Thailand, 26-27 June 2017); 8th International Conference on Animal Health and Veterinary Medicine ("Keynote Speaker": Park Inn by Radisson, October 20-21, 2017, Toronto, Canada); 6th World Waterfowl Conference ("Oral Presenter": October 22–25, 2017, Howard Civil Service International House, Taipei, Taiwan); 3rd International Conference on Veterinary & Livestock ("Keynote Speaker": Avani Atrium Hotel Bangkok, November 02-03, 2017 Bangkok, Thailand); 9th Global Veterinary Summit ("Keynote Speaker": Hampton Inn Tropicana, November 16-17, 2017, Las Vegas, Nevada, USA); and Euro-Global Conference on Food Science, Agronomy and Technology (FAT) ("Keynote Speaker": September 20-22, 2018 at Rome, Italy).



Biography

Dr. Kiran Dande is Associate Professor and Head Department of Dairy science at Mahatma Basweshwar College, Latur (INDIA). As an academic and researcher working in the areas of sustainable agriculture, animal husbandry and dairy science for over three decades, Dr. Dande has published 65 research papers in national, international peer reviewed and indexed journals. He holds four Indian National patents published in official Journal from Patent office. He is a recipient of two national awards - Rashtriya Gaurav (which translates to 'National Pride') Award from IIFS and Best Citizens of India Award from International Publishing House.

Dr. Dande was honored to be an invited speaker on the topic "Symbiotic Relationship and Sustainable Agriculture" at the 6th International Conference on Sustainable Animal Agriculture for Developing Countries organized by Brawijaya University at Batu city, Indonesia in October 2017. He has attended many national and International conference in India and abroad including Food & Nutrition Conference 2017 at Las Vegas (USA).

His research areas include Dairy Science, livestock nutrition and management and epidemiological studies related to Ixodid ticks. He is engaged in consulting farmers on sustainable agriculture practices and has been appreciated for his feed formulation in saving the lives of thousands of livestock during drought conditions by Veterinary Authorities of the Government of India.

He earned his Master of Science in Animal Husbandry and Dairying at Marathwada Agricultural University, Parbhani. He also earned Master of Philosophy in Zoology at Pune University, Pune and Ph.D. in Dairy Science at Swami Ramanand Teerth Marathwada University, Nanded (Maharashtra State, India).

The rise of Indian traditional dairy products – an economic perspective

K.G. Dande

Associate Professor & Head, Department of Dairy Science, Mahatma Basweshwar College, Latur, India

This talk begins by familiarizing the audience with the Indian dairy market. India is world's largest milk producer. Indian milk and milk products have been estimated to be worth INR 7,000 billion in 2016, growing at CAGR 13% during 2010-2016 and are expected to reach a value more than INR 16,000 billion by 2022. Of the milk produced each year in India, 50% is converted to a variety of traditional Indian products including but not limited to Ghee, Khoa and Chhanna (cottage cheese). Annually 950,000 tons of Ghee is produced, amounting to a value Rs.85,000 million and 1,200,000 tons of Chhanna is produced, amounting to Rs.600 million. The value of Khoa and Chhanna based sweets is about Rs.130,000 million annually.

These traditional Indian products have high demand in the domestic market due to not only their nutritional value but also therapeutic values. In recent years, international demand for these products has seen sudden rise because of both increased awareness and high number of Indian nationals settling abroad. While the demand for these products has increased, the supply chain has failed up to keep up with this demand. The Indian dairy market, which is comprised of an organized sector (Co-operative milk societies and Private corporations) and un-organized sector (individual farmers). The un-organized sector dominates the market - only 20% of the total milk production of the country is handled by the organized sector. The un-organized sector is formed by marginalized individual farmers who come from over 550,000 villages – they own 33% of the land under cultivation and 60% of the female cattle and buffalos but 75% of the rural households own an average of just two to four animals.

This talk argues that meeting the increasing demand for these products requires making significant improvements in the un-organized sector in the Indian Dairy Industry. Marginalized farmers in the un-organized sector need to be provided with an infrastructure to produce, store, transport and distribute high quality milk and other dairy products. Bringing parity between the quality of traditional Indian dairy products produced by organized and un-organized sectors presents a significant challenge. This challenge presents a crucial growth opportunity for various stakeholders in the dairy industry – both national and international.

This talk then proposes solutions to this challenge such as large-scale organization of self-help groups for educating farmers on best practices, developing man-made symbiotic relationships (permassociation) between plants, animals and humans, considering feed efficiency, environment synchronization and bio-techniques to enhance crop and animal husbandry. Providing advanced equipment and technology to farmers along with access to acumen about modern business practices such as quality management, marketing, large scale supply chain management etc. will significantly improve the quality of their dairy

products. While agro-based industry in India has developed significantly, animal husbandry based industry is still nascent, owing to the larger role played by the un-organized sector. Efforts need to be made to transform the mindset of traditional farmers into becoming “Animal Husbandry Entrepreneurs” and “Dairy Entrepreneurs” so that they can find innovative solutions to local problems and significantly reduce the inefficiencies in their farm and dairy based operations. Such solutions, if implemented at scale, can usher the next wave of White Revolution in India.

Audience Take Away:

- Understand better the current situation and challenges faced by Indian Dairy Industry.
- Details about growing importance of traditional Indian dairy products in global markets.
- Research opportunities – interesting avenues in traditional Indian dairy products that international researchers can find relevant research challenges.
- Market opportunities in the Indian dairy sector.

DAY 2

SPEAKERS

Euro-Global Conference on

Food Science, Agronomy
and Technology

SEPTEMBER 20-22, 2018
ROME, ITALY

Food-grade pickering emulsion stabilized by protein nanoparticles obtained from a novel lupin variety (AluProt-CGNA)

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The development of novel food-grade Pickering emulsions by using colloidal particles as emulsions stabilizers, has attracted growing interest in the food and pharmaceutical fields, due to their promising potential to develop new encapsulation systems and delivery of lipophilic bioactive ingredients. Pickering emulsions refers to emulsions that are not physically stabilized by conventional emulsifier molecules, but instead by solid colloid particles. There are various studies addressing the particles-stabilized Pickering emulsions, however a limited number of these works are directly compatible with food, since most of the particles (especially inorganic particles) exhibiting Pickering stabilization are not allowed in foods. Therefore, a novel aspect in the preparation of this system is the inclusion of food-grade emulsion Pickering stabilizers obtained for example from vegetable protein. Consequently, the main objective of our study is to develop a food-grade Pickering emulsions stabilized by lupin protein nanoparticles (LP-NPs) obtained from a new lupin variety AluProt-CGNA® (*Lupinus luteus*). This novel non-genetically modified variety contains a large amount of protein (~60%) in its dehulled seeds and it was developed and registered by Agriaquaculture Nutritional Genomic Center (CGNA) at La Araucania Region (Chile). Consequently, it is very interesting to prepare food-grade Pickering emulsion, stabilized by protein-based particles obtained from AluProt-CGNA®. It should be noted that this proteins have not yet been used for designing Pickering emulsion systems. Highly charged LP-NPs with neutral wettability were produced by a heat treatment of lupin protein isolate (LPIA) dispersions at different protein concentrations and temperatures. Then, oil-in-water emulsions were prepared through high-speed homogenization of oil phase with the suspension of LP-NPs. The creaming index stability, microstructure and physicochemical properties of Pickering emulsions were investigated. LP-NPs have exhibited a great potential to perform as a kind of novel food grade Pickering stabilizers for oil-in-water emulsions. The preliminary results have indicated that the heated lupin proteins, as compared to the unheated lupin proteins, exhibited a greater potential to act as a kind of excellent emulsifiers. The heating greatly improved the emulsification performance of the nanoparticles, especially at high concentrations (> 3%, w/v), as well as the emulsions were highly resistant to creaming over a 4-weeks storage period. The results also indicated that the LP-NPs exhibited much better interfacial and emulsifying properties, thus imparting a better Pickering stabilization for the emulsions and therefore it could be applied as a kind of Pickering stabilizers for oil-in-water emulsions; as compared to the unheated LPIA. The improvement of emulsification and interfacial packing was largely associated with the enhanced diffusion and/or adsorption at the interface. These findings provide important information in order to develop Pickering emulsions stabilized by protein particles and their potential applications in food formulations to achieve controlled release delivery or to enhance stability against oxidation of bioactive ingredients.

Audience Take Away:

- The results showed in the presentation would be of great importance for the fabrication of Pickering emulsions stabilized by food protein particles and their applications in food formulations.
- The information showed in the presentation will provide a better understanding of applications of Pickering emulsions in the area of encapsulation of lipophilic bioactive compounds in the food industry.
- The inclusion of protein-based particles would increase the utilization of protein isolate as food ingredient to develop encapsulation systems with improved properties.
- The results may provide useful information for applications of LP-NPs in environmentally friendly and food grade applications, notably in food, pharmaceutical and cosmetic products.

Biography

Burgos-Díaz is a Researcher at CGNA-CHILE. He is a specialist in food science and technology, whose main areas of expertise are encapsulation of bioactive compounds, functional properties of plant proteins and development of emulsions for application in the food industry. He has led several research projects in the mentioned topics and the results of his work have been published in several scientific publications and book chapters. He is currently leading a research project on "Microencapsulation of astaxanthin in a new food-grade Pickering emulsion system for increasing its protection and stability"; and a project on "Developing a premium protein isolate as a functional food ingredient".

Enological potential of wood shavings and mannoproteins for aging Portuguese red wines

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In recent years, wineries have introduced many technological innovations in the production of wines in order to achieve the good results at lowest prices. The aging stage of wine is a complex process due to the many changes produced in organoleptic characteristics which can improve the quality of a wine. The use of sticks in substitution of oak barrels is one possible strategy that allows to get good wine's quality. Also, the addition of mannoprotein has been used as they contribute to color stability and sensory characteristics, namely the reduction of red wine astringency. Nevertheless, the studies with Portuguese wines from Dão Appellation Region are scarce.

In this there was studied the addition of oak sticks (French or American with different level of toasting) and mannoproteins at Touriga Nacional red wines. Touriga Nacional is the most important grape varieties of Dão region. The phenolic profile and protein content was performed using HPLC and spectrophotometric assays. The sensory profile was evaluated by wine-taster experts. The results were dependent of sticks and mannoproteins type and dose used, but in general, allowed to obtain wines with better quality.

Audience Take Away:

- The experiments were performed at wineries and a similar procedure can be applied to other ones in order to improve their wine quality.
- The results obtained are useful since there is a lack of information about the use of these technologies in Portuguese wines, namely Touriga Nacional, one of the most important grape varieties of Portugal.
- The solutions suggested in this work are interesting of financial point of view, with good results.

Biography

Fernando Jorge Gonçalves has a degree in Food Chemistry, Master in Chemistry of Natural Products and Food and Ph.D in Chemistry. Professor of Polytechnic Institute of Viseu since 1999, its teaching and research activity include food technology and chemical characterization of foods. He is, also, reviewer of international scientific journals. He participated in several national and International projects of research and investigation. He has several scientific publications in national and international journals.

Emulsifying conditions and processing parameters optimisation of kenaf seed oil-in- water nanoemulsions stabilised by ternary emulsifier mixtures

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Kenaf (*Hibiscus cannabinus* L.) seed oil has been proven for its multi-pharmacological benefits; however, its poor water solubility and stability have limited its industrial applications. This study was aimed to further improve the stability of pre-developed kenaf seed oil-in-water nanoemulsions by using food grade ternary emulsifiers. The effect of emulsifier concentration (1, 5, 10, 15 % w/w), homogenisation pressure (16,000, 22,000, 28,000 psi), and homogenisation cycles (3, 4, 5 cycles) were studied to produce high stability of kenaf seed oil-in-water nanoemulsions using high pressure homogeniser. Generally, results showed that the emulsifier concentration and homogenisation conditions had great effect ($p < 0.05$) on the particle sizes, polydispersity index (PDI) and hence the physical stability of nanoemulsions. Homogenisation parameters at 28,000 psi for 3 cycles produced the most stable homogeneous nanoemulsions that were below 130 nm, below 0.16, and above -40 mV of particle size, PDI, and zeta-potential, respectively. Field-emission scanning electron microscopy micrograph showed that the optimised nanoemulsions had a good distribution within nano-range. The optimized nanoemulsions were proved to be physically stable for up to 6 weeks of storage at room temperature. The results from this study also provided valuable information in producing stable kenaf seed oil nanoemulsions for the future application in food and nutraceutical industries.

Audience Take Away:

- The results from this study also provided valuable information in producing stable kenaf seed oil nanoemulsions for the future application in food and nutraceutical industries.

Biography

Assoc. Prof. Dr. Nyam Kar Lin has completed her Ph.D at the age of 26 years from Universiti Putra Malaysia in Malaysia. She is the Head of Department of Food Science with Nutrition at UCSI University. She has published more than 60 papers in reputed journals. One of her scientific paper has been cited more than 150 times. Dr Nyam was being selected as one of the fellow out of 18 from ASEAN countries to participate the ASEAN Science Leadership Program.

Besides, she is also the reviewers for a few international journals such as Journal of Food Engineering, Industrial Crops and Products, etc.

Assoc. Prof. Dr. Nyam Kar Lin served as an elected member of the Council of the Malaysian Food Analyst, under Food Safety and Quality Division, Ministry of Health Malaysia. She is also an elected member of the Council of the Malaysian Institute of Food Technologists (MIFT). She is also a consultant for Malaysian Food Canners Association.

The role of hydrocolloids on the functional properties of lactose-free frozen yogurts at different production scales

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Lactose-free dairy products meet consumer's preferences, but they bring technological challenges to the food industry in order to guarantee their quality characteristics. This study aimed to investigate the functional properties of lactose-free frozen yogurts enriched with carrageenan (0.05, 0.1 and 0.15%) and cornstarch (1, 2 and 3%). The selection of hydrocolloids was based on preliminary tests involving sensory evaluation of 9 frozen-yogurt formulations, as well as on their impact in the final price of the product.

A commercial enzyme Ha-lactase[®] was used to promote lactose hydrolysis, which occurred simultaneously with yogurt fermentation. After preparation the lactose-free yogurt formulations were frozen with the aid of a home type ice-cream maker and analyzed immediately. The study showed that after 80 min of incubation, lactose in yogurt dropped to nearly 0%. The pH ranged between 4.13 and 4.23 and the percentage of lactic acid between 0.738% and 0.783%. The home type frozen-yogurts did not differ regarding to overrun or melting properties. The addition of hydrocolloids caused the increase of L*, a* and b* parameters. The formulation with 0.15% of carrageenan originated the highest viscosity, hardness and stickiness values. The samples containing cornstarch did not differ significantly, although the one with 3% received the best sensory score. In the case of carrageenan, the most appreciated was the one containing 0.1%.

Afterwards, a commercial grade soft-serve machine was used to test the preferred products. At this production scale the formulations showed pseudoplastic behavior, well fitted by the Herschel-Bulkley model. Thixotropy increased with the use of hydrocolloids. Elastic moduli predominated in all cases ($G' > G''$). In this trial, starch increased the viscosity of the products but decreased their overrun, contradicting the results obtained with the home type ice-cream maker.

This study showed that, apart from the influence that hydrocolloids have on the rheological properties of lactose-free frozen yogurts, the production scale and equipment used can also have a determinant contribution.

Audience Take Away:

- The audience may have contact with the production process of lactose-free dairy products and assess if the enzymatic hydrolyze of lactose influence the yogurt fermentation process.
- Food Scientists and Dairy specialists can become aware of the influence that hydrocolloids have on the rheological and sensory properties of lactose-free frozen yogurts and their acceptance by consumers.
- Dairy companies may understand of how the production scale and equipment can influence the properties of the Frozen-Yoghurt.

Biography

Associate Professor in the Department of Food Science & Technology of College of Agriculture of Coimbra. PhD in Chemical Engineering, by the University of Coimbra, in 2013. She is a researcher at CERNAS, with a focus on the development of novel products, food products and processes for the valorization of food processing by-products and effluents for sustainable development. Has participated in 5 national and 1 international R&D project (Lifelong Learning Programme Erasmus - Intensive Programmes (IP): Functional Foods: Science, engineering and myths. Currently coordinates the national project and collaborates in more 6 projects (+Agro, Lab2Factory, Lacties, MobFood, Bio4Cartilage and DermoBio).

Registered 2 patents, edited the book "Cheese: Production, Consumption and Health Effects (2017) Nova Science Publishers, Inc. USA, New York. ISBN 978-1-53612-841-3", published 12 scientific papers in international scientific journals, 11 book chapters and more than 30 national and international communications. Has been awarded with 11 national and regional prizes/awards on the domains of food products innovation. <http://orcid.org/0000-0001-9214-0614>.

Antioxidative properties Spent Coffee Ground (SCG) extracted using ultrasonic-methanol assisted technique

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Spent coffee that is produced in tons by restaurants and cafeterias, and consumers at domestic levels, could be a good source of natural antioxidants. The main objective of this study was to determine antioxidant properties of spent coffee ground (SCG) extracted using ultrasonic-methanol assisted technique. The antioxidative tests namely DppH, FTC, TBA, total phenolic content and total flavonoid were carried out to visualise the antioxidative properties of the extracted SCG. Robusta (41.63 ± 0.04 %) had the highest DppH inhibition while Liberica (29.95 ± 0.02 %) depicted the lowest DppH inhibition. In FTC and TBA analyses, spent Robusta was found to have highest activity with 60.42 ± 0.03% and 73.09 ± 0.08%, respectively. Total phenolic compounds in the samples varied widely ranging from 18.94 ± 0.06 to 26.23 ± 0.86 mg GAE/g sample, with Robusta being the highest value among the three, while range of total flavonoid content obtained was between 47.62 ± 0.05 to 56.20 ± 0.08 mg QE/g sample where it is found to be the highest in Arabica extract followed by Robusta (55.33 ± 0.06) whereas the lowest was spent Liberica extract. A strong correlation was obtained between antioxidative activities and total phenolic content, however it shows weak but positive correlation between antioxidative activities and total flavonoid content.

Audience Take Away:

- Spent coffee grounds (SCG) are one of the main coffee industry residues.
- As is known, coffee beans contain several classes of health related chemicals such as phenolic compounds, melanoidins, diterpenes, xanthines, and vitamin precursors. Because these compounds are only partially extracted during brewing, the resulting SCG can be considered as a source of potentially valuable bioactive compounds.
- In recent years, various novel extraction techniques have been developed for the extraction of nutraceuticals from plants, including ultrasound-assisted extraction, microwave-assisted extraction and high hydrostatic pressure extraction. This study will serve as reference data for future study of antioxidant in the spent ground coffee, extracted using ultrasonic-methanol assisted technique.
- Information from this study may also be useful to the industrial utilization of coffee and medicinal supplements, plus will promote the maximization usage of natural antioxidants contained in coffee.

Biography

Mohamad Khairi Bin Mohd Zainol was born in February, 1975 in Kedah, Malaysia. He continued his study at Faculty of Food Science and Biotechnology, Universiti Putra Malaysia (UPM) where he graduated with second class upper Bachelor of Science Degree in Food Science and Technology in 1999. He was offered a tutorship before continuing his Master's Science Degree in the field of Food Chemistry and Biochemistry at Faculty of Food Science and Biotechnology, UPM. In 2012, after completed his PhD at the University of Nottingham, United Kingdom he was appointed as senior lecturer at School of Food Science and Technology, Universiti Malaysia Terengganu (UMT), Malaysia.

Bioactive compounds and antioxidant activity in pumpkin (*Cucurbita pepo*) seed oil

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³Laboratory of Medicinal and Aromatic Plants, Biotechnology Center of Borj-Cedria Technopole, Hammam-Lif;

Pumpkin has ever been applied in the food industry for the production of purees, juices, jams and alcoholic beverages generating waste in the form of rind and seeds. The seeds are used for both edible and medicinal purposes. In fact, pumpkin seed oil has been reported to possess a strong antioxidant potential and has been identified as an exceptional preventive against hypertension and carcinogenic diseases (Rezig et al., 2012). Pumpkin seeds are also used in culinary practices mainly in the southern parts of Austria, Slovenia, and Hungary (Murkovic et al., 1996). Pumpkin seeds are also consumed after being salted and roasted in African countries, mainly in Tunisia.

The presentation will concern the evaluation of the bioactive compounds of pumpkin (*Cucurbita pepo*) seed oil of the 'Essahli' Tunisian cultivar following a cold pressed extraction method. Gas chromatography revealed that the major fatty acids were linoleic, oleic, and palmitic acids (45,90%, 29,3%, and 15,65% respectively). The Seed oil was also found to be rich in sterols (4849.62 mg/kg oil). The sterol marker β -sitosterol accounted for 39.66 % of total sterols contained in the seed oil of this variety. Total phenolic and flavonoids contents of *Cucurbita pepo* var. 'Essahli' were respectively 41.24 mg GAE/100g and 8.24 mg rutin equivalent/100g. IC50 of the pumpkin seed oil was of 64.71 μ g/g. The oil stability index was of 3.74h. Pumpkin seed oil revealed the presence of many bioactive substances such as flavonoids, total phenolic content, and phytosterols. These compounds may be used as natural antioxidants for industrial applications. Besides, the high-unsaturated fatty acid level makes the melon seed oil nutritionally valuable. Therefore, pumpkin seeds are of great interest thanks to their bioactive molecules and their plant oil. Thus, appropriate use of pumpkin seeds makes them a good example for valorization of vegetable processing by-products.

Audience Take Away:

- Pumpkin seed oil is a dichromatic highly viscous oil that has been documented for its strong antioxidant activity (Stevenson et al., 2007), and has been identified as an exceptional preventive against hypertension and carcinogenic diseases (Zuhair et al., 2000; Jian et al., 2005). In recent years, several studies have been conducted to better highlight the medicinal benefits of pumpkin seed oil (Stevenson et al., 2007). However, to the best of our knowledge, the composition of pumpkins eed oil remains fairly unexplored, particularly for North African varieties. The determination of both the bioactive compounds and the oxidative stability would significantly contribute to the valorization of pumpkin seed oil great potential in cosmetic, pharmaceutical and food industries.
- It is known that organic solvents are frequently used to extract oil from the seeds. N-Hexane is a typical solvent that is commercially used in oil extraction from different plant materials. However, its usage is now under close examination due to growing governmental control and concerns about consumer safety, especially regarding organic solvents' use in food-processing industries. Consequently, environmental rules and regulations plus an increasing awareness of health risks pushed manufacturers to adopt novel alternatives in the use of organic solvents for oil extraction (Mitra et al., 2009).
- In this study, a cold pressed technique was used to valorize pumpkin seeds as a vegetable by-product and a potential source for new trends of plant oils.
- The oral presentation will provide other researchers with opportunities to develop new extraction methods of seed oils as viable alternatives to organic solvents in order to meet the growing consumer demand for more natural products.

Biography

Born in 1978, Leila Rezig is Ph.D a senior research assistant in food processing. The doctoral thesis was defended at the High Institute of Food Industries of Tunis. She has worked as a teaching assistant at the Higher Institute of Technological Studies of Zaghouan and then at the High Institute of Food Industries of Tunis since 2016. Her fields of interest includes the fat, protein and carbohydrate profiles of oil seeds and their cytoprotective effect, the investigation of the physico-chemical and bioactive properties of different kinds of honey and the antioxidant and the antimicrobial activities of essential oils.

Preservation methods for microorganisms in kefir grains

Firuze Ergin*, M.Sc., Ph.D.s., **Yaren Temur**, B.Sc., **Safa Yaramışlı**, B.Sc., **Ahmet Küçükçetin**, Prof. Dr.
Department of Food Engineering, Faculty of Engineering, Akdeniz University, Antalya, Turkey

Introduction: Kefir is acidic, slightly alcoholic and a viscous fermented dairy beverage that has a long history in human nutrition due to its health benefits including anti-obesity, anti-oxidative, cholesterol-lowering, anti-allergenic, anti-inflammatory, anti-tumour, and anti-microbial properties. Kefir is produced by two different methods as traditional and industrial methods. In traditional method, kefir grains are inoculated to milk and a milk is incubated at 20-25 °C for an 18-24 h period. After incubation, kefir grains are sieved, washed and can be re-used for new kefir production. Kefir grains have a shape similar to small cauliflower or popcorn, with a diameter 0.3-2.0 cm and complex symbiotic microbial communities, including lactic acid bacteria, yeasts and acetic acid bacteria. The microorganisms in kefir grains should be kept viable by transferring kefir grains daily into milk. Besides, kefir grains can be stored in milk in refrigerator for 8-10 days. Different preservation methods such as freezing and freeze drying have been used to keep the microorganisms in kefir grains alive longer. The aim of this work was to investigate the effect of freeze drying on viability of microorganisms in kefir grains during storage.

Material and methods: The kefir grains used in this research were obtained from the Department of Food Engineering, Akdeniz University, Turkey. Skim milk powder, whey isolate powder and maltodextrin powder were suspended in distilled water at a concentration of 10% (w/w). Skim milk, whey isolate and maltodextrin solutions, which used as cryoprotective agents, were heat-treated at 62°C for 30 minutes and cooled to 25°C. After addition of kefir grains to cooled solutions (10%), mixtures were homogenized using a mechanical mixer. Freeze drying of the mixtures was performed with A FreeZone 2.5 Plus freeze dryer (Labconco Co., Kansas City, USA). Mixtures spread out at 1 mm layer on trays and frozen at -80°C for 24 h. Frozen mixtures were placed in the freeze dryer operated at -84°C and 0.02 mbar absolute pressure. After drying for 48 h, the dried mixtures were ground into fine powder using a grinder. All powders produced with different cryoprotective solutions were packaged under vacuum and atmospheric air conditions and stored at 25°C for 60 days. For kefir production, UHT skim milk was inoculated with the powders stored for 1, 30, and 60 days at a concentration of 0.5%. After inoculation, the milk samples were incubated at 25°C until the pH value decreased to 4.7. The pH values of the kefir samples were measured using a pH-meter (Orion 2 star, Thermo Scientific, Inc, USA) and titratable acidity was determined as % lactic acid according to Turkish Standards. The moisture content of the powders was determined using an infrared moisture balance (Precisa XM60, Intelligent Weighing Technology, Inc, Switzerland). Water activity measurements were performed at 25°C using an AquaLab water activity meter (4TE, Decagon Devices, Inc, Pullman, WA, USA). Microbiological analyses were run in duplicates for each mixture, powder and kefir sample. Ringer solution (1/4 strength) was used to prepare the dilutions for the microbiological analyses. Lactobacilli counts were performed on MRS medium at an incubation temperature of 30°C under anaerobic conditions for 3 days. Lactococci enumerations were carried out on M17 medium at an incubation temperature of 30°C under anaerobic conditions for 3 days. Yeast counts were performed on Yeast Extract Glucose Chloramphenicol (YGC) agar, with incubation at 25°C under aerobic conditions for 5 days. All analyses were performed on days 1, 30 and 60 of storage of the powders.

Results: The moisture content of the vacuum-packed powders ranged between 7.7 and 10.9%, which corresponded to water activity in the range of 0.32 and 0.48. The moisture content and water activity of the powders packed under atmospheric air were higher than those of the vacuum-packed powders. The initial counts of lactobacilli, lactococci and yeast in a mixture prepared from skim milk solution were 7.9, 6.5 and 5.5 log cfu/g, respectively. The highest counts of lactobacilli and lactococci were observed in the vacuum-packed powders obtained by skim milk solution. The reduction of lactobacilli, lactococci and yeast counts in all powders increased throughout the storage period. The pH values of milk samples inoculated with the 1-day stored powders decreased to 4.7 in between 24 and 30 hours of incubation, and the incubation time to reach a pH of 4.7 was extended for all samples inoculated with the 30-day stored powders. Kefir samples could not produced by using the 60-day stored powders because of the pH values of the milk samples inoculated with these powders did not decrease to pH 4.7 within 60 hours of incubation. The pH values of kefir samples obtained by using the 1- and 30-day stored powders were in the range of 4.41- 4.72 and 4.56- 4.73, respectively. The lowest pH value and the highest titratable acidity value were determined in kefir sample produced using by the vacuum-packed powder obtained by skim milk solution.

Audience Take Away:

- Information on kefir, health benefits of kefir and producing methods of kefir.
- Freeze drying is suitable method of preservation for the microorganisms in kefir grains at room temperature for 30

days.

- Freeze drying of kefir grains can be developed as an alternative method for the production kefir starter culture.

Biography

Firuze Ergin, was born in Antalya, Turkey on 17th October 1988. She completed her B.Sc. and M.Sc. in Food Engineering from Pamukkale University and Akdeniz University, Turkey, respectively. Afterwards, she started her PhD education in 2014 and she has worked as a research assistant at Department of Food Engineering, Faculty of Engineering, Akdeniz University, since in 2015. Her studies focus on dairy technology, probiotic dairy products, bacteriophages and microencapsulation technology.

Rheology of the low fat mayonnaise prepared using agar micro-gels

Isamu Kaneda, Ph.D.

Rakuno Gakuen University, Japan

We developed agar micro-gel oil suspensions using a W/O emulsion system. Namely, agar hot aqueous solution was dispersed in the oil phase with emulsifier at high temperature, and then the W/O hot emulsion is cooled. As a result of this procedure, the inner phase is gelled with agar. Finally we can obtain perfect spherical agar micro-gel oil suspension using the novel procedure. A new type of low fat food can be made by substituting oil phase for the agar micro-gel oil suspension. We attempted to prepare a series of low-fat mayonnaise using the agar micro-gel oil suspensions. A model mayonnaise which contains 65% oil was prepared as a control (M100). A low-fat mayonnaise which was made by using the agar micro-gel oil suspension as its oil phase. Since the agar micro-gel oil suspension contained 50 wt % agar micro-gels, the oil contents of this sample reduced 50% in comparison with M100 (M50+agar). We also prepared another model mayonnaise that 50% of oil contents were replaced with water as negative control (M50). We measured rheological properties of these samples. The apparent viscosity of M50 decreased in comparison with M100 dramatically, however, consistency drop of M50+agar was minimal. We also analyzed the frequency dependence of the complex modulus using a weal-gel model. This analysis revealed that agar micro-gels worked as viscosity thickener in the aqueous phase. It can be expected that the texture of the low fat mayonnaise made by this new method is similar to a full fat mayonnaise.

Biography

Isamu Kaneda is currently working as professor at the Rakuno Gakuen University. Dr Isamu Kaneda received his Doctoral degree on "Studies on viscosity thickening effect of succinoglycan and agar" from Rakuno Gakuen University. Dr Isamu Kaneda completed his Master of Science from Tokyo Institute of Technology. He then worked for industries (TEIJIN institute of bioscience and SHISEIDO research center) and he moved to academic post in 2007. Dr. Isamu Kaneda has authored several publications in various journals and books. His publications reflect his research interests in food rheology. Dr. Isamu Kaneda is also Editor in Chief of the Journal of Biorheology.

Effect of *Strobilanthes crispus* and *Centella asiatica* combination with Green Tea (*Camellia sinensis*) against lipid peroxidation

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The morbidity and mortality due to various cardiovascular disease, cancer, and arthritis is alarming. Fresh fruits and vegetables are excellent sources of important natural antioxidants. Antioxidants such as ascorbic acid, carotenoids, flavonoids, and hydrolysable tannins that are found in certain fruit and vegetables play an important role for treating various diseases. *Strobilanthes crispus* (*S. crispus*) from the family of Acanthaceae, is known locally as Pecah Kaca is an herbal medicine plant which contains high medical value. On the other hand, *Centella asiatica* (*C. asiatica*) is from the family of Umbelliferae. In Malaysia and other parts of Asia, it has been used as a traditional herbal medicine for many years and is commonly known as pegaga. Meanwhile, tea is one of the most commonly consumed beverages worldwide. Tea is obtained from the leaves of a plant called *Camellia sinensis* (*C. sinensis*), family of the Theaceae. Large amount of polyphenols, flavanols and catechins can be found in green tea.

This study was conducted to determine the effect of *C. asiatica* and *S. crispus* combination with green tea *C. sinensis* against lipid peroxidation. The samples were *S. crispus*; *C. asiatica*; green tea; combination of *S. crispus*:green tea (25:75; 50:50; 75:25) and *C. asiatica*:green tea (25:75; 50:50; 75:25) respectively. The antioxidative activities were determined by using Ferric Thiocyanate (FTC) assay, Thiobarbituric Acid (TBA) method and 2, 2-diphenyl-1-picrylhydrazyl (DPPH) test. Results revealed that all extracts exhibited high activities, comparable to Butylated hydroxytoluene (BHT) and α -tocopherol in FTC test. Combination of *S. crispus*:green tea (75:25) and *S. crispus* showed high activities in TBA test, show no significant ($P>0.05$) different compared to both standards. The antioxidative activities of green tea, combination of *S. crispus*:green tea (25:75) and *C. asiatica*:green tea (25:75 and 50:50) was as good as BHT and α -tocopherol in DPPH test. Based on the result obtained, combination of *S. crispus*:green tea (75:25) extracts was believed to have synergistic activity.

Audience Take Away:

- A few studies have shown that there are synergistic antioxidant activities of green tea with herbs.
- Although it has been demonstrated that green tea and some herbs have antioxidant activity and different antioxidant compounds, researches are limited in terms of the synergistic effects related to the used of combined green tea and *C. asiatica* or *S. crispus*.
- Therefore, this study was done with an aim to give more scientifically-proven knowledge related to the synergistic effects of *C. asiatica* and *S. crispus* with green tea.
- From the result obtained, it is believed that there is no synergistic effect for primary linoleic acid peroxidation. Due to this reason, the combination percentage for *S. crispus*, *C. asiatica* and green tea might not give synergistic effect in primary stage of oxidation.
- Not all the combinations ratio of compound might give the synergy effect because different combination ratio of herbs will produce varied interaction among the compound.
- The difference in antioxidative activities of different combination herbs extract may cause by several factors, including the different mechanism involved in the determination methods, structures of the different phenolic compounds and due to the synergistic effects of different compounds.

Biography

Zamzahaila Bt Mohd Zin was born in January, 1975 in Kelantan, Malaysia. She continued her study at Faculty of Food Science and Biotechnology, Universiti Putra Malaysia (UPM) where she graduated with second class upper Bachelor of Science Degree in Food Science and Technology in 1999. She was offered a tutorship before continuing her Master's Science Degree in the field of Food Chemistry and Biochemistry at Faculty of Food Science and Biotechnology, UPM. In 2014, after completed her Doctoral thesis "Characterization of Polyphenolic Content of *Strobilanthes crispus* (*S. crispus*) Extract and its Biological Effect" she was appointed as senior lecturer at School of Food Science and Technology, Universiti Malaysia Terengganu (UMT), Malaysia.

Biotechnology applications: Phenotypic & Genotypic characterization of food borne bacteria

Dr. Stalis Norma Ethica^{1,2}, M.Si. Prof. Dr. Agus Sabdono³, M.Sc. Dr. Ana Hidayati Mukaromah¹, M.Si , Ayu Rahmawati Sulistyanningtyas¹, S.Si., M.Si. Tara Puri Ducha Rahmani¹, S.Si., M.Sc.

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Genotypic and phenotypic characterization of bacteria is a necessity to understand the genetic makeup of the microorganisms and which genes are to be expressed to result in the observable characteristics (traits). Genotypic and phenotypic characterization of food-borne bacteria has been widely conducted to improve many aspects of human's life. In food technology, such characterization is advantageous to enhance bacterial fermentation products, improve bacterial enzymatic activities in food processing, control food safety from bacterial pathogenicity, determine bacterial bioremediation ability for treating food wastes, and more.

It is important to understand the relationship between genotypes and phenotypes because genes are expressed not only depending on their genome composition, but also on the environmental conditions as well as the function of genes influencing the associated traits. In most cases, genotype stays constant even in different environment. It seldom undergoes spontaneous mutations, which might cause it to alter. However, when similar genotype is subjected to different environments, it could generate a wide range of phenotypes.

In this lecture, the advance on technologies and approaches, which are simple yet useful to assess both genotype and phenotype characteristics of foodborne bacteria, are described. The description will include the use of various media, In Silico-, Colony-, Arbitrary-Primed- and Next Generation- PCRs, Automated Microbiology System, SEM (Scanning Electron Microscope), Chromatograph, and Phylogenetic Tree Construction Software. The use of these methods will be described in a research-based experience aiming to promote product-based studies and genome-scale analysis of bacterial metabolism. A detailed understanding in this matter hopefully will result in structured knowledge bases for many biotechnology applications including metabolic engineering, bioremediation agent development, probiotic discovery, etc.

What will be mainly discussed during the presentation is the shifting of techniques for the identification, classification and characterization and of foodborne bacteria in the last century from traditional towards molecular ones. The role of advanced biotechnology encompassing current genomics and proteomics technologies in genotypic and phenotypic characterization of foodborne bacteria will be discussed using descriptive research-based examples. An overview of how these new technologies complement conventional approaches will be presented with attractive schemes and figures. Presentation will be concluded by underlying the benefits of genotypic and phenotypic foodborne bacterial characterization on the environment and public health, as well as directions for future development in this field.

Audience Take Away:

The audience will be able to use what they learn by:

- Choosing alternative polyphasic approach, which will be presented in the lecture for food borne bacterial identification.
- Doing research and applying knowledge about genotypic and phenotypic relationship and how genotypic and phenotypic characterization could be done.
- Performing simple molecular techniques to conduct research or work related with the investigation of bacterial characteristics and its metabolism.

This will help the audience in their job by:

- Informing and describing them about simple yet advent biotechnology techniques, such as colony PCR, which could be used to characterize to understand the relationship/map between particular genes of food-borne bacteria with their phenotypes.
- Informing ways to simplify biochemical test in identifying food-borne bacteria using Automated Microbiology System.

- Informing ways to relate genotype and phenotype as an initial step to map them.

This research is what other faculty could use to expand their research or teaching by:

- Giving insights to research topics aiming to the importance and ways to investigate maps between genotypic and phenotypic characteristics of food related organisms.
- Giving ideas of research topics in metabolic engineering of food-borne bacteria
- Giving insights to advanced bacterial metabolism studies with genotypic and phenotypic characteristics as starting points.

This provide a practical solution to a problem that could simplify a designer's job by:

- Giving simple examples way to identify food-borne bacteria using polyphasic approach integrating genotypic and phenotypic analysis of the bacteria.
- Giving practical description of how to perform in silico polymerase chain reaction (PCR) efficiently by testing performance of primers using in silico web-based tools <http://insilico.ehu.eus/PCR/> prior to laboratory PCR work using thermal cycler.

This provide a practical solution to a problem that could make a designer's job more efficient by:

- Providing an example of successful primer design work to amplify gene of interest from food-borne bacteria
- Providing an example of PCR techniques (colony PCR) for Gram-negative bacteria, a way to isolate bacterial gene which without prior DNA extraction.
- Providing an example of simple biochemistry test of foodborne bacteria using Automated Microbiology System.

It will improve the accuracy of a design, for example in:

- Bacterial identification work by sing polyphasic approach combining 3 aspects: morphology, biochemistry and molecular tests, which basically the representation of integration both genotypic and phenotypic characterization of foodborne bacteria.
- Designing primers aiming to amplify of gene of interest by in silico PCR checking prior to wet PCR reactions to assess accuracy of primers in resulting targeted PCR products.
- Constructing phylogenetic tree using adequate software with essential statistical parameters.

It provides new information to assist in a design problem:

- By describing the advent in genotypic and phenotypic characterization latest techniques including metagenomics approach and its capabilities to assist particular problem.
- By informing predictions and directions for future development in genotypic and phenotypic mapping field.

Other benefits:

- Audience will be encouraged to conduct product-based research aiming to discover new strain of bacteria by informing them the required steps of bacterial isolation and criteria of novelty based on 16S rRNA gene.
- Colorful description will be presented to bring scientific yet entertaining lecture.

Biography

Dr. Stalis Norma Ethica, M.Si. was born in Surabaya, in 1976. Earning Bachelor and Master's Degree in Chemistry, and later Doctorate in Biotechnology from Universitas Gadjah Mada, Indonesia, she has both academic and industrial background. After 7 years managing industrial laboratory, she has been working as a full-time lecturer at the Faculty of Nursing and Health Sciences (FIKKES) of Universitas Muhammadiyah Semarang (Unimus) since 2016 and recently held a position as Head of Research Department for Indonesia Forestry Institute (IFI). She is currently running a Post-Doctoral Research 2017 Program (Program Pascadoktor) focusing on "Bioremediation of Biomedical Wastes" with grant from Indonesian Ministry of Research, Technology and Higher Educations (Kemenristek Dikti).

Functionality and utilization of mulberry in Korea

Hyun-bok Kim*, Ph.D., Gyoo Byung Sung, Ph.D., Seong-jin Hong

National Institute of Agricultural Sciences, Rural Development Administration, Republic of Korea

We confirmed that there were various functional components such as cyanidine-3-glucoside(C3G), unsaturated fatty acids, rutin, γ -aminobutyric acid(GABA) and resveratrol in mulberry fruits. Next we investigated the protective effect against neuronal cell and inhibitory activity against bacteria of mulberry fruit extracts. Also, we studied about the high value-added processing method using the mulberry fruit including the natural food colorant, beer, semi-dried mulberry fruit, honey powder, pop etc. C3G was extracted with 0.1% citric acid-70% EtOH. Then it was evaporated with large scale evaporation system. After adding dextrin to C3G concentration materials, we made pigment powder with freezing dryer. Semi-dried mulberry fruits can be stored at room temperature by adjusting the moisture content to around 15%. It means that the shape of fruit is maintained, and has chewing texture like jelly. In case of mulberry leaf, we studied on improvement method of rutin content using mulberry leaf powder. Mulberry leaves were collected and then hot-air dried and powdered for experiment. As a result, we have developed a pre-treatment method that extracts mulberry leaf powder with water or fermented alcohol with reflux extractor and then increases the rutin content by improving the process. The powder with increased rutin content is expected to be applicable to various foods as a food additive. It can be contributed to the improvement of the farm income by promoting consumption of mulberry leaf while satisfying the consumers' desire for functional food intake. In relation to the global increase trend of obesity population, there is a demand for the development of foods having high functional activity by mass-extracting anti-obesity active substances using mulberry product such as leaf and fruit. Therefore, we evaluated the anti-obesity efficacy according to varieties by using the mulberry leaves and fruit extracts. At the same time, high active varieties were selected. For this purpose, the effects of the extracts of the mulberry leaf and fruit on 3T3-L1 adipocyte differentiation were examined. As a result, in the case of mulberry leaves, the lipid accumulation inhibitory rate of 'Cheongolppong' was higher than that of the control at 500 μ g / ml treatment. And in the case of the extract of mulberry fruit, 'Daesim' showed the highest lipid accumulation inhibitory rate compared with the control at 50 times of diluted extract.

Audience Take Away:

- Functional ingredients in mulberry leaves and fruits, and food processing status by region in Korea.
- Development of manufacturing method of high value added products such as natural pigment, beer, semi-dried mulberry fruit and soda using mulberry fruit.
- Development of rutin content enhancing method and anti-obesity effect test of mulberry leaves

Biography

I graduated from Kangwon National University in 1992 and joined the Rural Development Administration as a sericultural researcher. I studied mulberry variety breeding for three years after being issued. Since 1995, I have been studying the efficacy and diversity of mulberry leaves while shifting Original sericulture to Functional sericulture. I have been promoting the study of functional and food-based materials of mulberry fruit to the media. As a result, the farmer, area and production volume of the mulberry fruit in Korea have increased sharply, contributing to the pioneering of the mulberry fruit industry. In 2003, I received Ph.D. from Seoul National University under the theme 'mulberry fruit'. Currently, I'm studying the effect of eliminating of orodor and functionality in order to increase consumption of mulberry leaves and twig.

Quality characteristics and antioxidant properties of bread incorporated by black carrot fiber

Hatice Pekmez*, Ph.D., Betül Bay Yılmaz, Ph.D.

University of Gaziantep, Turkey

Anthocyanins are the most abundant found pigments in nature and have been categorised as the group of water-soluble colouring pigments in fruits and vegetables responsible for the characteristic colour ranging from blue to red. In addition to their functional role in food colorants anthocyanin extract may improve the nutritional quality of food and beverages. There has been a great interest in anthocyanins not only their colorant abilities and aesthetic value, but also their being rich in terms of bioactive compounds, beneficial effect from a nutritional standpoint and their potential role in reducing the risk of coronary heart disease, cancer and stroke. Anthocyanins have been used in food industry to color confectinary, jam and jellies, ice cream, fruit preparations, sherbets, yoğurt, desserts and bakery fillings. Although there numerous researches on anthocyanin use in food products, there is a limited number of study on bakery products, especially on bread. Bread is the most important food produced from wheat, which is the raw material of many foods. It is the basic food stuff of the society. In all cuisines, the sacred bread is also the symbol of labor and fertility. It is cheap, filling, it is a source of energy and it meets the protein need. In present study, the quality characteristics and antioxidant properties of bread fortified with black carrot fiber (BCF) were evaluated. In order to determine to what extent BCF fortification meets the properties of the bread, the changes of total phenolics content, antioxidant activity, colour, physical and sensorial characteristics of bread were examined the effect of BCF addition from 0% to 7.5% (w/w). The results showed that the BCF fortification of bread is a simple way to increase antioxidant content and provide more attractive appearance especially for children. It could be an alternative way to produce functional bread for healthy diet. However, more acceptable bread samples could be prepared by analysing additional textural, rheological, dietary fiber content properties and also flavor improvement is required for further studies.

Audience Take Away:

- Increased antioxidant amount in bread which is the basic food of daily diet would be provided by the addition of black carrot fiber.
- More colourful, attractive and unusual appearance bread would be produced by black carrot addition especially for children.
- It could be an alternative way to produce functional bread for healthy diet.
- More favourable black carrot fiber fortified bread could be provided by flavor improvement and this fortification used in present study could be possibly tried for other bakery products.

Biography

Assistant Professor Doctor Hatice Pekmez has completed her PhD, MSc and BSc in Food Engineering from University of Gaziantep, Turkey. Since 2001 to 2013, she has worked as a research assistant at Gaziantep University, Faculty of Engineering, Food Engineering Department. Since then, she has been working as an assistant professor at Gaziantep University, Naci Topçuoğlu Vocational School, Food Processing Department. She has published more than 40 international and national papers, oral and poster presentations and serving as an editorial board member and reviewer in her study fields. Her experience includes various administrative duties. Her main research areas are cereal and cereal products technology, ozonation of cereals, drying technology.

Phytochemical analysis of *Cissus verticillata* berries

Andrea Goldson Barnaby*, Ph.D., and Sonal Gupte

University of the West Indies

C*issus verticillata* L. (syn *C. sicyoides*) otherwise known as Princess vine and curtain ivy belongs to the Vitaceae family. The leaves of this vine have been utilized in traditional medicine for the treatment of diabetes mellitus. There is however limited available information on the berries of this vine. This study was undertaken to evaluate the functional and nutritional properties of *C. verticillata* berries. Berry extracts were screened for the presence of bioactive components inclusive of saponins, tannins, and reducing sugars. The free radical scavenging activity and total phenolic content of the berries were determined. Extracts were also analyzed utilizing Fourier transform infrared and nuclear magnetic resonance spectroscopy. Phenylalanine ammonia lyase, a key enzyme in the phenylpropanoid pathway was characterized and purified utilizing aqueous two phase partitioning. Preliminary cytotoxicity assay was performed using the Brine shrimp assay.

C. verticillata berries are low acid (pH 6) and have a titrable acidity of 0.165 g of tartaric acid per 100mL of juice. The berries exhibit a refractive index of 17 °Brix and are expected to be sweet in taste. Extracts tested positive for the presence of saponins, and reducing sugars. *C. verticillata* berries possess high free radical scavenging activity ($84.4 \pm 4.4\%$), with an IC₅₀ value of 0.99 mg/mL which is intermediate to that of raspberries and blackberries, and contain a phenolic content of 3.2 ± 0.4 mg gallic acid/g dry weight.

Phenylalanine ammonia lyase (PAL) activity of the berries was 0.10 ± 0.01 U/mg protein. PAL exhibits Michaelis Menten kinetics with the substrate phenylalanine (K_m, 1.21 ± 0.28 mM) and has a V_{max} of 6.24 ± 0.28 M/min. The enzyme has a temperature optimum of 25°C and a pH optimum of 7.5.

Based on the Brine shrimp lethality assay, the berries appear to be non toxic with a LD₅₀ value >1000µg/ml. Proximate analysis revealed that the berries contained 85 % moisture, 10 % ash and 5 % lipids. The major fatty acids identified include palmitic acid (43.6 ± 1.8 %), oleic acid (13.8 ± 1.7 %) and linoleic acid (13.9 ± 2.0 %). Ascorbic acid concentration was 2.8 ± 0.1 mg/mL and protein (0.17 ± 0.02 mg/ml).

C. verticillata berries possess high levels of free radical scavenging activity and may be a novel source of antioxidants. The berries are also a source of the PAL enzyme which has biotechnology and medicinal applications. Future work will involve identification of the active components in *C. verticillata* berries.

Audience Take Away:

- The audience will learn more about antioxidants and their role in health.
- This research can be further expanded to include *in vivo* studies and identification of the active components present.
- This research identifies a new source of antioxidants.

Biography

Dr. Goldson Barnaby is a graduate of the University of the West Indies, Jamaica and the University of British Columbia, Canada. She currently serves as lecturer in the Department of Chemistry and Programme Coordinator for the M Sc in Food and Agro Processing Technology Programme at the University of the West Indies. Her research interests include the evaluation of the antioxidant activity and properties of tropical fruits with special emphasis on underutilized berries such as *Cissus verticillata*.

Phytase and xylanase, individually and combination on carcass broiler fed a diet with a high level of rice bran

N.G.A Mulyantini, Ph.D.

University of Nusa Cendana – Kupang NTT – Indonesia

Continued increase in poultry production is an important contributor to the supply of protein to expanding human population in the world. In the case of poultry nutrition, rice bran is appealing as potential feedstuff because it is available in many parts of the world, and also it contain considerable amount of nutrition. However, it may lead to production problems due to presence of components which possess anti-nutritive properties. Feed enzyme may offer possible solutions to the problems of feeding rice bran to poultry by allowing enhanced utilization of nutrients in rice bran, and reducing the deleterious effects of the anti-nutritive factors.

Audience Take Away:

- The objective of the research was to examine the effects of enzyme phytase and xylanase on broiler carcass.
- To compare the efficacy of 2 commercially enzyme in high level of rice bran in broiler diet.
- One hundred chickens (21 days of age) were used in completely randomized design. There were 4 treatment groups, replicated 5 times with 5 chicks per group. The diet treatment were as follows: 1) Control (practical type diet containing 30% rice bran), 2) Control + xylanase, 3) Control + phytase, 4) Control + xylanase + phytase. The variables observed were: carcass percentage, breast meat percentage, thigh percentage, abdominal fat, cholesterol content in the blood serum. The current study demonstrates that combination of xylanase and phytase can allow high levels (up to 30%) of rice bran to include in broiler diets without any detrimental effect on broiler carcass.

Biography

N.G.A Mulyantini has a degree in Animal Science, Master in Science and Agriculture and PhD in Animal Science from University of Queensland Australia. Since 2000, its teaching and research activity include Poultry production and Poultry nutrition. She participated in several national and International projects of research and investigation. She has several scientific publications in national journals.

Local chicken production system in East Nusa Tenggara Province- Indonesia

N.G.A Mulyantini and Ulrikus R Lole

University of Nusa Cendana NTT, Indonesia

Local chicken in Indonesia is found in huge number distributed across different region. Most of the farmer rear chickens under a traditional family-based scavenging management system. The birds are left to scavenge in the backyard or in the garden, and are provided with limited facilities such as a simple cage, a small amount of food scraps, and no diseases prevention program. Hatching is done naturally, so the production takes more time and production per year is low. The number of chickens breeder is still low because of feed shortage. Most of the feed used is the feed which compete with human consumption. Therefore, the farmers have to find alternative feed ingredients that are beneficial to the local poultry. Therefore, there is a need to improve the management system of rearing chickens village. Small-scale intensive chickens rearing system is one of the methods in reducing various problems and improving performance and production of chicken village. The programs involved were: training, workshop, demonstration and application programs in feeding management system, housing management system, and diseases prevention management system. This activities design applying innovative technology to do the extension, practice, mentoring and result evaluation of breeder management, handling the incubator, handling day old chicks and raising chicks until finisher period. The result showed that average of egg production increased, hatch technology could be implemented correctly with average of hatchability was 85.85%, mortality rate of 2 weeks old chickens was decreased up to 3.76%. Mortality rate of 2 months old chickens was 0.68% with average body weight of 1075.3 grams. It can be concluded that the community services programs was very essential tool for profitable and sustainable local chickens farming system in East Nusa Tenggara Province Indonesia.

Biography

N.G.A Mulyantini has a degree in Animal Science, Master in Science and Agriculture and PhD in Animal Science from University of Queensland Australia. Since 2000, its teaching and research activity include Poultry production and Poultry nutrition. She participated in several national and International projects of research and investigation. She has several scientific publications in national journals.

Evaluation of microbial load of beef of arsi cattle in Adama Town, Oromia, Ethiopia

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The study was conducted in Adama city, on carcass samples collected from the Ethiopian breed called Arsi breed cattle with the objective of evaluating beef microbiological qualities with standard procedures. Carcass samples were randomly chosen at abattoir using systematic random sampling techniques. On the night of carcass sampling about 125 cattle were slaughtered and the carcass samples were chosen on every 10 counting. Beef samples were aseptically excised and collected from all parts of the exposed body of carcasses. The methods described by the Nordic Committee on Food Analysis (NMKL) were adopted to analyze each of the parameters considered. Aerobic plate (AP) count, total coliform (TC) count and fecal coliform (FC) counts were significantly different among different sampling days and batches of samples ($P < 0.05$). The mean AP, TC, FC, E. coli and staphylococci counts were 1.62×10^5 , 5.29×10^1 , 9.05×10^1 , 8.97×10^1 and 5.54×10^5 , respectively. Salmonella and Shigella bacteria were not isolated per 25 g samples. In Adama, carcasses are normally transported to the butchers' shop either in vans, minibus, taxi, three wheel motor cycle and horse-cart. This exposes the meat to a number of pathogens some of which may be pathogenic.

Ethiopia is one of the top possessors of livestock in Africa with an estimated population of 52.13 million, 24.22 million, and 22.62 million heads of cattle, sheep and goats, respectively (CSA, 2012). These livestock are playing an important role in the national economy, contributing to both agricultural products and national GDP. But the contribution of livestock and livestock products export to earn foreign exchange is not too large due to the fact that the country is not fully exploiting this resource. Several studies reveal that the production and productivity of the animal is low and products being produced are of low quality.

Yet, in recent years feedlot farms are flourishing and getting engaged in the export of processed meat to the Middle East and North African (MENA) and absorbing foreign currency from international markets. Standards, such as acceptable microbial load level are being adopted by almost all international markets. Several scientists have indicated the importance of continuous assessment on meat microbial load qualities. As far as microbial load level of Ethiopian meat is concerned there is limited information on the microbial quality of Ethiopian beef that is being retailed in different selling outlets. Therefore, this particular study investigated the microbial load on the beef harvested from the Arsi breed (Ethiopian breed cattle) and recommended how the eaters should handle and cook the beef.

Audience Take Away:

- My audience will understand about the beef in the developing countries like Ethiopia look like microbially.
- My audience will learn how the foreign nationals and tourists should handle and cook the Ethiopian beef.
- My audience will know how the abundantly available resources like livestock failed to be used efficiently in Ethiopia.
- My audience will have clear understanding of the investment opportunities in livestock sector in Ethiopia.

Biography

Arse Gebeyehu Wode was born on September 12, 1982 and studied my elementary and high school at Ethiopian Adventist Academy. After successful completion of high school I joined Mekelle University in 2002 to study animal science and got my BSc degree after four years. During my postgraduate study I studied animal production and collected my MSc degree in 2012 from Haramaya University. I'm senior researcher at Adami Tulu Agricultural Research Center with over 10 years experience in meat and dairy animal research. my recent research I studied the microbial load of beef of Arsi Cattle (bos indicus Ethiopian breed).

Evaluation of bioactive constituents of wild *Dioscorea dumetorum* against plant pathogens

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The phytochemical screening and evaluation of efficacy of ethanolic extract of wild *Dioscorea dumetorum* was determined using standard microbiological and physiochemical methods against some plant pathogens. The extraction of bioactive constituents of the samples was conducted using 80% aqueous ethanolic solution. The phytochemical screening revealed the presence of Alkaloids 8.6%, Saponins 10.8%, Tannins 3.7%, flavonoids 2.5%, steroids 1.7%. The antifungal potentials of the crude extract was tested against fungi isolates of *Rhizopus nodosus*, *Fusarium solani*, *Aspergillus flavus*, *Rhizopus stolonifer*, *Synchytrium endobiotium*, *phytophthora infestans*, *Spongospora subterranea*, *Venturia inaequalis*, *Magnaporthe oryzae*, *Ustilago maydis*, *Fusarium oxysporum*, *Fusarium moniliforme*, *Sclerotium rolfsii*, *Penicillium digitatum*, *Pencillium italium*. The minimum inhibitory concentration (MIC) ranged between 10-35 mg/ml. The antifungal activity against *ustilago maydis* was the highest with zone of inhibition of 35.4mm, *Spongospora substerranea* 30.5mm, *Synchytrium endobiotium* 28.2mm, *Rhizopus nodosus* 25.1mm, *Rhizopus stolonifer* 24.3mm, *Aspergillus flavus* 24.0mm, *Fusarium solani* 23.5mm, *Sclerotium rolfsii* 18.6mm, *Fusarium oxysporum* 16.8mm, *Penicillium digitatum* 14.3mm, *Pencillium italium* 13.7mm, *Venturia inaequalis* 11.2mm, *phytophthora infestans* 10.3mm. These results show antifungal action and medicinal potentials of aqueous ethanolic crude extract of *Dioscorea dumetorum*. This research is at the preliminary stage and it is ongoing. It may proceed to the isolation and characterization of the most bioactive component(s) of this wild yam. This research is therefore open to agricultural research plant pathologist, pharmacologist, food and nutrition, food safety, security and quality control, food and chemical toxicology and food and drug analysis. This research aim at strategies of controlling post harvest losses caused by fungi during storage. The research is educative because this wild yam is grown in most region of the world. The research is a practical solution to the problem of fungi infestation in wide range of crops. The local people of Igede tribe of Nigeria has used the aqueous extract of this wild yam species for years to control post harvest losses without understanding the scientific implications.

Biography

Mrs Odeh, Ichiko-Chic was born on 10th November, 1966 to the family of David and Abigail Igwe Otor of Ibila, Oju L.G.A, Benue State. She obtained First leaving certificate in 1979 from Methodist Primary School, Ibila center, GCE,1984 from Wesley High School, Otukpo, NCE, 1989 from ATC/ABU, Kano, B.Sc Ed (Chemistry),1997 and M.Sc Organic Chemistry,2015 from University of Agriculture, Makurdi. She is a senior lecturer in Chemistry Department, College of Education, Oju and currently a PhD student of Organic /Natural product Chemistry, Benue State University(Center for Food Technology and Research), Makurdi. She has attended various conferences, seminars and workshops in Nigeria, Ghana and Israel and has published many scholarly articles nationally and internationally both in chemistry and education. Mrs. Odeh I.C is a member of Chemical Society of Nigeria, National Association of Vocational and Technical Educators, Teachers Registration Council of Nigeria, National Association of Women in Colleges of Education and World Educators Forum. She has published two books on general knowledge. Her wealth of experience in the teaching of chemistry over the years has culminated in this research as a student of organic and natural product chemistry. She is married to Mr. Dave Odeh and are blessed with children.

Spatio-temporal optimization of food crop land based on pedo-agroclimate at suboptimal land using multicriteria approach in Buton district, Southeast Sulawesi Indonesia

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This research aimed to: (1) evaluate the availability of potential land and determine the suitability class for the development of food crops; (2) evaluate and determine the major and prime food crops; (3) identify the farming-based socio-cultural and economic characteristics, and utilize them as guidance in dealing with temporal climatic change; (4) evaluate and determine the prioritized major food crops based on multi-criteria approach; (5) develop planting management, and land improvement and management, through the input of suitable location-specific technologies, to be able to solve the challenges for the development of major food crops that are more productive and sustainable.

This research was regional based, using overlaid maps of thematic lands, conducted on dry-land area with dry-climate at the main region of Buton District, and based on a two-steps land evaluation approach (FAO, 1976). The research method used was a spatial research method GIS. The research had three main activities: data collection, evaluation, and mapping. Data collection included data on land biophysical, climate, and farming-based socio-culture and economic, using survey method. Land evaluation was conducted based on FAO method (1976) and Djaenuddin et al. (2011). The major food crops were determined using LQ method, and the prioritized food crops were determined using MCDM method through the application of AHP, and then mapping.

Research results showed that: (1) the main region of Buton District had relatively varied characteristics of land biophysical, climate, socio-culture and economic, (2) potential land for the development of food crops was 74,664.64 ha, where the land suitability level of S2 (moderately suitable) of 5,096.52 ha, S3 (marginally suitable) of 44,521.38 ha, and the rest was N1 (not suitable) and N2 (very not suitable), (3) there were eight major food crops in the research area, namely: cassava, soybean, upland rice, sweet potato, ground nut, maize, green bean, and paddy rice, (4) prime food crops in research area were varied among regions (10 sub-districts), however, in general, it was concluded that there were four prime food crops, namely: cassava, maize, upland rice, and paddy rice, (5) the management for planting, improvement and land management were by the application of multiple cropping system, planting diversification, and appropriate planting date for the period of December, January, February, and March, using drought resistant cultivar, and several other efforts for adaptation and conservation, such as mulching and cover crops, to deal with climate change. These were conducted to maintain the land and crop productivity, and the sustainable food availability.

Audience Take Away:

- Each region has different pedo-agroclimate conditions and each type of plant has different pedo-agroclimate needs in order to gain optimal productivity. Each type of food crop requires different pedo-agroclimates, even the same types of food crops on the same land but different plant growth phases require different pedo-agroclimate conditions.
- The success of the development of food crops in suboptimal land is determined by local farmers' knowledge about the constraints of land and climatic factors. Spatial planning for plant development has to be based the ability and suitability of the land in order to effectively and efficiently achieve optimal production. Suboptimal land with soil and climate constraints is not a permanent obstacle in the development of food crops, it can be remedied by

applying a multicriteria approach;

- There are three main substances of the multicriteria approach that need to be prioritized by farmers/companies to optimize productivity of suboptimal land so that recommended superior food crops can be developed in each region, namely: (1) socio-cultural aspects, including three sub-criteria, namely policy (P), Infrastructure (I), Farmers' Preference (FA); (2) the potential of pedo-agro-climate, including two sub-criteria, namely Land Suitability (LS) and Location Quotient (LQ), and (3) socio-economic potential, including two sub-criteria, namely market opportunities (MO), and Net Income of Farmers (R/C) ratio (NI).
- Based on the multicriteria approach (three criteria and several sub criteria), farmers or companies can determine the superior food crops priority that can be developed using the Analysis Hierarchy Process (AHP) method. Research results shows that the criteria of socio-culture are the highest factor in determining the success of the development of food crops at suboptimal land which has a pedo-agroclimate barrier of 46.5% (0.465), the second determining factor is the pedo-agroclimate criteria of 34.1% (0.341), and the third is socio-economic criteria with a value of 19.4% (0.194). At the sub-criteria level, policy direction is the first determining factor of 21.6% (0.216), and sequentially followed by land suitability of 20.4% (0.204), infrastructure of 14.4% (0.144), LQ of 13.7% (0.137), farmer's net income (R / C ratio) of 11% (0.110), farmer preference of 10.5% (0.105), and market opportunity of 8.4% (0.084)

Biography

Aminuddin Mane Kandari is an expert in Agroclimatology at the Department of Environmental Science, Faculty of Forestry and Environmental Science, Halu Oleo University, Southeast Sulawesi, Indonesia. He completed his doctoral degree at the Hasanuddin University in 2014 (agroclimatology), Master Degree at the Bogor Agricultural Institute (agroclimatology), and Bachelor Degree at the Halu Oleo University (agronomy). He has published many scientific articles to international journals : (1) Agroecological Zoning and Land Suitability Assessment for maize (*Zea mays* L.) in Buton Regency, Indonesia (AFF Journal, 2013); (2) Land Suitability and Problems Assessment for Food Crop Development Based on Pedo-Agroclimate and Resource Management (IJTAS journal, 2014); (3) Land Suitability Evaluation for Plantation Forest Development Based on Multicriteria Approach (AFF Journal, 2015); (4) Local Wisdom as Adaptation Strategy in Suboptimal Land Management at Binongko Island, Wakatobi, Indonesia (BBR Journal, 2017); and Assessment of Land Biophysical Properties on Different Slope Positions as Sustainable Management Conservation in Districts of North Moramo, South Konawe, Indonesia. He has also presented his articles to the international conference: (1) Optimization of Agriculture Land Based on Agroclimate Suitability Assessment of Pepper (*Piper nigrum* L.) Development in Konawe Regency, Indonesia: The 8TH International Conference on Innovation and Collaboration Towards Asean Community 2015; (2) General Study of Climate and Biodiversity Characteristics in Wawonii Island Konawe Islands Regency, Indonesia: Proceedings Celebes International Conference on Diversity at Wallace's Line (CICDWL 2015).

Other jobs at the Halu Oleo University are: (1) The head of Senat University 2005 - Now); (2) Former Deputy Dean on planning and financial matters of Faculty of Forestry and Environmental Science (2014 - 2015); (3) Former Deputy Dean on academic matter (2009 - 2012) of the Faculty of Agriculture; and (4) Former Deputy Dean on Student Matter of the Faculty of Agriculture (2005 - 2009).

Agro-ecological analysis of the “Kalalasi” agropolitant development area, Buton district, Southeast Sulawesi Indonesia

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Agricultural sector has historically served as a pillar of the Indonesian economy, but has yet to achieve its full potential. This sector has long been an important source of income for local households and has also contributed much needed export revenue. However, a host of challenges restrict crop yields such as limited access to capital for farmers as well market access and outdated infrastructures. It is therefore important to develop an integrated framework for agricultural development in which upstream activities well linked with downstream industries. Buton district is one of agricultural based area and it's located in Southeast Sulawesi Province of Indonesia. Local government is struggling to increase local farmer welfare through agropolitant development framework. The study aimed to: (1) analyze agro-ecological conditions within developed agropolitant area (soil characteristics and qualities and climatic conditions); (2) analyze and recommend suitable agricultural commodities based on land suitability analysis approach; (3) and determine infrastructures needed to properly link agricultural development area and its downstream activities. Results study showed that:(1) agro-ecological conditions were relatively varied within the developed agropolitant area; (2) Land suitability analysis showed that several annual crops have the land suitability level of S3 (highly suitable) such as : paddy rice which covers 7,637.47 ha of the area, ground nut (7,968,83 ha) green bean (5398,21 ha), cassava (5,288.58 ha). Kinds of fruit crops that have high suitable class within the area were water melon (10,705.24 ha) and orange (5042,85 ha). While plantation crops that have land suitability level of S3 (highly suitable) are cashew nut (5.2018,07 ha), cocoa (8247,07 ha) and coffee (8247,07 ha). It is therefore, all kinds of those crops are strongly recommended to be planted within the area of agropolitant; (4) In order to increase productivity of the annual crops, medium scale of irrigations need to be built in each sub-district, while small scale industries are needed to gain added value of fruit and plantation crops. Last but not the least, such infrastructures as road and harbor need to be built to link production zone to the local market within the agropolitant area and to trading those commodities to the national and global market.

Audience Take Away:

- The idea to develop this research framework is to give significant contribution the development of agropolitant area that is designed by local government of Buton District. Agropolitant concept is one of agricultural based development model that promotes mutual linkages between on farm and off farm activities. This model places on “urban agriculture” as the center of development area with the availability of resources, both natural and human resources as well as financial resource. Within agropolitant area, there will be an establishment and the development of economic poles growth and it's expected to bring about spread effect to other regions. Agropolitant area is not limited as center of agricultural based services, but also function as processing industrial services, ecotourism and other services. There is also a need of available facilities and infrastructures to support the development of agribusiness system, such as road, irrigation system, water clean source, electricity, processing industries, financial supporting system, harbor, terminal, telecommunication facilities, etc. An implementation of agropolitant development framework is expected to support local economic development, through integrated agribusiness approach and promoting linkages between rural and urban development. So that we can share our experience and knowledge in understanding a broad concept of agropolitant model and management.
- This research can represent agro-ecological conditions of the tropical land area, especially in Indonesia. So that the audience will overview various land characteristics and qualities as well as climatic conditions of the study area.
- The development of agropolitant area can be started with such questions as what kinds of commodities will be developed, and are those commodities biophysically and economically suitable with agro-ecological conditions within the area. In term of agricultural commodity development, land suitability method can be used to analyze level of suitability whether is low, medium or highly suitable to be planted within the area. It is therefore, we also want to share our knowledge and experience with the audience in term of using land suitability approach to the development of suitable plants under agropolitant framework and management.

- It is also important to analyze existing and needed supporting facilities and infrastructures and its interconnection so that on farm activities can be well linked with downstream industries. It will be interesting to discuss a broad concept of urban and rural linkages to promote local economic development through this presentation.

Biography

Safri Kasim is a currently PhD student at the Pascasarjana Program of Halu Oleo University and as a lecturer at the Environmental Studies Department, Faculty of Forestry and Environmental Science, Halu Oleo University, Southeast Sulawesi, Indonesia. Graduated from the Faculty of Environmental Studies, York University, Canada in 2000 and conducting research on the area of agroforestry, agro-ecology and ecosystem approach to environmental planning and management for the last ten years. Actively write and presenting academic articles both to the national and international journals. Currently working as Deputy Dean on academic matter Faculty of Forestry and Environmental Science (Dec 2012 - Now); Deputy Dean on student and alumni matters (Nov 2009 - Nov 2012) at the Faculty of Agriculture and the Head of Forestry Department, Faculty of Agriculture (2005 - 2009).

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