

2ND EDITION OF EURO-GLOBAL CONFERENCE ON

FOOD SCIENCE AND TECHNOLOGY

Theme:

Optimizing new paths in food science and
technology towards the global demand

Park Inn by Radisson Hotel & Conference Centre
Bath Road, Heathrow, Middlesex
UB7 0DU, London, UK



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*Optimizing new paths in food science and
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SEPTEMBER 19-21, 2019
LONDON, UK

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FAT 2019



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Thank You
All...

Welcome Message



Dear Attendees of the Fat 2019, the Global Food Science and Technology Conference

Welcome to London!

Fat and food are the two key-words of the more than twenty Scientific Sessions of our Conference "Fat 2019". This message witnesses the fact that there would be no life without an unlimited number of lipophilic molecules in the biosphere. The importance of research and applications on chemistry, technology, nutrition and safety of fat is an axiom.

Our programme responds to the global, future requirements: New avenues in technology and nutrition of fat but always in a sustainable way. The world-wide development is based on new concepts

supporting the innovative progress in life-sciences. The participants in our Congress in London are the best proof of the central role of fat in various fields of the daily life and academia.

Our common goal as specialists is to find solutions for the end-users – the close to eight billion human beings, the consumers. Science and technology are tools to guide our daily life in a safer direction. We are responsible not only of the validity of our single experiments or unit-operations in science and technology but also of any future applications in the hands of less experienced citizens.

Heikki Kallio

Professor Emeritus, Food Chemistry
Food Chemistry and Food Development Unit
Department of Biochemistry
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Welcome Message



Dear Conference participants of the 2nd Edition of Euro-Global Conference on Food Science and Technology 2019,

I would like to welcome you to beautiful London and wish you a nice conference with many exciting lectures from different areas. I am happy to be here and looking forward to have a lively exchange. I hope we can all learn something from each other. I have the honor to share with you something about insects. Because of the increasing population, I hope to highlight the importance of using this resource to feed our future world population.



I wish you all the best and a wonderful time here in London.

Nina Kröncke

**Nina Kroencke M.Sc.
Scientific Researcher**

University of Applied Sciences Bremerhaven

Keynote

Speakers



Brian Marsh
University of California
USA



Mohammed Moghadasian
University of Manitoba
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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 2019

Food Science Conference 2019 provides extensive information on rapid scientific and technological advances that are transforming the way our foods are produced, processed and consumed. It addresses current techniques, identifies key challenges and proposes effective solutions.

FAT 2019 is composed of keynote lectures, oral and poster presentations, workshops and interactive sessions in a friendly and learning environment which uplifts your research and knowledge.

Scope of FAT 2019: It serves as a platform for food scientists, food technologist, food chemists, food engineers, students, young researchers from academia and business organizations to share their views and research on the current trend in food science, food technology and food chemistry.



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DAY 1

KEYNOTE FORUM

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Biography

Dr. Marsh obtained a BS degree in Plant Science and a MS in Soil Science and Biometeorology at Utah State University. He received his PhD in Soil Science at the University of Kentucky. He was hired as Assistant Professor/Agronomist-in-Charge of the Kansas State University Cornbelt Experiment Field. Dr. Marsh returned home to California when he was hired as University of California Cooperative Extension (UCCE) Farm Advisor and Director of the Shafter Research and Extension Center. He currently serves as UCCE County Director and Agronomy Advisor in Kern County. He has written 370 research papers, technical reports and extension articles.

Nitrogen fertility in potato for optimum production and environmental stewardship

Brian Marsh

University of California, USA

Groundwater in parts of the Southern San Joaquin Valley has high nitrate levels. A State Water Resources Control Board commissioned report has indicated that crop land agriculture is the main source of nitrates in the groundwater. Annual rainfall is less than 20 cm, thus irrigation is necessary for optimum crop production. A project was undertaken to evaluate current nitrogen fertility and irrigation scheduling in potato production and their contribution, or lack thereof, to nitrate movement in the soil profile and potential nitrate contamination of groundwater. A line-source sprinkler plot area was established to create soil moisture regimes of 120% of target, target (optimum soil moisture for potato growth) and 80% of target. Pre-plant and post-harvest soil samples were collected to a depth of 2 meters. Plant, root and tuber samples were collected and analyzed for nitrogen content. Soil moisture and irrigation amounts were monitored. Plant dry matter and tuber yield increased with each N rate increase. The high N rate increased plant growth disproportionately to the increased tuber yield. Appropriate irrigation scheduling did not produce water movement beyond the effective potato rooting zone. Excessive irrigation moved soil nitrate deeper into the soil profile.

Audience Take Away:

- The partitioning of nitrogen between the above ground plant material and tubers changes with nitrogen fertilizer rate
- How line source sprinkler set up can be used to evaluate different irrigation or rainfall levels in a small area
- How irrigation and nitrogen application rate impact plant growth, yield and nitrate movement into the soil profile



Biography

Nina Kröncke studied Food Technology (B.Eng.) and Biotechnology (M.Sc.) at the University of Applied Sciences Bremerhaven, Germany. Now she works as a researcher at the Institute of Food Technology and Bioprocess Engineering, Germany, in the research group of Prof. Dr. Rainer Benning and specialized in working with mealworms (*Tenebrio molitor*).

Feeding study for the mycotoxin zearalenone in yellow mealworm (*Tenebrio molitor*) larvae – investigation of biological impact and metabolic conversion

Nina Kröncke

University of Applied Sciences Bremerhaven, Germany

Insects could be used as an additional source of animal protein incorporated in food and/or feed. The processed proteins of yellow mealworm larvae (*Tenebrio molitor*) are, together with six other insect species, legally allowed in animal feed. Before considering *T. molitor* larvae as suitable for consumption, the possible presence of contaminants must be identified. One of the contaminants of most concern are mycotoxins. This report focusses on the effect of the presence zearalenone (ZEN) and its metabolites on *T. molitor* larvae. Seven different diets were prepared, namely the; control, spiked (S1: 558.5 µg/kg ZEN; S2: 2254 µg/kg ZEN), artificially contaminated (A1: 427.0 µg/kg ZEN; A2: 2283 µg/kg ZEN) and naturally contaminated (N1: 602.3 µg/kg ZEN; N2: 919.3 µg/kg ZEN). The amount of ZEN and its metabolites in the feed, larvae and the residue (combination of left over feed and faeces) were measured by HPLC-MS/MS. A significant difference in individual larval weight gain was found between the diets containing naturally contaminated wheat (N1: 7.80 mg; N2: 9.25 mg) and the other diets after eight weeks of exposure. No ZEN or ZEN metabolites were detected in the *T. molitor* larvae after harvest. However, ZEN, α- and β-ZEL were found in the residue samples. Lastly, ZEN- and ZEL-sulphates were only detected in the control and the naturally contaminated samples. Thus, suggesting that mainly transformation to of either ZEN to ZEL or ZENS to ZELS takes place during larval metabolism.

Audience Take Away:

- Mealworm larvae represent a very sustainable source for feed and food
- It could be possible to optimize waste management by offering insects food that is not authorized for human consumption
- *Tenebrio molitor* can be fed with mycotoxin-contaminated substrate



Biography

Dr. Peng Sun received her PhD degree majoring in Animal Nutrition at China Agricultural University. Now she joined the research group of Prof. Hongfu Zhang at the Institute of Animal Sciences, Chinese Academy of Agricultural Sciences (IAS-CAAS). Dr. Peng Sun have obtained the position of a Professor at IAS-CAAS. Her recent research is focused on milk quality and safety. She has published 78 papers, among which 35 papers have been embodied by Science Citation Index (SCI), which have been cited 307 times by other SCI papers. As the first and corresponding author, the applicant has published 20 SCI papers.

Milk bioactive proteins and their physiological functions

Peng Sun

Chinese Academy of Agricultural Sciences, China

Milk is the basic food for infants and newborn animals, providing a rich source of proteins, carbohydrates, minerals, and vitamins. Milk also provides nourishment for people of all ages due to its abundant nutrients, and it is used in the manufacture of numerous health-related products. Milk contains caseins and whey proteins as the two major protein classes. Caseins fall into four major types known as α s1-, α s2-, β - and κ -casein, whereas whey proteins comprise a mixture of globular proteins including β -lactoglobulin, α -lactalbumin, serum albumin, lactoferrin, and other bioactivators. The various biological activities of these proteins are involved in preventing and treating numerous nutritional, physiological and metabolic diseases. Lactoferrin (lactotransferrin; Lf) is an iron-binding glycoprotein and one of the most important bioactivators in milk and other external secretions. It has numerous biological roles, including the regulation of iron absorption and modulation of immune responses, and has anti-microbial, anti-viral, antioxidant, anti-cancer, and anti-inflammatory activities. Lf regulates the quantity of iron absorbed in the intestine via its role in iron transport and can also chelate iron, directly or indirectly. Early investigations focused on its iron-binding ability, which is involved in iron transportation and metabolism. However, since its anti-microbial properties were identified, recent studies have demonstrated that it can limit pathophysiological events associated with oxidative stress, inflammation and carcinogenesis. To date, Lf has displayed a broad range of preventive, therapeutic and biological activities. Lf can inhibit proliferation of several kinds of tumor cells, and it was reported that the increased oncogenicity of human cervical endometrium was related to down-regulation of Lf, accompanied by increased tumor cell proliferation. Lf has been proved to exert anti-tumor effects by inhibiting angiogenesis in a HT29 human colon tumor model. However, heat treatment affected the antitumor activity of Lf in a temperature-dependent manner. To date, Lf has displayed a broad range of preventive, therapeutic and biological activities. Notably, it has been used as an adjuvant therapy for some intestinal diseases. It is now used in nutraceutical-supplemented infant formula and other food products.

Audience Take Away:

- Milk contains a variety of bioactive substances, which might be inactive after heat treatment
- Lactoferrin has been proved to exert anti-tumor effects by inhibiting angiogenesis in a HT29 human colon tumor model.
- Lactoferrin effectively inhibits HT29 tumors, which might be achieved by regulation of phosphorylation from various kinases and activation of the VEGFR2-PI3K/Akt-Erk1/2 pathway
- Heat treatment affected the antitumor activity of lactoferrin in a temperature-dependent manner, which might provide valuable information for milk process

SPEAKERS

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Soil Sampling for food Security

Claudia Quilesfogel-Esparza

Soil Department, Motzz Laboratory, USA

With human population steadily increasing, food will have to be grown in a more sustainable way. It is hard to talk about agriculture without mentioning soil, however soil is often not treated as a finite natural resource. The agriculture industry has had a soil depleting problem that became famous during the Dust Bowl in the United states.

There is a desire from conscious consumers to know how their food is grown and what practices were used organic vs. conventional farming. Consumers want quality when it comes to the food they purchase, and they are willing to pay a premium for it. Soil health is becoming more and more important in agriculture to ensure food security.

Soil sampling provides vital information in what is happening in the field. The importance of correct soil sampling which includes the time to sample, location and number of samples is quintessential to maximizing the crops grown in a field. However, interpreting a soil report is often overlooked.

Interpreting soil reports is key in understanding what nutrients are lacking and what are in excess. Applying fertilizer can have huge environmental and monetary impact on yield and price of the crop. The amount of fertilizer needed to grow a crop and at what stage of the crop to fertilize is imperative information that will cut down on cost and yield. Without soil we will not have a way of feeding our ever-growing human population.

Audience Take Away:

- Gain an appreciation for soil
- Be able to distinguish different farming methods, organic vs. conventional farming
- How to sample soil
- Understand the basics of a soil report

Biography

Claudia Quilesfogel-Esparza graduated in 2015 from the University of Arizona with a B.S in Environmental Science with a Soil Science emphasis. Since graduating Claudia has worked at Motzz Laboratory in Phoenix Arizona and is currently the Laboratory manager. She is an Associate Professional Soil Scientist.

A phage filter for the identification and quantification of pathogens in large volumes of liquids

Bryan A. Chin*, Songtao Du, Tung-Shi Huang

Auburn University, Auburn AL, USA

In the United States approximately 48 million illnesses occur each year due to foodborne pathogens. On average, the American citizen will become ill 12.8 times during their lifetime and endure 50 days of sickness due to foodborne illness [1, 2]. The medical costs, recall costs and productivity losses due to foodborne illness are more than \$15.6 billion per year [3]. Large volumes of food must be evaluated for the presence of pathogens that cause illness. The current technique of analyzing only a few ml of food samples from thousands of green spinach leaves, fruits or other vegetables is woefully inadequate to insure the safety of our food supply. In this paper, a clog resistant, biomolecular, phage filter has been developed to capture, concentrate and isolate small numbers of target pathogens from large volumes of liquid. The phage filter consists of a magnetized filter frame and thousands of phage-coated filter elements made of a magnetoelastic material [4, 5]. Pairs of magnets were used to generate a uniform magnetic field to align and hold filter elements on the frame. Filter elements, held by the magnetic field, are free to rotate, allowing passage of large debris. The strip-like filter elements were made of Metglas 2826MB ribbon with phage specific to target pathogens immobilized on the surface. A prototype filter with high density of filter elements in the size of 2 x 2 has been demonstrated. Figure 1 is a photo of one layer of the non-clogging filter. Measured Capture Efficiency (Salmonella filter) is shown in Figure 2.

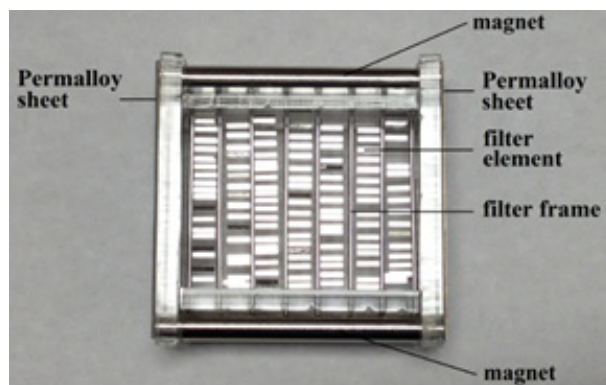


Figure 1: Photo of Phage Filter

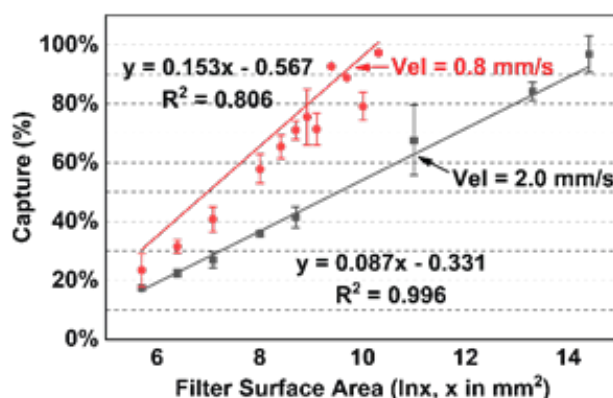


Figure 1: Photo of Phage Filter

Biography

Dr. Bryan A. Chin graduated from Stanford University. He worked for Westinghouse and the U.S. Department of Energy prior to coming to Auburn University where he has been a member of the faculty for 39 years. Dr. Chin is the Director of the Auburn University Detection and Food Safety Center, Chair of Materials Engineering and a fellow of ECS, ASM, ANS, and AWS professional societies. He is also an Honorary Professor of the Chinese Academy of Sciences and Foreign Member of the Russian Academy of Engineering Sciences. Dr. Chin has published more than 300 reviewed scientific articles.

Sensory characteristics of three different open-pollinated beetroot cultivars, *Beta vulgaris* L. ssp. *vulgaris* (conditiva), compared to two F1 hybrids

Khadijeh Yasamin Shirazi*, Jens Hartung, Simone Graeff-Hönninger

University of Hohenheim, Germany

About a quarter of the beetroot, *Beta vulgaris* subsp. *vulgaris* (conditiva), produced in Germany grows on organic land, which makes this vegetable a typical organic product. Beetroot contains considerable concentrations of biologically active substances, which are relevant to its taste. However, the relevant compounds are not characterized in many beetroot cultivars, especially in those used in the organic sector. The overall aim of the project is to characterize taste relevant compounds in different cultivars. Based on these results new open pollinating red beet cultivars will be bred using the traditional method of single plant selection, which is in line with the concept of organic agriculture, in order to use the cultivars potential to improve taste and health-promoting substances.

Juice samples were produced from three different open-pollinated cultivars, namely, Robushka, Nochowski, Jannis and two F1 hybrids, Boro and Monty. The beetroots were grown under organic conditions, at the research station of the University of Hohenheim (Stuttgart, Baden-Württemberg, Germany). The sensory evaluation was set up using 37 untrained panelists, which were among the master students and staffs of the University of Hohenheim. The organoleptic attributes evaluated were: sweetness, aroma intensity, bitterness, earthy taste and overall acceptability. The order of presentation of samples to the participants was randomized for each panelist. The juice samples were served in clear glasses to the participants and in order to avoid carryover taste, plain bread was available and water was provided to rinse the mouth between evaluations. Each sensory attribute was scored on a 10 – point Hedonic Scale. The data were analysed using a mixed model approach fitting fixed effects for cultivar and random effects for order and panelists.

The results indicated significant differences in sweetness and earthy taste between the cultivars ($p < 0.0001$ and $p = 0.0022$, respectively). Nochowski was evaluated as a cultivar with the sweetest and lowest bitterness taste compared to all other studied cultivars. However, Robuschka was rated as a cultivar with the highest aroma intensity, lowest earthy taste and highest overall-acceptability. Taking all the cultivars into account, the open-pollinated cultivars showed more sweetness, less bitterness and higher overall-acceptability compared to F1 hybrid cultivars.

Audience Take Away:

- Understanding the differences between the organoleptic attributes of various beetroot cultivars
- A guidance for selection of the proper cultivars for various purposes such as breeding and food product development based on the difference between the cultivars regarding their sensory characteristics
- According to the fact that, using F1 hybrid cultivars in organic farming is critical, this study tries to use the genotypic potential of the different beetroot cultivars and introduce the new open pollinating bred lines with outstanding features to the market

Biography

MS.c. Khadijeh Yasamin Shirazi studied Food Science and Technology at the Shiraz University, Iran (2008-2012). Based on her tend to widen the knowledge in the field of organic agriculture, she started her master in an international interdisciplinary master program, namely Organic Agriculture and Food Systems, at University of Hohenheim, Germany. She accomplished the master thesis under the supervision of Prof. Dr.-Ing. Reinhard Kohlus, Department of Process Engineering and Food Powders. In 2018, she joined the research team of Prof. Dr. agr. Simone Graeff-Hönninger, Working Group of Cropping Systems and Modelling, Institute of Crop Science, and doing her Ph.D. project on the topic of Evaluation, agronomic and organoleptic development of existing red beet cultivars and breeds for new and further specific utilization.

Solid-state fermentation for Chinese liquor production

Guangyuan Jin^{1,2*}, Arjen Rinzema¹, Yang Zhu¹, Yan Xu², Rene Wijffels¹

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Chinese liquor (Baijiu) is the world's largest consumed spirit (over 4 billion litres annually, total output values 40% of fermentation industry and 68% of brewing industry in China with Profit/Tax: \$80 billion/\$10.5 billion, 2016). Typically, with Jiuqu (as sort of Koji) as starter, Chinese liquor is fermented and distilled under solid-state conditions. The traditional manufacture process consists of an aerobic part (with *Aspergillus*) for starter and an anaerobic part (with *Saccharomyces cerevisiae* and *Lactobacillus*, etc.) for liquor. Despite a certain degree of stable production, the traditional manufacture process is artisanal and unpredictable, leading to quality defects even safety concerns. Better understanding and control of the solid-state fermentation process will help to get an optimized environment for liquor flavour formation, the ultimate criterion of liquor quality. First, we use a model system to simulate and study the basic principles under starter (aerobic) fermentation focusing on water change. Then for liquor (aerobic) fermentation, we use online and offline methods to detect key process parameters and modelling. The hidden knowledge behind the traditional Chinese liquor production is rich in useful principles including flavour chemistry, microbial growth, solid-state fermentation, enzyme production, bioconversion, microbial community evolution and metabolism, and process engineering. Therefore, to get insight into the hidden knowledge behind the complicated and somehow empirical solid-state fermentation process of Chinese liquor can enrich the food sector to improve our quality of life and benefit other industrial sectors in the modern biomass-based technology, economy and society. Here we used mathematical modelling to study dynamics under traditional solid-state fermentation using Chinese liquor production system as a model. This work can be used to define most important factors, guide the scale-up and process control of traditional solid-state fermentation.

Audience Take Away:

- The hidden knowledge behind the traditional Chinese liquor production is rich in useful principles including flavor chemistry, microbial growth, solid-state fermentation, enzyme production, biocatalysts, microbial community metabolism and process engineering
- Studies in a more in-depth, systematic and practical way on this look-like empirical process to explore the scientific principles behind will benefit the liquor industry in particular, and the (food) biotechnology sector in general
- This study can benefit the traditional solid-state fermentation modernization for process control and improvement
- The technique used in this system can guide the study in similar complex traditional solid-state fermentation system

Biography

Mr. Guangyuan Jin studied Fermentation Engineering at the Jiangnan University, China and graduated as MS in 2015. He then joined the research group of Prof. Rene Wijffels at the Bioprocess Engineering Group in Wageningen University and Research, the Netherlands. His study topic is solid-state fermentation for Chinese liquor (Baijiu) production, focusing on engineering aspects of the fermentation for process control and optimization. First author paper Mystery behind Chinese liquor fermentation was published in Trends in Food Science and Technology (2017).

The use of vacuum impregnation in the traditional and innovative processing of fish products

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The consumption of fish and seafood is highly recommended worldwide because of its proven benefits on human health. Their nutritional importance is based on the content of high biological value proteins and polyunsaturated n-3 fatty acids, vitamins and minerals. However, its composition makes them highly perishable, for the presence of low- molecular-weight nitrogen compounds, almost neutral pH and high water activity (aw). This fact motivated the development of preservation methods to extend fish shelf-life. In this context, hurdle technology (HT) irrupted into food scenario responding to the increasing demand of healthy food, usually related with minimal processing to reduce nutritional losses. HT combines low intensity barriers to create a hostile environment for microorganisms. Our research include the use of vacuum impregnation (VI) among these hurdles, in either traditional or innovative preservation methods, to valorize fish species which are underexploited or have different commercial importance. VI modifies mass transfer mechanisms by the application of a partial vacuum pressure (p1) to food immersed in a solution for a certain time (t1) and the further restoration of atmospheric pressure during t2, which favors the impregnation with the solution of interest. We studied different fish and VI treatments: 1) Biopreservation of hake (*Merluccius hubbsi*) fillets (1% p/v Nisin, p1=50-100 mbar, t1=t2=5 min); 2) Osmotic dehydration (OD) of flounder fillets in quaternary solution (10%p/v NaCl, 3%p/v Sucrose, 0.5%p/v acetic acid; 4 vacuum pulses cycles: p1=100 mbar, t1=5, t2=10 min, total: 7h); and 3) Brining of white fish fillets (10%p/v NaCl; p1=100 mbar, t1=5 min, t2=30, 60, 120, 180, 240, 300, 360 and 420 min). We analyzed Impregnation Percentage (IP), water, salt, sucrose and acetic acid contents, aw, mesophilic bacteria counts (MB), *Staphylococcus* spp., color (L*, a*, b*) and texture (Texture Profile Analysis) of VI and control (treated at atmospheric pressure) samples. Statistical analyses included Two-ways ANOVA, MANOVA, Tukey Test ($\alpha=0.05$) and Principal Component Analyses (PCA). Solutes mass transfer kinetics in 2) and 3) were properly modeled by Peleg equation ($R^2>0.971$). In 1) IP and nisin activity was higher in hake fillets treated with 100 mbar (8670 IU/100g), than with 50 (6477 IU/100g) and 0 mbar (5755 IU/100g), with no significant changes on fish color. There was a significant reduction of MB and *Staphylococcus* spp. counts in hake treated with VI, which extended the product shelf-life. In 2) was a significant positive effect of VI on mass transfer kinetics of salt, sucrose and acetic acid towards the fish muscle during flounder OD. This implied shorter processing time, as well as lower aw values influencing the product stability. In 3) salt gain improved by VI. Total mass change was positive and significantly higher in VI fillets, resulting in higher product yield. The use of VI reduced salting processing time in a 75%, according to Peleg model predictions. VI did not affect the color and texture of brined hake. PCA indicated that fresh hake and 240min brined samples differed in IP, NaCl, color and elasticity. The described experiences prove the positive effect of VI on fish processing efficiency, and let glimpse its potential applications in combination with other process or hurdles for the development of fish products.

Audience Take Away:

- The audience will be aware of the importance of fish consumption for human health, due to their rich nutritional composition, high in proteins, polyunsaturated fatty acids, vitamins and minerals. For instance, fish polyunsaturated long chain n-3 fatty acids are essential in human nutrition. They have proven to have anti- inflammatory effects, decrease platelet aggregation and to be essential parts in the cell membranes, cardiovascular system, brain, and nervous tissue
- The presentation shows the practical applications of vacuum impregnation in different fish species processing, as promoter of the incorporation of different substances of interest into the fish muscle. For example, it demonstrates the use of IV and vacuum pulses to promote the solutes flux during osmotic dehydration of fish in multicomponent solutions and bio preservative substances to extend fish shelf-life. These techniques could be potentially used with other preservation barriers to improve quality and shelf-life of safe fish products
- Brining is a preliminary, critical and even essential process for many traditional and innovative fish products obtained, for instance, by hurdle technology. Brining time could be reduced by vacuum impregnation; without negative effects on the product texture attributes, as it was evaluated by Texture Profile Analysis
- Applications of vacuum impregnation in fish processing discussed in this presentation could be implemented for the valorization of different fish species worldwide

- The examples showed in this work could trigger the use of other novel, functional or biopreservative substances applied by vacuum impregnation in either underexploited or commercially important fish species
- The reduction of process time by vacuum impregnation in some of the preservation techniques described could positively influence fish processing at industrial scale

Biography

Professor Alejandra Tomac is a Researcher at the National Scientific and Technical Research Council (CONICET) in Argentina. Her investigation focusses on the preservation of fish products with traditional and innovative methods, including hurdle technology, ionizing radiation and vacuum impregnation. She became a Food Engineer at the National University of Mar del Plata (UNMDP), Argentina, in 2006, and then she specialized in Export Management & Entrepreneurial Development at MIB School of Management, Italy. She graduated as Ph.D. in Engineering at La Plata National University (Argentina, 2013). In 2008, she joined the Food Quality and Preservation Group (Food and Environment Science and Technology Institute, UNMDP) where she continues working nowadays. She is also the Professor of Food Engineering Degree Thesis (Engineering Faculty, UNMDP).

Study on high-yielding cultivation technology theory and practice of super hybrid rice in china

Guohui Ma

Hunan Hybrid Rice Research Center, China

China has made great progress in research of super rice, and we achieved the yield as high as 17.28 t/ha over 6 hectares in Yunnan, China in 2018. The plant type of super hybrid rice (SHR) was studied to be characterized with effective increase of source, expansion of sink capacity and coordination of high-level source and sink. The yield difference among SHRs, hybrid rice varieties (HRV) and modern inbred rice (MIR) was shown that: 1) SHR had a significantly higher yield than HRV and MIR by 10.1% and 16.6%, respectively; 2) SHRs, Liangyoupeijiu and Liangyou0293, had higher harvest index than that of Shanyou63 (HRV) by 12.2% and 8.3% respectively; 3) The maximum weight of panicle of LiangyouE32 (SHR) at maturity was append up to 13.23g before stem broken in the simulated experiment, while Shanyou63 (HRV) only being 7.72g, indicating SHR has a stronger lodging resistance.

The reasons of SHRs with a great yield gap were studied. The results showed that: 1) the RUE of SHRs was significantly lower in ordinary rice area than that in the ecologically suitable rice area by 11.4%; 2) SHR was intolerant to weak light, the RUE of SHRs decreased by 93.7% at 70% artificial shading; 3) SHR was intolerant to lower fertility conditions. LiangyouPeijiu (SHR) at the nitrogen stress yielded 23.1% lower than that at a suitable nitrogen rate. The authors proposed integrated package techniques with the key points of young seedling transplanting, reasonable spacing, water-saving & root-enhancing, and lodging resistance by way of combination of promotion & inhibition.

Audience Take Away:

- Establish a sustainable way to keep contact for future technical consultancy
- Establish a cooperative program to do joint research work
- Join in the training program of hybrid cultivation technology

Biography

Ma Guohui (Prof), born in May, 1959, a research professor, PhD supervisor, is now the DDG of China National Hybrid Rice R&D Center or Hunan Hybrid Rice Research Center. He is also a member of the expert team of the State's Support Project of Ministry of Science and Technology. Employed as one of the first batch of research professors of China Food and Food Safety Research Center, he is also selected to take part in the '121 Talent Project of New Century' of Hunan province and honored as 'Chutian Scholar' of Hubei province. He served as guest professor in universities including Central South University, Hunan Agricultural University, Yangtze University and Northeast Agricultural University, and has cultivated more than 10 master and doctoral students.

Main achievements: Second prize of National Science and Technology Achievements, 1 First prize of Hunan Provincial Science and Technology Achievements, 3 Second prize of Hunan Provincial Science and Technology Achievements, 5 Third prize of Hunan Provincial Science and Technology Achievements. Advanced Individual of National Agricultural technology extension and Advanced Individual of National Food Production awards by the Ministry of Agriculture in 2004 and 2007 respectively. Advanced Individual of National Rural Science Popularization award by China Association of Science and Technology in 2005. Advanced Individual of National Science and Technology Projects in High-yield Food award by the Ministry of Science and Technology in 2011. He published over 70 Chinese and English research papers in professional magazines in and outside China and published (editor-in-chief or co-author) 5 Chinese and English writings.

Evaluate the appropriate fertilizer usage to narrow the rice yield gap in the major super-hybrid-rice-growing areas

Liu Yang^{1*}, Ma Guohui²

¹ Hunan Rice Research Center, China

² State Key Laboratory of Hybrid Rice, China

The yield of super hybrid rice had achieved world recognized marks and accumulated a lot of valuable experiment, but the yield potential maximum only at the special ecologic regions and the grain yield varied sharply among normal ecologic regions. In this study fifteen field experiments with five super hybrid rice varieties and four N levels were conducted at eight locations from 2015-2017 to illuminate the effect of yield components' variation on the yield gap and the yield-improving effects response to N levels. In this study, the yields of super hybrid rice varied from 8.98 to 10.59 t ha⁻¹, 7.82 to 9.24 t ha⁻¹ and 8.59 to 10.63 t ha⁻¹ in 2015, 2016 and 2017 respectively, their amplitude of variation significantly negative correlate with the that of panicles ha⁻¹ ($r=-0.6614$) and grain weight ($r=-0.6599$). The grain yield gap was highest under no fertilizer treatment (N1) and had been decreased 12.97% at most when fertilizer applied moderately. The yields which were increased by fertilizer had been affected by N levels significantly and by regions extremely significantly, and it positive correlate with spikelets ha⁻¹ that increased by fertilizer ($r=0.5247$). Compared with N1, the treatment of N3(20kg ha⁻¹) had increased yield about 3.03 t ha⁻¹, in which the yield gap was smaller 5.49% and 16.32% than that of N2 and N4 respectively. So we concluded that the super hybrid rice varieties which have the characteristic of multi-panicle and heavy-grain was basic for narrowing the grain yield gaps among different regions. In addition, reasonable fertilizer at the level of 20 kg ha⁻¹ nitrogen was beneficial to the sink size improving and was essential for the realization of high and stable yield simultaneously. Therefore, this study provided a theoretical support and technical guidance for minimizing yield gaps in the major super-hybrid-rice-growing areas.

Biography

Dr. Liu Yang studied agronomy at Hunan Agriculture University in China, and graduated as MS in 2010. He works at the rice research institute in Hunan province, and joined the research group of Prof. Ma Guohui at the Southern Regional Collaborative Innovation Center for Grain and Oil Crop in China, and mainly engaged in the research on the formation mechanism of high yield of super hybrid rice. He obtained the position of an Associate Professor at the Hunan Academy of Agricultural Sciences. He has published more than 50 research articles, received 2 Hunan provincial science and technology progress awards, accredited 6 China national invention patent.

Investigation of microbial contamination levels in meats and meat processing products

Minyoung Bae*, J. Sung, Y. Cho, J. Yoo, Y. Han, S. Kim, J. Myung, J. Hong, S. Park, D. Choi and M. Kim

Ministry of Food & Drug Safety, South Korea

It is stipulated in the WTO as a food safety management measure different by country that The member countries must take all actions to protect the life and health of humans and animals from hazards that may arise from the pathogenic microorganisms, toxins, pollutants and food additives of food, beverages and feed in the SPS Agreement. The key is that these measures must be made on the basis of scientific risk assessment. Accordingly, we tried to confirm the food poisoning hazard degree due to the intake of meat and meat processing products quantitatively by performing the development of growth prediction model of pathogenic *Escherichia coli* and risk assessment of meat and meat processing products in food, and to derive the management measures for safe food intake. In this study, the monitoring inspection was carried out with the beginning of risk assessment. A total of 500 samples were collected according to the sampling plans recommended by The International Commission on Microbiological Specifications for Foods(ICMSF) from a number of stores and markets. The methods of microbiological test in this research were accorded to the Korean Food Code. As a result, EHEC(*E. coli* O157: H7, O111;NM) was detected from beefs (3/82) and porks(1/104). And EPEC(*eaeA*) was detected from beefs (7/82) and porks(1/104). ETEC(STp) was detected in one sample of beef. Among other meat processing products(hams, bacons, and sausages etc.), pathogenic *Escherichia coli*(EHEC, EPEC, ETEC, EIEC and EAEC) was not found. Up to now the monitoring is in progress, and it is expected to be able to share more and more monitoring results at the time of poster presentation.

Audience Take Away:

- Monitoring condition of meats and meat processing products in South Korea

Biography

Mrs. Bae studied Immunology at the Seoul National University, Korea and graduated as MS in 2009. Then she is in charge of food microbiology research at MFDS(Ministry of food and drug safety).

Antibacterial activity of novel peptides purified from buffalo and bovine casein hydrolysates by proteases

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The objective of this study was to investigate the antibacterial characteristics of buffalo casein (CB) and bovine casein (CN) hydrolysates by proteases (papain, pepsin, alcalase and trypsin) and its fractions against Gram negative (*Escherichia coli*, *Salmonella typhimurium*) and Gram-positive (*Staphylococcus aureus*, *Bacillus subtilis*). The casein hydrolysates were separated using ultrafiltration (UF) and further purified by RP-HPLC. The fractions produced higher antibacterial activities were identified for their peptides using LC MS/MS. The results demonstrated that pepsin hydrolysate from concentration of 6 mg/mL to 10 mg/mL exhibited highest antibacterial activities against all pathogenic bacteria with exception for *Salmonella typhimurium* that was the least affected. The fraction with a low molecular weight (<1 kDa) of peptides demonstrated the highest inhibition of growth than other fractions. Moreover, fraction (<1 kDa) at concentration of 1mg/mL was the most effective as an inhibitor against *Bacillus subtilis*; whereas *Escherichia coli*, *Salmonella typhimurium* and *Staphylococcus aureus* were at concentration of 4 mg/mL in both CN and CB. Among 40 fractions of RP-HPLC purified, fraction 1, 14 and 15 and fraction 2 and 4 showed higher antibacterial activity than the other fractions for CB and CN respectively. Consequently, the novel antibacterial peptides identified by LC MS/MS were LRG, DKT, RLME, SKK, LRF, MRSPGANH and EMEL in CB. The results could provide novel antibacterial peptides from CB that can find a potential natural food preservative utilization in the food industry as a natural bio-preservative and nutraceuticals, and pharmaceuticals.

Audience Take Away:

- They will be able to use technical ultrafiltration and HPLC to separation of bioactive peptide in natural bio-preservative and nutraceuticals products
- The audience will be more interested about information and acknowledgments production and identification of some bioactive peptides from the enzymatic hydrolysis of buffalo's milk casein fractions in comparison with those of cow's milk
- The researcher at other faculty could be used to expand their research or teaching
- The results could provide novel antibacterial peptides that can find a potential natural food preservative utilization in the food industry
- The research field will provide new information to assist in a design problem such as Pharmaceutical, and Dairy food industry, Also Ministry of Health and Population

Biography

Dr. Ahmed Behdal Shazly studied Dairy Science & Technology at Faculty of Agriculture – Ain Shams University, Egypt. He got two diplomas in Biotechnology and Quality control of Food and Milk product field in 2003 and 2004 and graduated as MS in 2009. He studied in Food science and Technology at Jiangnan University, China, and graduated as PhD in 2017. He then joined the research group of Prof. Youling Xiong and Prof. Jie Chen at Jiangnan University. He has last two published research articles in Food Chemistry journals.

Very promising attraction: Advanced, novel, energized, natural, sustainable and effective product without active substances, for no more needed irrigation for good agricultural yield in drought and heat condition

Majda Ortan, ing.

Executive Director, Founder and Owner of Company

In growing season 2013 was in Slovenia obtained field's trial with target to produce hops without pesticide. As alternative to usual plant protection products, energized, sustainable, professional products known under brand Cora agrohomoepathie®, were used. Those high innovative, novel, natural products are energized (from appropriate complex of appropriate plants and mineral sources) and don't contain active substances. Active are vibrations of appropriate plants-mineral natural sources, suitable stabilized on carrier medium. Specification data sheets about our products Cora agrohomoepathie®, which are available for foreign markets, are available under this link. With different products Cora agrohomoepathie® and sprinkling program, were to pests and diseases hops management, assured strengthening of hops own vitality and so (implicitly, by strengthening of vitality), also hops own resistance to diseases, pests, to biotic and to abiotic stress. Produced hops were in good quality, the cones were healthy and without damage, alpha acid content were more than 20% better as in the cones of the harvest of year 2013 of the same variety of hops. The amount of yield was just 3% less as the average amount of the harvest of year 2013 of the same variety of hops. It should be pointed out that hops on experimental surfaces where we used Cora agrohomoepathie products were not irrigated and not watered, despite severe drought and heat. It should be pointed out, that hops on experimental field surfaces where we used Cora agrohomoepathie products®, was not irrigated and not watered, despite severe drought and heat. To strengthen adaptability of hops to the severe drought and heat, was used novel product Cora agrohomoepathie X62***.

Effectiveness of the novel product Cora agrohomoepathie X62 in case of drought and high temperatures in growing seasons, was carried out, evaluated were results of effectiveness of the product and confirmed was its effectiveness in terms of strengthening the vitality of agro-cultural plants and indirectly specifically strengthening the adaptability of plants to the conditions of severe drought and heat. The results were obtained from the hops field trials on the Aurora hops cultivation, in non-irrigated and not watering hops field in 2013, when in Slovenia severe drought and heat occurred. Monitoring and testing were carried out by highly specialized experts in the field of hops in Slovenia. Slovenian Institute for hops researching and brewing, was for comparisons of results of effectiveness of the products Cora agrohomoepathie X62, assured the results of the monitoring of the production of hops from year 2013 of the Aurora variety, on their hops fields, which were irrigated (*).

The hops field trial with use of product Cora agrohomoepathie X62, was conducted in extreme conditions of severe drought and several heat waves during the growing season, which were occurred also in sensitive developmental phenophases of hops.

With results excellent performance results confirmed the effectiveness of the product Cora agrohomoepathie X62 by its use on not irrigated hops plants on severe drought and heat: it has been proven, that the yield of hops from not irrigated surfaces, where spraying with spray from product Cora agrohomoepathie X62 was performed, in terms of quantity was very comparable with the yield from irrigated surfaces, and in quality, compared to the value of alpha acids, had the equal result as the highest value of alpha acids, which was measured on the comparative and irrigated hops field (*).

Biography

Majda Ortan, ing Professor of Chemistry, of laboratory knowledge and skills and of technologies subject in high school programmes. Head of Quality Control in company TAB d.d. The Representative of The leadership for Quality Management Systems and Environmental Management Systems in some production companies from automotive and steel industry, The External Auditor for Quality Management system and Management of the Environmental Systems, to prepare for this I've been trained at Bureau VERITAS and I also worked as the Lead Auditor examined by BVQI London.

Effects of heat stress in domestic birds in the climate of Iraq

Ali Sabah Ali Al-Hasani
University of Baghdad, Iraq

Rising temperatures are an important problem facing the raising of birds, and unfortunately, there are no accurate statistics in Iraq shows the range of the economic losses suffered by the poultry industry as a result of low productivity of birds as well as the high rate of mortality (Darraji and Hassani, 2000).

The researchers did not stand idly by, despite the lack of a panacea, as they made several attempts to reduce the impact of heat stress.

1 - Engineering: In this axis, most of the researches and studies tended to find the best ventilation and cooling systems, design for buildings, building materials and paint, direction of housing, a forestation around the buildings, reducing the density of birds, increasing waterwheel and fodder, spraying birds with water, lighting programs and the provision of cold water to drink.

2 - Genetic side: It aims to find strains resistant to heat stress such as dwarf birds and naked birds.

Physiological and nutritional aspects: Studies and research in this aspect focused on reducing the heat increment by adding fats or adding salts such as ammonium chloride NH_4Cl and calcium carbonate NaHCO_3 and calcium chloride KCl (Al-Obaidi, 2000, Al-Yaseen and Al-Naimi, 2003).

Progress has been made in overcoming heat stress in the engineering, administrative and, to some extent, genetic aspects. This has not been successful in the physiological and nutritional aspects, as many questions remain to be answered and resolved. For example, what is the best way to adapt birds, salt concentration, salt type, method and time of salt presentation, time and length of the fasting period, the role of the wing in regulating body temperature. This study aimed to identify the negative damage to heat stress and ways to mitigate it in the climatic conditions of Iraq.

Audience Take Away:

- The Iraqi methods that used to alleviate the damage that caused by heat stress in poultry farms
- The above methods can be applied in areas similar to the climate of Iraq
- The results of this study can be used in teaching as a representative study of a wide range of Iraqi climate conditions
- Further scientific research related to similar conditions can be carried out
- This study can be used to develop poultry hall designs and provide some solutions to design-related problems, and identify the physiological status of birds during and after heat stress, also identify the effect of using some feed additives and non-feed additives to alleviate the damage caused by heat stress

Biography

Dr. Al-Hasani, is assistant professor at the Animal Resources Dept., College of Agriculture, University of Baghdad.

Minor: Avian Physiology and Molecular Biology.

B.Sc. Animal Production in 1996, M.Sc. Avian Physiology in 2007, Ph.D. Avian Physiology in 2015 from College of Agriculture, University of Baghdad. Publications: 32; Conferences: 20; Invention: 4. Membership of: Syndicate of Iraqi Agriculture Engineers, Iraqi Poultry Sciences Association, Iraqi Animal Science Association, Iraqis Innovators and Inventors Association, Association of Preservation of Genetic and Environmental Resources.

Advanced polymer composites for oxygen barrier and scavenging food packaging

Xu LI *, Chin Chong YAP, Lu MAO, Ming Yan TAN and Siew Yee WONG

Institute of Materials Research and Engineering, Singapore

The main purpose of packaging is to protect the packed products from the contamination, maintain the high quality level of the products over sufficient period during the distribution, storage, sale, and use. Products especially perishable foods are highly sensitive to oxygen. However, conventional transparent plastic films have poor oxygen barrier property and the technologies in the market to improve packaging's oxygen barrier usually lead to high equipment investment, high energy consumption, and low transparency.

To overcome this issue, two technologies have been developed by our group. For the first transparent oxygen-barrier packaging technology, natural source silicates have been successfully introduced into polymer layer to create torturous path of oxygen molecules to enhance its barrier against oxygen. The key technology here is to align all the plate-like silicate filler in one orientation. As shown in the cross-section view of the oxygen-barrier coating on polyethylene terephthalate (PET) film through scanning electron microscope (SEM) and transmission electron microscopy (TEM), the plate-like silicate filler form a compact layer with high orientation on the PET film, which is simply implemented via standard doctor-blade coating process (Figure 1). With this technology, transparent polymer films with oxygen transmission rate less than 0.5 cc/m².day have been achieved. With the second technology, iron-based nanomaterials with high oxygen scavenging property have been developed and integrated into coating suspension to form transparent coating on plastic film. Such transparent coated films can achieve oxygen scavenging capacity about 8.8 cc/100 cm² and the transparency is not compromised much.

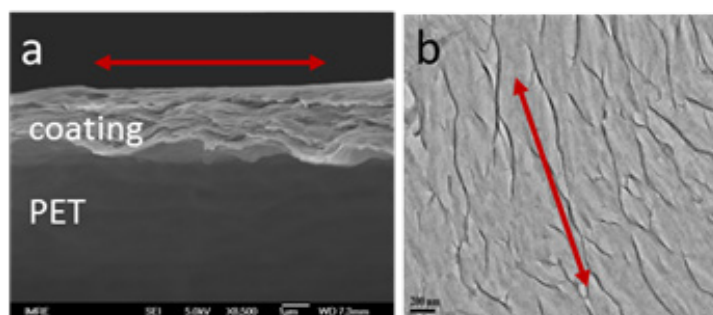


Figure 1. (a) SEM and (b) TEM cross-section images of the oxygen barrier coating on a PET film. The red arrows indicate the one-direction alignment of the silicate filler in the coating

Audience Take Away:

- The technologies will provide practical solution to food packaging company to produce sustainable food packaging through reducing materials utilization and recycling the packaging materials, such as mono-plastics and paper
- The transparent oxygen barrier will provide a platform for developing intelligent food packaging
- The oxygen scavenging technology can be expanded to other active food packaging

Biography

Dr Xu LI is a Senior Scientist at Institute of Materials Research and Engineering (IMRE), Agency for Science, Technology and Research (A*STAR), Singapore. He finished his PhD study in polymer chemistry in the Department of Chemistry, National University of Singapore in 2001. He is an adjunct Associate Professor of the Department of Chemistry, National University of Singapore from 2012. He has published more than 100 research papers and filed 15 international patents. Some of those patented technologies were successfully adopted by industry companies. As a principle investigator, he is now leading a research team on polymeric materials development for various applications, including controlled release, bioimaging, energy storage and food packaging.

KEYNOTE FORUM

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LONDON, UK

FAT-2019





Biography

Dr. Moghadasian is a full professor in the Department of Food and Human Nutritional Sciences at the University of Manitoba, Canada, and Principal Investigator at the Canadian Centre for Agri-Food Research in health and Medicine (CCARM), Winnipeg, Canada. His research team investigating mechanisms by which functional foods may reduce risk factors for chronic diseases. His research data on this topic have been published in 93 peer-reviewed scientific papers, several book chapters and a book entitled Functional Foods and Cardiovascular Disease.

The power of functional foods in reducing the burden of chronic diseases

Mohammed H. Moghadasian

University of Manitoba, Canada

Chronic diseases including cancer, cardiovascular abnormalities, diabetes and associated complications are now on the top list of causes of morbidity and mortality worldwide. Diets and lifestyle certainly make a difference in the onset and progress of such disorders. Over the past few decades, the authorities in food and nutrition revisited the power of foods in prevention and/or treatment of diseases. This resulted in recognizing a group of foods which are able to provide health benefits beyond their nutritional values; such foods are currently called Functional Foods. Functional Foods can be generated through the specific technological methods in agricultural systems or by the processes of fortification or enrichment of certain foods using specific nutrients or phytochemicals. In this presentation, advances in the field of Functional Foods, their functional ingredients and potential mechanisms in prevention and/or treatment of chronic diseases will be discussed. A specific focus will be placed on the overall benefits of such foods in reductions in financial burden of chronic disorders encountering the health system as well as improvements in quality of life and productivity of both the general population and certain patient groups.



Biography

Dr. Heikki Kallio studied Biochemistry and Food Chemistry at the University of Turku (UTU), Finland and received his PhD degree in 1976. After five years as a Research Director in food industry he was nominated as an Associate Professor in Food Chemistry (UTU). In 1985-86 he worked as a Visiting Professor at the University of California Davis and in 1990-1991 at the Australian Wine Research Institute, Adelaide University, Australia. He was nominated as Professor in Food Chemistry (UTU) in 1991. Dr. Kallio has published with his colleagues over 300 articles in international peer-reviewed Journals concerning e.g. lipids, aroma compounds and natural colors.

Human milk as a model of functional foods identification of the 500 major Triacylglycerol Regioisomers lifts the Veil

Heikki Kallio

University of Turku, Finland

Human milk is a natural and optimal model for infant formulas. Lipids form a major class of components, energy source and versatile protectants, not only in human milk, but also in milk of other mammals (Mammalia) and of egg-laying mammals (Prototheria). Further, lipids in eggs, spawn and roe of various animal species of the phylum Chordata play a key-role among all the nutrients. Quantitatively the major class of lipids is triacylglycerols (TAG) with three fatty acids (FA) of various chain lengths and an assembly of double bonds (DB) attached to glycerol. The lipid fraction of human milk contains a pool of over 1000 different TAGs but 40 major ones cover 2/3 of all the TAGS. From a nutritional point of view the three stereospecific (*sn*) positions of FAs in the glycerol backbone are biologically not equal.

Absorption of short and medium chain (8:0-12:0) FAs is enhanced when located in the *sn*-3 position. Palmitic acid (16:0) located in the *sn*-2-position gains digestion and is absorbed as monoacylglycerol (MAG). This also promotes mineral absorption, bone strength and wellbeing of gut microbiota. Lauric (12:0) and linoleic [18:2(n-6)] acids have beneficial microbicidal effects. Gastric lipase produces 1,2-diacyl-*sn*-glycerols which act as second messengers in stomach. Human milk contains also small but proper amounts of α -linolenic [18:3(n-3)], arachidonic [20:4(n-6)], eicosapentenoic [20:5(n-3)] and docosahexaenoic [22:6(n-3)] acids. Rumenic acid (c9,t11-18:1) is beneficial for cardiovascular health.

The lipid pool of human milk has not a constant composition. It depends on many factors such as gestation at birth, time after postpartum, diet, diurnal rhythm, metabolic status and genetic background. The fat content of milk also increases during breastfeeding. Further, phospholipids and cholesterol have significant roles in wellbeing of an infant. Compared with milks of other mammalian species, human milk is rich in oleic [18:1(n-9)], linoleic and α -linolenic acids and in a series of PUFAs with 20 and 22 carbons. The two key-factors in human milk lipids are the composition of FAs and their regioisomeric *sn*-positions in the glycerol backbone.

Analysis of TAGs of natural fats has traditionally involved isolation and purification procedures followed by enzymatic and multiphase chromatographic and mass spectrometric (MS) steps. Development of chromatographic resolution and a number of MS methods for TAG analysis has reached many hyphenated solutions. On the top, we developed a highly sensitive method to analyze ratios of TAG regioisomers in human milk. UPLC resolution of lithiated TAGs followed by daughter scan MS/MS of positive ions revealed several position-indicating ions. Reference TAGs containing C14–C20 FAs showed good linear response. Analysis of Finnish and Chinese pooled human milk samples revealed hundreds of TAGs. Over 60 mol% of the TAGs were quantified with standard deviation <17%. 16:0 was typically in the *sn*-2 position when present together with C18 FAs. When together with FAs 10:0, 12:0, 14:0, 20:1 and 20:2, the *sn*-2 preference of 16:0 was less clear. Oleic acid occupied typically the primary positions but when together with FAs 20:1, 20:2, 18:2, 14:1, 12:0 or 10:0 the positioning of 18:1(n-9) did not follow the rule.



Biography

Brendan Griffiths is a field agronomist and academic with around 30 years' experience working in crop agronomy in rain grown and irrigated cropping systems, largely on grey and black vertisols in Eastern Australia. After graduating from the University of Southern Queensland, he completed a Master's degree in Agriculture at the University of New England, and went on to study a PhD at UNE titled 'Agronomic constraints to irrigated wheat production in Northern NSW', due to be completed later in 2019. His other research interests include work in general crop nutrition, and subsoil constraints. He has spent the past eight years employed at the University of New England as lecturer in Cotton Production, and is a director of Precision Cropping Technologies Pty. Ltd., an Australian based firm providing software and services to commercial agriculture in the area of spatial data management and analytics related to crop production, and soil characterization.

Spatial and temporal visualisation of constraints to plant root development in irrigated agriculture in eastern Australia

Brendan Griffiths

University of New England, Australia

During the years 2015 to 2018 an investigation was conducted to investigate the spatio-temporal distribution and extent to which cotton root development and general soil structural decline in the Eastern Australian irrigated cotton industry is occurring. A network of up to around 800 capacitance soil moisture monitoring probes was utilised, spread over a geographic area of 1000 km in length and 500 km in width. The dataset was interrogated with the view to locating probe sites with minimal or no root development below a depth of 60cm in the soil profile. Our investigations concluded that around 25% of all sites surveyed, in all three years, showed no root activity below the threshold of 60cm. Since this initial survey the research team has been investigating spatial variability across the fields where probes were located, to better understand the distribution and extent to which these constraints are occurring at field level. Methods utilised in these field level investigations include establishing statistical relationships between spatial datasets collected via electromagnetic conductance and point sourced soil chemical datasets, collected from within those fields.

Audience Take Away:

- Cotton in Australia is grown largely on grey and black vertisols, with self-mulching properties, and irrigated via flood-furrow
- In the pursuance of yield optimization in irrigated production, with the genetics currently available, commercial practices have tended towards shortening intervals between irrigations resulting in a higher number of overall irrigations applied per season
- In the short term this has (anecdotally) resulted in higher yields, although in the longer term we have observed some soils with lowered ability to maintain their structural integrity. This loss of structural integrity results in loss of soil porosity, and the flow-on effects of increased waterlogging, reduced hydraulic conductivity, reduced root activity, the propensity for increased nitrogenous losses, and the inevitable decrease in crop yield
- This presentation provides the audience with the tools to be able to identify soil structural decline, in vertisols, with the view to preventing further degradation of soil physical properties

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Biofortification of zinc and manipulation of its overall quantity in mealworm (*Tenebrio molitor*) larvae by using zinc-enriched substrate

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Current estimates predict that the human population might surpass 9 billion individuals by 2050 which presents the challenge of providing nutrition and battling malnutrition despite growing demands. According to the FAO, malnutrition in the form of zinc-deficiency affects about 30 percent of the world's population. In recent years, insects are being (re-)introduced worldwide as an alternative protein source to conventional livestock production. The yellow mealworm (*Tenebrio molitor* L.) is one of the most widespread species that are commercially produced; mainly on mixed-grain diets. Insects have been shown to accumulate heavy metals and micronutrients, making the yellow mealworm a promising candidate for zinc supplementation in human diets. Rearing the larvae in zinc-enriched substrate raised their overall zinc content to up to three times the control level. However, in-vitro gastrointestinal digestion of our test larvae shows that the bioaccessibility of zinc after drying of the larvae can be as low as 20-40%, depending on the drying process. One reason for the low amount of resorbable zinc might be phytic acid which has been shown to diminish zinc bioaccessibility in certain animals and is a major component in mixed-grain diets. Our research investigates the impact of a modified substrate composition on the quantity of bioaccessible zinc in mealworm larvae. The possibility to increase the larvae's zinc content and improve overall bioaccessibility of micronutrients by altering the substrate composition has the potential to combat zinc deficiency in humans and thus is a promising field of study where more research is needed.

Biography

Sebastian Demtroeder studied Biology at the Leibniz University, Hannover and the Humboldt University, Berlin and graduated as MSc in 2015. After a stint at the Museum fuer Naturkunde Berlin, he joined the research group of Prof. Dr. Benning at the Institute for Food Technology and Bioprocess Engineering in Bremerhaven, Germany where he is working on rearing insects for sustainable future protein production.

Developmental and postnatal endocrine toxicity of tembotrione concerning plasma levels of 17 β -estradiol and testosterone

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Institute for Medical Research and Occupational Health, Croatia

Tembotrione is herbicide belonging to a family of aromatic ketones. It is a relatively newly developed substance used for post-emergent control of broad-leaved and grassy weed. It acts by depleting of carotenoids which deprives chlorophyllit and has been designed to overcome cornfield toxicity of earlier herbicides of this class. Though its formulation has been based on leptospermone, a naturally occurring substance produced by plants themselves, it exhibits adverse effects in non-target organisms. Being relatively short time on the market, assessments of possible effects of long-term exposure at low doses of tembotrione have not been assessed yet. Thus, we conducted the study to evaluate possible adverse effects on most sensitive members in every population: offsprings. More particularly, we measured level of sex hormones (17 β -estradiol and testosterone) in Wistar rat pups of both sexes of dams treated with tembotrione. To observe transplacental effects treatment started with first day of gestation and newborns were sacrificed on day of the birth. To observe both transplacental and translactational effect on sex hormones the treatment was prolonged till since first day of gestation until weaning when pups' blood samples were collected. To evaluate the sole translactational effect of tembotrione dams were treated from birth until weaning. Also, prepuberty blood samples were taken and levels of sex hormones were measured. In all experiments dams were treated in consecutive days by gavage with three doses relevant to realistic human exposure and derived from toxicological referent values for ADI (0.0004 mg/kg b.w./day), NOAEL (0.0007 mg/kg b.w./day), and 1/500 LD₅₀ (4.0 mg/kg b.w./day). The hormone levels were measured in plasma by the enzyme-linked immunosorbent assay (ELISA) using Estradiol rat ELISA and Testosterone rat/mouse ELISA Kit DEMEDITEC Diagnostics GmbH (Kiel, Germany). The absorbance was read at 450 nm. In male newborns and pups, transplacental and translactational exposure to tembotrione, respectively, significantly increased serum levels of testosterone (2.0 \pm 0.2 vs 0.4 \pm 0.1 and 2.0 \pm 0.4 vs 1.6 \pm 0.5 ng/ml, respectively). Prolonged exposure during both, gestation and lactation did not affect the testosterone levels (2.6 \pm 0.5 ng/ml), while in prepuberty pups testosterone was significantly lower (2.2 \pm 0.6 ng/ml) than in negative controls (4.6 \pm 0.9 ng/ml). In newborn female rats levels of 17 β -estradiol were higher at lower doses (72.3 \pm 4.2 vs 56.5 \pm 3.5 pg/ml) but significantly decreased at 1/500 LD₅₀ (3.4 \pm 0.7 vs 2.6 \pm 0.3 pg/ml). In plasma of weaned and prepuberty female pups levels of estrogen were not affected (3.0 \pm 0.7 vs 4.9 \pm 1.3 and 1.4 \pm 0.2 vs 1.6 \pm 0.4 pg/ml, respectively). Following 48 consecutive days treatment with any of tembotrione doses levels of testosterone (0.2 \pm 0.0 vs 0.5 \pm 0.2 ng/ml) and estrogen (18.3 \pm 1.7 vs 16.4 \pm 2.2 pg/ml) in dams remained unaffected. Based on the results we may conclude that transplacental and translactational exposure of offsprings to different doses of tembotrione may affect plasma levels of 17 β -estradiol and testosterone. Discrepancies in the effects between lower and highest dose of tembotrione indicate important role of metabolic activity of placenta and dams' livers. They indicate that higher doses may lead to metabolic overload of placenta and its abort. Nevertheless, observed effects may pose significant risk for proper development of primary sexual properties, sexual dysfunction and infertility.

Audience Take Away:

- They will be stimulated to broaden their research of pesticide mode of action using different angles of approach, determine safe levels of exposure, if any
- It will raise awareness of the necessity to consider external triggers to assess the risk from developmental and endocrine toxicity. Results will help to define those triggers and screening assays that would indicate existence of those triggers. We provided the model of assessing sex hormones disruption in indirectly exposed offsprings and showed that there are differences in the level of endocrine disruption considering the stage of the development and growth of pups. It definitely provides ideas how to use specific segments of that approach to obtain more relevant results on hormone toxicity
- It will help to broaden the knowledge regarding the mode of action of herbicides on non-target organisms. The data that could be obtained present valuable base of teaching the adverse effects of substance endocrine toxicity. Obtained results together with the experimental design may be incorporated in lectures of collegia in the field of toxicology as parts of endocrine disruption chapters
- It helps to move forward and upgrade the research to deduce whether other hormones and endocrine pathways may be affected by new generation of herbicides. The model that is presented here is common to many other endocrine disruptors and it makes an assessor's job more effective
- Since there data regarding tembotrione's toxicity are scarce, this study represent added value to the knowledge its adverse effects

Biography

Prof. Davor Zeljezic, PhD obtained the MSc in toxicology in 2000 and in 2003 PhD in genetic toxicology at the Faculty of Science, Croatia. He published 86 scientific papers in journals in SCI(E), cited 1461 times. He is tenured scientific advisor at Institute for Medical Research and Occupational Health, Croatia and obtained position of professor at University of Rijeka. He is expert on behalf Republic of Croatia in Member State Committee of European Chemicals Agency (ECHA) and member of Risk Assessment Committee of ECHA. He was member of Food enzymes scientific working group of European Food Safety Authority (EFSA).

Optimizing nutritional food quality of grain legumes on low sulphur status soils

Surendra Singh

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Sulphur is the vital structuring nutrient specially needed for the synthesis of protein and it is indispensable for the synthesis of certain amino acids like cysteine, cystine and methionine and its deficiency may limit the nutritional value of food. An adequate supply of S in deficient soils improves nutritional food quality such as seed protein content in legumes and grain sizes. Nourishment of legumes S nutrition is paramount importance for increasing the yields and protein quality on low soil available sulphur status. Grain legumes are grown in upland soil which is impoverished with respect to coarse texture, low content of organic carbon and soil available S. Sulphur fertilization in deficient soils, influences the amount of nutrients provided by food of plant origin towards their dietary requirements by humans. Legumes grown on low soil sulphur status have poor protein content of grain quality to fulfill the growing population in years to come. This paper explicates the response of grain legumes to added S sources and levels on yields and its nutritional food grain quality such as protein and S-containing amino acids. The investigation was also aimed to explain the interrelationship between soil S deficiency, lower protein grain quality in legumes and human health. The sulphur nutrition in legume needs to be looked in the perspective of soil-plant-human health continuum.

The objective of the present research work was to explore the possibility of improving nutritional food quality of grain legumes with sulphur application grown on S deficient upland soils. Field experiments were conducted during last one decade on S deficient upland soils to investigate the impacts of sulphur on major rainfed grain legumes viz; green gram, black gram, pigeon pea, lentil and gram. The sulphur treatments were replicated thrice in randomized block design. The results revealed that grain yields of legume increased considerably with application of 30 to 50 kg S ha⁻¹ along with the recommended dose of N, P and K fertilizers over unfertilized control. The higher S uptake was obtained when S applied alone or in combination of recommended dose of N, P and K fertilizers. Protein content in these grain legumes increased greatly up to 22.7 to 24.6 per cent over unfertilized control (20.6 to 21.2 %). The S-containing amino acids viz; cysteine and methionine of these rainfed grain legumes were also improved considerably with soil application of sulphur along with RDF in highly S deficient soil.

Audience Take Away:

- Soil is an important source of plant nutrients to supply in our food quality of crops
- Adequate supply of sulphur from the soils helps in quality food that ensures synthesis of protein
- in grain legumes and improve human health
- Protein is essential to meet the dietary needs for healthy human life. Sulphur nutrition research in soil for legumes has direct relation with nutritional food quality and human health
- Sulphur plays a vital role in the synthesis of S containing amino-acids for food quality such as protein content in legumes and grain size

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 21 st November, 2006 as professor of Agricultural chemistry. Altogether, he has experience more than 30 years (teaching, research, extension, consultancy, development, administration, etc.). Prof. Singh had worked extensively in the research areas of: sulphur research in soils and crops, use of gypsum in ameliorating sub-soil acidity, use of industrial by-products as a source of nutrients, and Integrated Nutrient Management in soils for enhancing nutrient use efficiency, nutritional food quality and crop productivity in different type of soils. Prof. Singh has more than 250 publications to his credit. He has guided/advised many M.Sc. and Ph.D. students in Soil Science and Agricultural Chemistry. Dr. Singh has successfully executed more than 15 externally funded research, extension and developmental projects as Principal investigator. He received prestigious TSI-FAI Award (1998) on Plant Nutrient Sulphur Status and forms of sulphur in soils of Bihar plateau and its response in oilseeds and pulses), Fellow of Indian Society of Soil Science (2012) In recognition of my outstanding work on developing INM technology for rice based cropping systems in copper- mines areas and using gypsum for enhancing productivity of oilseeds and pulses in Jharkhand and best teacher award (2016) Dr. Dinesh Chandra Kulshrestha Vishisht Shikshak Puraskar in the field of outstanding teaching in Soil Science and Agricultural Chemistry Recently, participated in Euro-Global Conference on Food Science, Agronomy and Technology (FAT-2018) at Rome, Italy during 20-22 September, 2018 and presented as speaker of my research paper entitled Soil available nutrients and nutritional quality of crops on 20.09.2018.

Characterization of wheat gluten subunits by liquid chromatography–mass spectrometry and their relationship to technological quality of wheat

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The quality of common wheat is largely influenced by the composition of its storage proteins. The currently presented research explores factors influencing observed differences in quality and quantity between wheat cultivars, in particular in relation to gluten composition and its relationship to technological characteristics. Eight wheat cultivars were selected for evaluation. Analysis results demonstrated that Morvarid and Sirvan cultivars yielded the highest quality of wheat, while the Chamran cultivar was indicated as the most favorable for baking Taftoon bread. Conversely, the Sepahan cultivar was deemed to have the worse quality in both categories. A Q Exactive LC-MS/MS system was employed to evaluate the most effective sub-fractions of gliadin and glutenin on wheat quality. Matching peptides resulting from trypsin digestion on gliadin and glutenin fractions, led to the identification of subunits α/β -gliadin, γ -gliadin, HMW-Dx5, HMW-Bx17, HMW-Dy3, HMW-Dy10, HMW-By15, LMW-m, LMW-s, and LMW-i. The obtained results indicated that the most influential subunits of glutenin on wheat quality were Dy10, Dy3 and Dx5, while the most effective gliadin subfraction was noted to be α/β -gliadin. However, the most important subunit influencing the quality of flat breads in particular was identified as the x-HMW-GS, in particular the Bx17 subunit, and LMW-GS.

The drying of avocado (*Persea americana*) slices

Saheeda Mujaffar^{1*} & Tsai-Ann Dipnarine²

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The Pollock (*Persea americana*) is a West Indian variety of avocado. The fruit is an oblong to pear-shaped green fruit that can weigh between 0.5 to 2.2 kg. Ripe avocados are highly perishable, and the pulp deteriorates rapidly when exposed to air, light and heat. Various preservation methods, including the use of preservatives, have been investigated in an attempt to extend the life of avocado pulp, which is very popular as a table fruit and in food preparations such as guacamole. The objective of this work was to investigate the drying of avocado pulp slices (1cm thick) using two methods; namely, hot-air (oven) drying at 60°C, and freeze drying. Samples were dried until constant weight was achieved, 24 and 72h, respectively. The initial moisture content and water activity (*a_w*) values of fresh pulp averaged 3.16 g H₂O/g DM (75.98% wb) and 0.889, respectively. Slices were oven-dried to an average moisture content of 0.06 g H₂O/g DM (5.78% wb) after 24h, and a final average water activity of 0.606. Slices were dried in the freeze dryer to an average moisture content of 0.03 g H₂O/g DM (3.47% wb) after 72h, and a final average water activity of 0.564. The pH of the dried slices averaged 5.38 and total soluble solids averaged between 0.01-0.02 g/g DM. With respect to the appearance of dried slices, freeze dried slabs were far superior in colour, texture and appearance and rehydration capacity, and more closely resembled fresh slices. Protein and fat content of freeze-dried slices averaged 0.13 and 0.90 g/g DM, respectively. For freeze drying, drying occurred in the falling rate period and drying rate constants (*k₁*) averaged 0.151 1/h. The Verma model was found to best fit the MR data, based on the root mean square error (RMSE) and the chi-square statistic (χ^2). The results show the clear potential for freeze drying to produce a natural, ready-to-use dried avocado pulp product without the use of heat, additives or preservatives.

Audience Take Away:

- Information on selected quality characteristics of oven- and freeze-dried avocado pulp slices is presented
- The drying behavior is described through the use of drying rate curves and a drying rate constant and the decline in moisture modelled using well-known thin layer models

Biography

Dr. Saheeda Mujaffar holds a BSc. Degree in Natural Sciences (1990) and an MPhil. (1996) and PhD. Degree (2003) in Agricultural Engineering from the University of the West Indies and has worked as a Food Technologist in industry. She has served as the Co-ordinator of the Food Science and Technology Programme in the Department of Chemical Engineering for the past two years and is actively involved in both teaching and research at the Master's and Doctoral levels. Dr. Mujaffar's specific areas of research interest include Drying of Agricultural Commodities, Mathematical Modelling, Food Analysis, Agricultural waste utilization and Product Development.

Prevalence and High Incidence of Sterigmatocystin in cocoa beans from Three Agro- ecological zones (AEZs) of Nigeria

Aroyeun S.O.^{1*}, Michael Sulyok², Rudolf Kriska³

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Composite samples of fermented and dried cocoa beans collected from three agro ecological zones (AEZs) of cocoa production in Nigeria were evaluated for the presence of Sterigmatocystin (STC) and some other multivitoxins with the liquid chromatography Tandem Mass Spectroscopy (LC-MS/MS) technique. The possible effects of fermentation methods and Time, Methods of drying and drying time on the prevalence and incidence of STC were evaluated using the Liquid Chromatography Tandem Mass Spectroscopy (LC-MS/MS) methods. The study showed a very high prevalence of STC (100%) with values in the range of 0.02 and 1934µg/kg in all the cocoa samples analyzed. The methods and time of cocoa fermentation as well as the drying method and drying times have significant effects only on the STC incidence in all the positive samples. The highest incidence of STC was observed at the Derived Savannah and lowest at the Humid Forest zones. Out of the eighty multivitoxins detected, seventy three of these have not been detected in Nigerian cocoa beans or any other cocoa producing countries of the world. The bacterial toxins had a low concentration and were not a source of concern.

In conclusion, this study has established the prevalence of STC in cocoa beans from all the AEZs studied irrespective of the method and time of both the fermentation and drying.

Therefore, to reduce the prevalence of STC, Post-harvest Practices of cocoa beans should be handled with Good Agricultural Practices (GAP). There is a need for an immediate action plan for mycotoxin Mitigation in Nigerian cocoa especially in the Derived Savannah zone in view of the economic importance of cocoa beans.

Key words: STC, Cocoa, Fermentation, Drying, Prevalence, Incidence

Real-time lidar data acquisition and 3d image reconstruction for orchard canopy profile measurement

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The ability to quickly measure and represent tree canopy profile in three dimensions (3D) is extremely important for precision agriculture applications. In this paper, we proposed a laser scanning sensor-based object reconstruction algorithm to rebuild and display 3D plant target images in real-time and compute geometrical characteristics of tree canopy profile. The developed algorithm can process 2D laser sensor raw data to build a pseudo-color 3D image in real time and to measure the dimensions of target tree canopy profile. The developed software program was written in C++ based on OpenCV library. It also integrates user-friendly GUI to provide user machine interactions. The software program was tested on a specially designed indoor LiDAR-based canopy profile measurement platform. Two artificial trees (tree-1 and tree-2) were used as target objects. The reconstructed 3D image and data analysis results showed that the performance of the developed algorithm to measure tree canopy profile and to reconstruct the 3D image in real time is very well at travel speed ranged between 1.0m/s and 2.0m/s and detection distances ranged from 1.5m to 2.0m. The mean RMSE values for height measurement in tree-1 and tree-2 were 72.5mm and 17.8mm respectively. In width measurement, the mean RMSE values were 50.7mm for tree-1 and 80.9mm for tree-2. For a real filed application, this study plays an initial level role in several aspects including generating real time control signals based on target plant-geometrical characteristics for controlling and monitoring processes in orchard and crop management.

Key words: precision agriculture, LiDAR range finder, 3D plant image, real-time reconstruction, canopy measurement OpenCV, and Qt creator.

Audience Take Away:

- Real time display and representation of environmental parameters such as the structural characteristics of trees, crops and forests in three dimensions (3D) is a useful tool for facilitating visualization and scientific measurements
- LiDAR allows tree orchard to be captured and represented in laser intensity as a set of 3D points (point cloud) with high spatial accuracy
- In most side-view monitoring activities of orchards and high row-cultivated plants, Canopy characteristics supply valuable information for tree-specific management reducing production costs and public concerns about environmental pollution. Some important agricultural tasks that can benefit from this plant-geometry characterization are the application of pesticides, irrigation, fertilization and crop training
- Knowledge of the geometrical characteristics of plantations will permit a better adjustment of the dose of the product applied, improving the environmental and economic impact

Biography

Dr. Destaw Addis was born in Addis Ababa, Ethiopia in 1979. He received a BSc. degree from Adama University, Ethiopia in 2003, and MSc degree from Tianjin University of Science & Technology, China, in 2009. He then joined the research group of Prof. Yue Shen at the School of Electrical and Information Engineering, Jiangsu University, China. He received his PhD degree in 2018 at the same University. His research interests include object detection, patten recognition and AI application in precision agricultural. He published more than 13 research articles in SCI and EI Journals. He is currently working as Assi.Prof. in Adama science and technology university.

Optimization of process parameters for mechanical extraction of banana juice using response surface methodology

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In Tanzania banana juice is traditionally processed under very basic conditions characterized by low efficiency and poor hygiene. Introduction of mechanical pressing has created opportunities for upgrading banana juice production, but more knowledge is needed about critical factors for juice release and about optimizing extraction for higher yield and quality. This study sought to identify and optimize important factors associated with juice release. This was done using an experimental design (Box-Behnken design of Response Surface Methodology) involving three levels of three independent variables: blending speed (1000-3500 rpm), extraction time (30-240 s), and stage of ripeness (3-7). A second-order polynomial equation was created to describe the relationship between dependent and independent variables. The results showed that juice yield increased with blending speed, extraction time, and stage of ripeness, whereas the quadratic (squared) effect of these factors was a significant decrease in juice yield. Optimum juice yield (57.5%) was obtained at blending speed 2650 rpm, extraction time 162 s, and ripeness stage 5. Analysis of variance showed that stage of ripeness significantly ($p \leq 0.001$) affected juice yield. This novel information on the underlying factors in banana juice extraction and on optimization of the process can be used to improve mechanical extraction of low-viscosity, clear banana juice and achieve scaling-up of banana juice processing.

Audience Take Away:

- Optimal conditions for banana juice extraction
- Optimized mechanical juice extraction can help commercialize banana juice processing
- The method is cost effective and nutrients are retained since there is no application of enzyme or hot water

Biography

Ms. Nuria Majaliwa is the PhD student at the department of Biology and Biological Engineering, Chalmers University of Technology, Goteborg, Sweden. She received her BSc in Food Science and Technology and MSc in Food Science from Sokoine University of Agriculture, Tanzania. She is supervised by Professor Marie Alminger at the division of Food and Nutrition Science, Chalmers University of Technology and Dr Oscar Kibazohi at department of Chemical and Mining Engineering, University of Dar es Salaam.

Cottonseed meal on the growth performance, dressing yield, organ development and meat composition in broiler chicken

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A feeding trial with broiler chicken was conducted to know the effect of cottonseed meal on the growth performance, dressing yield, organ development and meat composition. A total of 288 day old chicks were considered to be used cottonseed meal as feed additives in broiler diet. The treatments were control (basal diet) and other 5 different levels of CSM powder (1%, 1.5%, 2.0%, 2.5% and 3.0%) with basal diet. The broiler chicks were distributed in 6 different dietary treatments having 48 chicks in each with 4 replications and each replication contained 12 chicks. The experimental design was completely randomized design and the management practices were standard with dietary requirement. All the data were analyzed using SAS statistical analysis software. Highest weight gain (2295g/bird) was obtained in the 2% CSM fed group compared to other dietary groups with the lowest FCR (1.61) among the CSM added groups. The highest European Feed Efficiency Factor (EPEF) was calculated in 2% CSM added group among the cottonseed meal fed groups. The higher the EPEF value, the better the technical performance. The breast and thigh meat content in CSM fed (2%) group was observed 565 g/b compared to control 547 g/b and other CSM fed birds. Addition of CSM enhanced about 1% dressing percentage (74.22%) compared to control (73.20%) except the highest level (3%) of CSM. The values of internal organs were not varied significantly among the dietary treatments except abdominal fat pad. This response indirectly revealed that no negative impact was found after using CSM in the diet. Cottonseed meal has influence on reducing abdominal fat than non-fed CSM group. The crude fat contents in broiler chicken meat were found 2.84% in breast meat and 3.88% in thigh meat in control diet. Addition of CSM reduced the crude fat content in breast meat by 22 percent and in thigh meat by 32 percent compared to control that indicated to lean meat production from broiler chicken. Considering all the parameters it can be concluded that addition of cottonseed meal as it is can be added up to 2% in the broiler diet for maintaining production performance and lean meat production.

Keywords: broiler chicken, cottonseed meal, growth performance, dressing yield, meat composition

Biography

Dr. MSK Sarker has completed his PhD from South Korea in 2010 in Poultry Nutrition and Feed Biotechnology area from Sunchon National University. He did his MS in Poultry Science degree in 1999 from Bangladesh Agricultural University, Mymensingh. Dr. Sarker has been serving as a Senior Researcher at Bangladesh Livestock Research Institute, Savar, Dhaka since 2010 with a total service length about 20 years. He visited about 17 countries and published hundred papers including full article and proceedings.

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Fractionation of essential and toxic elements in wines link toward geographical origin

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Wine is one of the most widely consumed beverages in the world and the evaluation of its quality is important for manufacturers, merchants, and consumers. The confirmation of wine authenticity e.g. confirmation of its geographical and botanical origin is a real analytical challenge. Various parameters including chemical elements content, their isotope ratios, particular organic constituents have been demonstrated as identifiers for wine authenticity. Evidently, the establishment of the profile of the chemical element of wine may reveal the geographical region and conditions of cultivation of grapes, as well as the manufacturing fabrications used. The hypothesis in this study is that total elements content in wine is not sufficient and changes in chemical speciation of elements during the vinification process present important information influencing the final evaluation of its geographical origin. In this study, the analytical procedure is developed for the determination of chemical elements contained in wine fractions – protein, polyphenol, polysaccharide as well as for the quantification of kinetically labile cation and anion complexes. As a first step the distribution of total Al, As, B, Ba, Be, Ca, Cd, Co, Cr, Cs, Cu, Fe, Ga, Hf, Li, Mn, Mo, Nb, Ni, Pb, Rb, Sb, Sc, Sr, Ti, Th, Tl, U, V, W, Y, Zn, Zr, La, Ce, Pr, Nd, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, and Lu between precipitate and liquid fractions obtained during the fermentation process was measured. As a second step developed analytical procedure for chemical elements fractionation was applied for liquid fraction of wine must after first fermentation and finished wines after clarification. in grape juice and between and applied for samples obtained from different steps in the winemaking process. Results obtained are linked to the bioavailable fractions of the same elements determined in extracts in respective soils. Monovarietal grapes from major vineyard regions in Bulgaria were used for this study. Calculated correlation coefficients between elements concentrations in kinetically labile fractions in must and wine and elements concentrations in bioavailable fractions of soils were discussed from the view of geographical and botanical origin of studied wines. The chemical elements with highest discriminant power were defined. Final statistical treatment for the possibilities to assess the geographical origin of wine was based on cluster analysis.

Audience Take Away:

- The possibility to use chemical elements content for identification of wine geographical and botanical origin
- Changes of chemical elements concentrations and speciation during vinification process
- Correlations between concentrations of chemical elements in wine and their bioavailable concentrations in soils

Biography

Prof. Dr. Irina Karadjova studied Chemistry at the Faculty of chemistry and pharmacy, University of Sofia St. Kliment Ohridski, Sofia, Bulgaria and graduated as MS in 1981. She then joined the research group of Prof. D. Tsalev at Department of Analytical chemistry of same faculty. She received her PhD degree in 1992 at the same institution. From 1992 to 2019 she obtained the position of an Associate Professor and then full Professor at the Faculty of chemistry and pharmacy. She is a Head of Laboratory for Analytical Atomic Spectrometry. She has published more than 70 research articles in SCI(E) journals with more than 1500 citations.

Ammonia exposure alters genes expression of porcine uterus

Bao Yi*, Liang Chen, Hongfu Zhang

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The health production and reproduction of sow are critical importance to pig farms. With the development of intensive large-scale pig industry, air quality in housing is particularly poor. Atmospheric ammonia is a common problem in pig production, which causes remarkable economic losses as well as potential welfare problems of the pig industry. However, the molecular mechanisms and metabolic pathways in sow uterus altered by high concentrations of ambient ammonia exposure on sow are still unknown. In the present study, high-throughput RNA-Seq was utilized to identify differentially expressed genes (DEGs) in sow uterus exposed to 3 ppm (Control), 25 ppm (A25), 50 ppm (A50), 75 ppm (A75) levels of ammonia. The transcriptome and gene cluster analysis showed that A50 and A75 groups have similar gene expression pattern in sow uterus, and lower ammonia levels of Control and A25 groups with similar mode. Differential expression analysis showed that 486 and 130 DEGs (FDR < 0.05) were separately identified in A75 group and A50 group compared with Control group, of which 118 DEGs were common genes in A75 and A50 groups. A total of 2288 and 1034 DEGs (FDR < 0.05) were identified in A75 group and A50 group compared with A25 group and 843 DEGs were common genes. KEGG pathway analysis showed that these 843 DEGs were enriched in calcium signaling pathway (ssc04020), neuroactive ligand-receptor interaction (ssc04080), metabolism, contraction and development of muscle cells related pathways (ssc05410, ssc05414, ssc04261 and ssc04260). This study provides new insights to sow uterus exposed to different levels of environmental ammonia, and it is significant importance for sow health production and safe products in pig industry.

Audience Take Away:

- It provides new insight to ammonia exposed sow uterus transcriptome
- It is important to control ammonia levels for health pig production and reproduction
- It is necessary to use some measures or feed additives to decrease ammonia release

Biography

Dr. Bao Yi studied Biology at Shandong Normal University, China and got her Bachelor's degree in 2009. After five-years' study and research work at China Agricultural University, Beijing, China, she received her PhD degree in 2014. Then she joined the research group of Prof. Hongfu Zhang as post-doctoral fellowship at Institute of Animal Sciences, Chinese Academy of Agricultural Sciences (IASCAAS). After three-years' postdoctoral training, she obtained the position of an Associate Researcher at IASCAAS. Then she visited Iowa State University in 2018 as a visiting scholar. Now she mainly focused on monogastric animal nutrition and environmental control.

Measuring the trans-fatty acid content of various vegetable frying oils using near infrared spectroscopy

Han Zhang* and Jie Yu Chen

Akita Prefectural University, Japan

A rapid technique for determining the trans fatty acid content of various vegetable frying oils has been developed for assessing its content in fried foods and monitoring its content in frying oils during processing. Eleven types of edible vegetable oils purchased from a supermarket in Japan were used as the raw oils for potato frying. Frozen packaged par-fried French fries were purchased from a local supermarket and used for deep-frying in a restaurant-grade stainless steel electric fryer. The oils were heated at 180 °C for 6 h daily for 6 days, with a total of 10 batches of frozen French fries being fried for 3 min on each frying day. As this way, frying oil samples with different trans fatty acid contents were collected from various vegetable oils used for actually deep-fat frying French fries. NIR spectra in the wavelength range from 400 to 2500 nm were recorded from oil samples in disposable 5-mL test tubes. Partial least square (PLS) regression with full cross validation was used to correlate the trans fatty acid content of frying oils with the near infrared spectra. The partial least squares calibration models had a coefficient of determination (R^2) of 0.90, a standard error of prediction of 0.24%, and a ratio of standard error of performance to standard deviation of 2.6 for the independent validation of the trans fatty acid content, in various vegetable frying oil samples. NIR spectroscopy offers a fast and simple method to determine the trans fatty acid contents of various vegetable frying oils.

Biography

Dr. Han Zhang is an associate professor in the laboratory of food quality science, department of biotechnology, faculty of Bioresource, Akita prefectural university, Japan. She is engaged a research about the food science and technology, and has demonstrated the importance of the fatty acid composition in the deterioration of the edible oils during frying processing.

Quantification of mineral elements in royal jelly samples from bulgaria

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Royal jelly is a bee product secreted from the hypopharyngeal and mandibular glands of young worker honeybees (*A. mellifera*) and it serves as a food for the queen bee and for the larvae growing up. Elemental analysis of RJ is of great interest from a nutritional and toxicological point of view and is mandatory in food quality control as far as RJ is a natural food product widely used in the diets and cosmetics. The purpose of the present study was quantification of Al, As, B, Ba, Be, Ca, Cd, Co, Cr, Cs, Cu, Fe, Ga, Hf, Li, Mn, Mo, Nb, Ni, Pb, Rb, Sb, Sc, Sr, Ti, Th, Tl, U, V, W, Y, Zn, Zr, La, Ce, Pr, Nd, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, and Lu in various RJ samples from Bulgaria. Analytical procedure developed consists of two steps: sample around 0.5 g is digested with nitric acid and chemical elements content determined by ICP OES and ICP-MS spectrometry. Royal jellies from different geographical regions were analyzed. Statistical analysis and box plots were performed using (SPSS Statistical Package, version 21 for Windows). Results obtained will be discussed from both viewpoints: the concentrations of chemical elements depend mainly on geographical origin of the sample or they have to be considered in the light of the suggestion that Royal jelly is a form of lactation on the insect level and shows homeostatic control of chemical elements content. Suitable statistical treatment will be used to identify correlations between essential, nonessentials and toxic elements in the samples.

Acknowledgment: *This work was supported by the Bulgarian Ministry of Education and Science under the National Research Programme Healthy Foods for a Strong Bio-Economy and Quality of Life approved by DCM # 577/17.08.2018*

Audience Take Away:

- Chemical elements content in Royal jelly from Bulgaria
- Correlations between chemical elements content in Royal jelly and connections with geographical/botanical origin
- Could we accept Royal jelly as a form of lactation on the insect level

Biography

Prof. Dr. Irina Karadjova studied Chemistry at the Faculty of chemistry and pharmacy, University of Sofia St. Kliment Ohridski, Sofia, Bulgaria and graduated as MS in 1981. She then joined the research group of Prof. D. Tsalev at Department of Analytical chemistry of same faculty. She received her PhD degree in 1992 at the same institution. From 1992 to 2019 she obtained the position of an Associate Professor and then full Professor at the Faculty of chemistry and pharmacy. She is a Head of Laboratory for Analytical Atomic Spectrometry. She has published more than 70 research articles in SCI(E) journals with more than 1500 citations.

Using near infrared spectroscopy on fried potatoes to measure the total polar compounds in frying oil

Jie Yu Chen* and Han Zhang

Akita Prefectural University, Japan

The quality of fried foods is closely related to the quality of the frying oils. Therefore, research interest in how fried foods are degraded by deteriorating frying oils has increased over recent years, because of the connection between degraded oils and the risk of cardiovascular disease. During frying, oil is at a high temperature for prolonged periods in the presence of air and water. This leads to a wide range of complex chemical reactions such as thermal oxidation, hydrolysis, and polymerization. The compounds generated by these chemical reactions not only adversely affect the flavour of fried foods but are also undesirable and unhealthy for consumers. Therefore, it is imperative to have a rapid method to evaluate the quality of the fried foods and monitor the quality of the frying oils. This study proposes a rapid technique for determining the degree of degradation of frying oils by scanning intact fried potatoes using near infrared spectroscopy. The near infrared spectra were recorded directly from the intact fried potatoes over wavelengths ranging from 400 to 2500 nm. Partial least square (PLS) regression was used to correlate the TPC content of the frying oils with the near infrared spectra from the intact fried potatoes. The PLS calibration model exhibited a high correlation coefficient of prediction (r) of 0.94. The result indicated that this measuring method offers a fast and simple method to determine the degree of degradation of edible frying oils.

Biography

Dr. Jie Yu Chen is a professor in the laboratory of food quality science, department of biotechnology, faculty of Bioresource, Akita prefectural university, Japan. He is engaged on a research in the field of food science and technology, particularly rapid food analysis and quality evaluation of foods. His research has been focusing on developing innovative analysis and measurement technologies to improve the safety and quality of foods.

Promotional materials for consumers and children regarding adulterated food and food safety

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Adulterated food is produced using a variety of methods, all with the goal of maximising illicit profits: false designation of country of origin, adulteration of fake raw materials, adulteration of unauthorized raw materials, and so on. Accordingly, research and analysis is being undertaken to identify such foods. Currently, however, there is very limited means for acquisition, education, and transmission of correct information. In this study, the project team's research results have been collected and subdivided, and subsequent information has been selected and reclassified, so that each particular target audience may easily understand and apply the disseminated information in the real world. We aim to cultivate a 'safe eating culture' by providing consumers and children with tips for identifying unsanitary foodstuff along with the correct knowledge about direct overseas purchases, and information assisting them in the selection of foods. This informative resource seeks to convey the importance of food safety and present concrete action plans to cope with adulterated foods.

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Biography

Gun-Hee Kim is a Professor at Duksung Women's University, Department of Food and Nutrition. In addition to her teaching duties, she undertakes research in the field of fruit and vegetable technology as it relates to food science and nutrition with the aim of producing health functional materials using plant resources. As an ODA specialist in food science and technology, she has been carrying out consulting and educational activities in food science, including agricultural food control, sanitation, and safety for ASEAN since 1991.

Chemical composition and antioxidant activity of steam distilled essential oil and glycosidically bound volatiles from *Maclura tricuspidata* fruit

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The objective of this study was to determine chemical composition and antioxidant activities of steam distilled essential oil (SDEO) and glycosidically bound aglycone fraction (GBAF) isolated from fully ripe *Maclura tricuspidata* fruit. SDEO was isolated by simultaneous steam distillation and extraction (SDE). GBAF was prepared by Amberlite XAD-2 adsorption of methanol extract, followed by methanol elution and enzymatic hydrolysis using *Aspergillus niger* cellulase. Both fractions were analyzed by gas chromatography (GC) and gas chromatography-mass spectrometry (GC-MS). A total of 76 constituents were identified from both oils. The SDEO contained p-cresol (383.5 ± 17.7 ug/g) in the highest concentration, followed by δ -cadinene (147.7 ± 7.7 ug/g), β -caryophyllene (145.7 ± 10.5), β -ionone (141.0 ± 4.5 ug/g), n-nonanal (140.3 ± 20.5 ug/g), theaspirane A (121.3 ± 4.5 ug/g) and theaspirane B (99.67 ± 9.05 ug/g), excepting fatty acid and their esters. Especially, 10 carotenoid-derived compounds were identified in SDEO of *M. tricuspidata* fruit for the first time in this study. A total of 22 components were identified from GBAF with p-methylsalicylaldehyde, α -methoxy-p-cresol, 2-methyl-1-butanol, benzyl alcohol, 9-hydroxymegastigma-4,6-dien-3-ones (2 isomers) and p-hydroxybenzyl alcohol as major components and also almost of components identified in GBAF fraction were identified for the first time as constituents of *M. tricuspidata* fruit. The antioxidant activity in GBAF was higher than those of SDEO, and potent antioxidant activity in GBAF has been determined to be primarily due to presence of phenolic compounds such as α -methoxy-p-cresol, vanillyl alcohol, ferulic acid and pyrocatechol. These results suggest that intake of antioxidant-rich preparations from *M. tricuspidata* fruit are beneficial to human health.

Audience Take Away:

- Chemical composition in *Maclura tricuspidata* fruit are existed glycosidically bound type or free aglycon. This study is glycosidically bound type to aglycon type by enzyme reaction for confirm Chemical composition in *Maclura tricuspidata* fruit. Also we were performed antioxidant activity for detection high activity fraction
- Chemical composition affect to product quality on food processing. This result bring to important information for person or company that interested in *Maclura tricuspidata* processing

Biography

Dr. Kim studied Food Science and Technology at the Jeonbuk University, Republic of Korea and graduated as MS in 2014. She received her PhD degree in 2017 at the same institution. She then joined The Foundation of Agri-Tech. Commercialization and Transfer of public institution. She work as researcher and analysis functional compound in food. She has published 5 research articles in SCI(E) journals.

Determination of Chlorogenic acid and Arbutin contents in Fruits

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Gyeonggi Province Institute of Health and Environment, Republic of Korea

In this study, the sample preparation method and the simultaneous determination method by ultra-high performance liquid chromatography coupled to tandem mass spectrometry for 9 isomers of chlorogenic acids and arbutin in fruits were developed. The contents of the chlorogenic acids and arbutin among the 25 items (124 samples) of fruits were quantified. The quantitative analysis was studied by dividing the fruit samples into the three categories such as, the items and the cultivars, and the parts of the fruit. The chlorogenic acids among the samples were high in the order of aronia berry, blueberry, peach, apple, cherries, avocado, tomato, plum, pear, and fig were contained in the range of $139.18 \pm 39.81 \sim 0.94 \pm 0.39$ mg/100 g FW. As a result of studying the difference between the cultivars, the content of chlorogenic acids by Alps Ottome (among the apples), Wonhwang (among the pears), Kawanakawase Hakuto (among the peaches), and Cherry tomato (among the tomatoes) was higher than other cultivars. The chlorogenic acids content of the apple (Hongro cultivar) in the pulp was higher than that in the peel. The chlorogenic acids content of the pear (Shingo cultivar) in the peel was higher than that in the pulp. The content of arbutin in the pear was 28.93 ± 13.56 mg/100 g FW. The arbutin content of Shingo was greater than Wonhwang in the studying of the cultivars difference. The peel of the pear contained higher chlorogenic acids than the pulp.

Audience Take Away:

- An introduction to the method of analyzing chlorogenic acid and Arbutin by LC-MS/MS instrument
- Know the type and content of chlorogenic acid and Arbutin containing fruit
- How Chlorogenic acid differs according to fruit varieties

Biography

Young-ju Choi studied food and nutrition at Yongin University and epidemiology at Catholic graduate school. She is currently working at Anyang Agro-fishery Products Inspection Center of Gyeonggi Province Institute of Health and Environment as a research scientist.

A Safety Survey on Pesticide Residues in Dried Agricultural Products

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We performed a safety survey on residual pesticides in dried agricultural products. The total 110 samples of dried agricultural products, which were distributed in Gyeonggi-do in 2018, were analyzed for 263 pesticides by multi-class pesticide multi-residue methods by using gas chromatograph and liquid chromatograph. Also, we conducted a validation study about analysis method. The 10 kinds of pesticides were detected in 10 samples; *Ricinus communis* leaves, chwinamul, radish leaves, *Cirsium setidens* and pepper leaves. Chlorpyrifos was detected in *Ricinus communis* leaves, chlorpyrifos, hexaconazole, pyridalyl were detected in chwinamul, diniconazole, isoprothiolane, lufenuron were detected in radish leaves, hexaconazole was detected in *Cirsium setidens*, bifenthrin, chlorothalonil, boscalid, pyraclostrobin were detected in pepper leaves. The residue level in pesticides were 9.1%, among them one sample was detected over Maximum Residue Limit(MRL) and the unsuitable level in pesticide was 0.9%. In the validation study, the values of limit of detection (LOD), limit of quantification (LOQ), coefficient of determination(R²) and recovery were in the range of 0.002~0.027 mg/kg, 0.006~0.083 mg/kg, 0.9964~1.0000 and 74.8~118.9%, respectively. Positive List System (PLS) was newly introduced as part of the safety management of residual pesticide in agricultural products in Korea on 2019. With the application of PLS, if MRL is not established, 0.01 mg/kg is applied uniformly. In spite of strengthen of residue limit, MRLs of dried agricultural products are still insufficient. So this study would like to utilize as a basic data for setting the MRLs of them.

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 survey of pesticide residues in dried agricultural products for 1 year, we will share the results of pesticide contamination of them
- We will report the detection and unsuitable level of residual pesticide in dried agricultural products, so the audiences can utilize these results to their research
- This study can be used as basic data for setting the MRLs since MRLs of dried agricultural products are still insufficient

Biography

Hyo-Kyung Lee received a Bachelor's degree in Food Science and Technology from Jeonbuk National University in 2014 and Master's degree in Food Science and Technology from Jeonbuk National University in 2016. She is currently working at Suwon Agricultural and Fishery Products Inspection Center of Gyeonggi-do Institute of Health and Environment as a research scientist.

Prediction of weight loss of low temperature stored tomatoes (tiwai 250) by nondestructive firmness method

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Seoul National University, South Korea

The purpose of this study was to investigate the weight loss, firmness, external color and vitamin C (VC) content of tomatoes (*Lycopersicon esculentum*). Same tomato samples were measured by non-destructive method and stored at low temperature and high humidity for 15 days. Tomatoes were harvested in the light red stage, sorted and packed in boxes, and then stored in a constant temperature and humidity environment (10, 90, 10% RH). Weight loss, firmness and external color quality were measured every three days. Weight loss increased by $1.13 \pm 0.15\%$, but it may not be considered to affect quality. The surface color of fruit was changed, especially in brightness and hue angle. The color values were analyzed by ANOVA, and the results were significant ($p < 0.001$). Fruit firmness decreased during storage, but not in direct proportion. The firmness was reduced to 40% of the initial state on the 15th day of storage. Finally, all the experimental data were summarized, the relationship between firmness and weight loss was analyzed, and a linear regression model was constructed. The model can predict weight loss by non-destructive hardness measurements. The results of this study can be used to help tomato exporters and suppliers obtain real-time quality factors through the proposed method and regression model.

Audience Take Away:

- In this study, the tomatoes were stored for a certain period of time (15 days) to analyze the quality factor of the tomato factor weight loss rate, color and firmness of the tomato and analyze the correlation between firmness and weight loss rate as a result of measuring the tomato firmness in a non-destructive method and derived a linear regression model to predict the weight loss rate of the tomato
- It is possible to estimate the weight loss rate through a non-destructive firmness measurement in a constant storage environment after harvest and use the indicator to determine the freshness

Biography

Dr. Seong In Cho received degrees of BS at department of agricultural engineering, Seoul National University, MS and Ph.D at Purdue University in USA. Since 1992, he has worked as assistant and associate professor at department of biosystems engineering, Seoul National University. He is currently working as a full professor at the same department. He has published 108 research articles, 14 patents, and 12 books.

The fluidized bed drying of watermelon (*Citrullus lanatus*) rind

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The University of the West Indies, Trinidad and Tobago

The rind of the watermelon (*Citrullus lanatus*) fruit is a major agricultural waste but is edible and a potential source of nutrients. The rind can be dried and converted to a powdered form which can be used in a variety of food applications. The fluidized bed drying of watermelon rind pieces was investigated as a rapid drying method to producing a high-quality dried watermelon rind powder. Rind pieces (1x1x0.5 cm) were dried in a Sherwood Scientific Tornado Fluidized Bed Dryer (Sherwood Scientific Ltd, Cambridge, UK) at 70°C (4 m/s) until there was virtually no change in weight. The dried samples were then ground to a fine powder (180 μ m). The initial moisture content and water activity (aw) values of fresh rind averaged 7.78 g H₂O/g DM (88.43 % wb) and 0.979, respectively. Rind was dried to an average moisture content of 0.025 g H₂O/g DM (2.4% wb) after 53 min, and final average water activity of 0.463. Drying occurred in the falling rate period and drying rate constants (k) averaged 0.0830 1/min, with the corresponding diffusivity values averaging 3.50×10^{-9} m²/s. The Aghbashlo et al. model was found to best fit the MR data, based on the root mean square error (RMSE) and the chi-square statistic (χ^2). Dried rind samples could easily be ground into fine powders which were an attractive green colour, high in protein (16.9% wb) and fibre (24.2% wb). The results show the clear potential for fluidized bed drying as a rapid drying method of drying watermelon rind pieces to be used in the manufacture of watermelon rind powders.

Audience Take Away:

- Information on the processing of watermelon rind is presented
- The drying behavior using a rapid drying method is described through the use of drying rate curves and a drying rate constant. The Moisture decline is modelled using well-known thin layer models
- Quality attributes of the powdered rind samples are presented

Biography

Dr. Saheeda Mujaffar holds a BSc. Degree in Natural Sciences (1990) and an MPhil. (1996) and PhD. Degree (2003) in Agricultural Engineering from the University of the West Indies and has worked as a Food Technologist in industry. She has served as the Co-ordinator of the Food Science and Technology Programme in the Department of Chemical Engineering for the past two years and is actively involved in both teaching and research at the Master's and Doctoral levels. Dr. Mujaffar's specific areas of research interest include Drying of Agricultural Commodities, Mathematical Modelling, Food Analysis, Agricultural waste utilization and Product Development.

Response of indigenous yeasts isolated from honey exposed to different conditions of growth and extracts of *Persea americana* seeds

Akpomie Olubunmi Olufunmi^{1*}, Akponah, Ejiro and Onoabedje, Precious

Delta State University, Delta, Nigeria

Honey is of economic and health benefits to man but provides a good medium for the growth of some organisms especially osmophilic yeasts which may cause spoilage or have health implication. The study was aimed at determining the yeasts that are able to grow in honey and their response to some conditions of growth in the environment. Honey samples were collected from retail centres in Abraka, Nigeria. The yeasts were isolated on Malt Extract Agar. The yeasts were identified by macroscopic examination, germ tube and glucose fermentation tests. Growth response of the yeasts was determined at varying temperatures of growth (4°C, 30°C and 37°C), glucose concentration (5%, 10% and 15%), ethanol concentrations (5%, 10%, 15%) and pH (4, 5, 6 and 7). Three yeasts isolates were identified as *Candida* species A (CSA), *Candida* species B (CSB) and *Saccharomyces cerevisiae*. The growth of the isolates was enhanced on exposure to all the glucose, ethanol and pH concentrations. However, the growth was inhibited at 4°C and when exposed to high concentrations of ethanol extract of *Persea americana* seeds. The pure seeds extract of the plant can be incorporated into honey during processing and subsequently stored at 4°C to prevent of growth of these yeasts.

Keywords: Growth, Glucose, Honey, *Persea americana*, pH, Temperature, Yeasts

Audience Take Away:

- *Saccharomyces cerevisiae* and *Candida albicans* were the fungi isolated from the honey samples
- The two isolates and optimum growth at 30°C which increased with time and minimal growth at 4°C. they still grew well at 37°C. Presence of sugar encouraged the growth of the organisms, they grew well at pH 4,5,7, and in the presence of ethanol
- *Candida* species and *Saccharomyces cerevisiae* were inhibited at high concentrations of the *Persea Americana* seeds extracts
- Extracts of *Persea americana* seeds can be incorporated as additives in the processing of honey and can be stored at a low temperature to secure it from these osmophilic yeasts

Biography

Dr. Olubunmi Akpomie obtained a B.Sc (Microbiology) from the University of Benin, Nigeria in 1985. After which she proceeded to Ahmadu Bello University, Zaria for her M.Sc in Applied Microbiology. She lectured at the Nigeria Institute for Science and Leather Technology, Zaria. She received her PhD degree (Microbiology) in 2014 from Delta State University, Abraka where she is presently an Associate Professor. She is a member of the research team in the Department of Microbiology and a Deputy Director in the Advanced Research Centre (Delta State University, Nigeria). She has published more than thirty research articles in reputable journals.

Introducing a new breed of hybridized probiotic yeast strains for the fermentation of wine and other beverages

Tah Clovis Tiku

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Interspecific hybrids are quite common in agriculture, horticulture and bread making today. Probiotics are viable microbial cells such as yeast and other bacteria, normally isolated from gastrointestinal tracts of humans but also found in other ecosystems that convey health beneficial properties to humans. Commercially available yeast strains always provide a consistent and reliable fermentation, but most fermentation products produced using single non-probiotic inocula are thought to lack the sensory complexity, rounded palate structure and beneficial health properties obtained from spontaneous fermentations. In contrast, interspecific probiotic yeast hybrids have the potential to convey health benefits and deliver increased complexity, sensory, and stress resistance properties of fermentable products while maintaining the robustness and desirable traits of the yeast parent. In this light, interspecific hybrid strains with probiotic traits will go a long way to optimize most fermentation processes, while conveying health benefits at the same time. This project will be aimed at generating novel interspecific yeast strains, that are non-genetically modified, with unique properties that can be used industrially to optimize the fermentation stages of wine and other beverages. A new breed of fermentative yeast will be generated through the interspecific hybridization between a commercial *saccharomyces cerevisiae* and a probiotic *saccharomyces* Var. *boulardii*.

Audience Take Away:

- To understand and apply this knowledge in practice on the field through the optimization of the fermentation processes of wine and other beverages using hybridized probiotic yeast strains. This will guarantee good yeast performance with stress resistance, product quality and ensure consumer acceptability
- Understand the mechanism of generation of non-genetically modified yeast strains which do not pose any health risk to consumers
- This presentation will help research institutions involved in the wine or other beverage sector to understand how they can improve on product quality should they use hybridized probiotic inocula during fermentation
- This project will enable the audience to know an alternative option in tackling yeast fermentation related challenges as far as beverage fermentation is concerned

Biography

Mr. Tah Clovis Tiku, holder of Bachelor of Technology(B.tech) in Food Science and Technology, from University of Bamenda-Cameroon. He is a final year master's student in Food and Beverage Innovation and Management at Universita Politecnica Delle Marche, Ancona-Italy. He is currently working on his master's thesis supervised by Prof. Bruno Mozzetti. He has published one article during the end of his undergraduate studies in the IRA-International Journal of Applied Sciences.

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The selection basis for the creation of fast-growing and sustainable energy plantations of Scots pine on lands unsuitable of Polissya and Forest-Steppe of Ukraine

Olga Mazhula

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Energy plantations of wood species contribute to the reduction of soil erosion and the concentration of carbon dioxide, dust and harmful emissions, increased oxygen production and as a result of climate stability on the planet. The Scots pine (*Pinus sylvestris* L.) is a promising breed for growing on marginal, low-yielding, dry and unfit for mechanized land cultivation.

For the creation of fast growing and sustainable pine plantations, their genetic selection basis, that is, high-quality seeds, is of paramount importance. From the 60s of the last century in Ukraine, work was carried out on the selection of plus trees of Scots pine (Pyatnitsky S.S, Molotkov P. I., Gryzaichuk V.V., etc.).

From the cuttings and the seeds of selected positive trees, we have created, respectively, 9 Clonal and Seedling seed orchards of Scots pine 1-st and 2-nd generations. Genetic tests of plus trees was carried out in areas similar to the potential planting area of future energy plantations.

Long-term systematic studies from 2000 to 2010 years of the cone and seed harvest in seed orchards of Scots pine of the created 1985 - 1992 in the Kharkiv region allowed us to determine critical periods for initiation of cones. The size of crop of cones of Scots pine is depended by climatic conditions: air temperature and moisture deficit for explicit ten-day periods 2 years before. These indicators allow predicting the harvest of cones for 2 years ahead.

Storage of seeds without losing its qualities is a considerable issue due certain periodicity of high yielding years and to the insufficient number of improved seeds for annual production needs. The experiments on the storage of pine seed performed by us in 2006 and 2009. The samples of pine seeds of autochthonous populations and seed orchards of Scots pine were handed on storage in National storehouse of seeds of agricultural sorts in Plant Production Institute named after V. Ya. Yuriev in Kharkiv. Prior to laying the seeds on the storage, an analysis of its germination energy and germination capacity, as well as drying and accelerated aging of part a samples of seeds, according to Likhachev's methodology was conducted.

In 2018, an analysis of the quality of the pine seed samples was carried out. Studies have shown that the germination energy in various samples when stored at + 4 ° C ranged from 52,0 to 80,2; the germination capacity - from 73,0 to 93,7%. At -20 ° C, the energy of germination in samples of different origins was from 70,5 to 96,2%, the germination capacity - 76,0 - 97,5.

As our research shows, the effective way of long-term storage of pine seed is place in hermetically sealed foil bags in the storage chamber in a regulated temperature range, where the constant temperature was maintained at + 4 ° C and -20 ° C. The seed quality of the seeds is best preserved at -20 ° C. The higher the quality of the seed was deposited, the better it was stored during the 10-year period. The highest quality after long-term storage had pine seeds from seed orchards I and II generation. It testifies that its parameters are influenced not only by climatic and environmental conditions, but also by genetically determined properties of pine trees.

The practical value of our researches:

- 1) Ability to predicting the crop of the seeds of the Scots pine;
- 2) Solving the problem of the complete provision pine seed of genetically improving quality.

Biography

I, O. Mazhula studied forestry at the National Forestry University of Ukraine in Lviv, Ukraine and graduated as forestry engineer in 1984. From 1984 to 1989 - postgraduate student of the breeding, seeding and introduction laboratory of forest species at the Ukrainian Research Institute of Forestry & Forest Melioration named after G. M. Vysotsky Ukrainian Academy of Sciences. I received her PhD degree in 1993 at the same institution. From 1993 to 1998 I worked senior research assistant and from 1998 to 2013 - a leading researcher at the same laboratory. From 2013 to 2015 I obtained the position of an Associate Professor at Kharkiv National Agrarian University named after V. V. Dokuchayev. From 2015 to 2018, I was caring for a sick mother and working as possible at the Separated subdivision of National University of Life and Environmental Sciences of Ukraine "Boyarka Forestry Research Station". Since 2018 till now - a senior research at the institute of Bioenergy Crops and Sugar Beet of National Academy of Agrarian Sciences of Ukraine. I have published more than 90 research articles in SCI(E) journals.

Adherence of Iron and folic acid supplementation and determinants among pregnant women in Ethiopia: A systematic review and Meta-analysis

Melaku Desta

Debre Markos University, Ethiopia

Background Maternal dietary diversity is a proxy indicator of maternal nutrient adequacy and improves health outcomes for both mothers and babies. However, little is documented on dietary diversity among pregnant mothers. Therefore, this study assessed diet diversity and associated factors among pregnant mothers attending the antenatal clinic in Shashemane, Oromia, Central Ethiopia. Methods An institution-based cross-sectional study was conducted on 315 systematically selected pregnant women attending antenatal clinic of Shashemane town in April 2017. Dietary diversity was assessed using a 24 h dietary recall method, and the dietary diversity score was computed for ten food groups. Bivariate and multivariate logistic regressions were computed to identify associated factors of dietary diversity. Result In this study, only a quarter (25.4%) of pregnant mothers consumed adequate dietary diversity. Mother's tertiary (AOR 3.18; 95% CI: 1.8, 6.35) and secondary (AOR 2.13; 95% CI: 2.32, 8.72) education, household monthly income above 3500 ETB (AOR = 2.24; 95% CI: 1.47, 7.78), livestock ownership (AOR = 4.15; 95% CI: 2.07, 9.86), women who got emotional support from the husband (AOR = 3.49; 95% CI: 1.12, 8.23), and women who participated in the shopping (AOR = 2.54; 95% CI: 3.27, 9.83) were more likely to attain the adequate dietary diversity. Conclusion The study revealed that the overall consumption of adequate dietary diversity was found to be low. Developing the educational level of women, increasing household income and owning of livestock, increasing husbands' support, and improving women's participation in the shopping are recommended to improve women's adequate dietary diversity.

Biography

Melaku Desta obtained a College of health science, Debre Markos University, Ethiopia. Melaku desta currently works at research in Obstetrics, Infectious Diseases and Gynaecology. Their most recent publication is 'Knowledge, practice and associated factors of infection prevention among healthcare workers in Debre Markos referral hospital, Northwest Ethiopia.

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