

Food Science

Virtual 2020 - 2nd Edition

September 10-11, 2020

FOOD SCIENCE

VIRTUAL 2020 -2ND EDITION

SEPTEMBER 10-11, 2020

Theme:

To Exchange Innovations and Emerging
Novel Research in Plant Sciences

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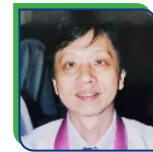
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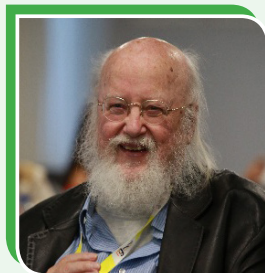


Wuyeh Drammeh

Ministry of Health and Social Welfare,
Gambia

Thank You
All...

Keynote Speakers



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Switzerland



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University of Wales Trinity Saint David,
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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 90 different countries and 1090 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 **Food Science Virtual 2020** |

Food Science Virtual 2020 is an online event offers you an interactive experience to listen and talk with experts in all facets of the food and beverage industry. Food Science Virtual 2020 is designed to provide a platform for Food Technologist, Food Microbiologist, Food safety officers, Scientists, Researchers, Industrialists, Food Engineers, and Food Professional from Manufacturing, Retail, and Food Service Industry from all over the world to exchange their knowledge and experience on food research.

Food Science Virtual 2020 is an excellent coliseum for passionate researchers with its well organized scientific program. The program includes plenary talks, keynote lectures, Speaker talks, and developments in the arena as well as therapeutic aspects.

KEYNOTE FORUM

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Klaus Ammann

University of Bern, Switzerland

Overregulation of GM crops is too expensive, delays approvals and harms research

The Cartagena Protocol on Biosafety (CPB) has now been adopted by 172 parties. It still builds on the principle that GM crop plants might bear risks in contrast to the conventional crops: Objective of CPB. The huge apparatus on risk assessment based on this protocol is building on the principle, that the mechanism of transgenicity is totally artificial and is not found in nature. Modern molecular science insights have proven the contrary, as shown in on the molecular basis of transgenesis. This results in maintaining to an asymmetric risk assessment of innovation of GM crops. The possible exemption of widespread GM crops in Art. 7.4 bis have been considered since many years, but no final decision has been taken. Basically, Genetic Engineering is in a constant debate, but in Europe no final decisions have been taken

A really negative follow-up of populist opinions brings a halting of regulatory approvals since 1998 in Europe. Although many authors consider the full extent of reasons still to be conjectural, many data suggest that changes in regulatory environment may have been a cause. In a combination of high costs for lost implementation and high costs for regulatory approvals the present state and operational experience has grown into a major obstacle of modern crop breeding. One of the main difficulties in this kind of regulatory stall is the very active role of GMO opponents, most of their fundamentalist arguments are contradicted in many peer reviewed publications, but still, European politicians and an important part of the public still hang on to the populist arguments. In Asia, signs of progress are becoming reality for the Golden Rice and Bt-Brinjal.

Biography:

Prof. Emeritus hon. Bern University Switzerland. Born Dec. 6, 1940 in Bern, thesis: vegetation and glacier history, summa cum laude in 1972 Bern University. Research topics: Biodiversity, Vegetation Ecology, Lichens and Mosses, Biomonitoring of Air Pollution, Plant Biotechnology: Biosafety, Gene Flow and Ecology of Transgenic Crops. Guest lecturing in Delft, Netherlands, Istanbul, Turkey, research in Jamaica, at Duke University and Missouri Botanical Garden. Member of the steering committee of www.ppri.net. Scientific activities: maintaining 500 reference bibliographies on plant biotechnology and biodiversity, over 320 publications under Klaus Ammann in journals, blogs, newspapers, books on biosafety research and ca. 190 slide presentations, many literature references with full text links. Editor, Co-Editor in journals from Elsevier, Springer and Landes. Member of scientific committees in Switzerland and Europe on biodiversity and biosafety. Fellow of the Royal Society of Biology, external member of the European Academy Details see [http:// www.ask-force.org/Curriculum/Links2.pdf](http://www.ask-force.org/Curriculum/Links2.pdf)

SPEAKERS | D
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Nitric oxide and reactive oxygen species regulation of NADPH oxidase for the high light induction of autophagy in *Chlamydomonas reinhardtii*

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Nitric oxide (NO) is a signaling factors involved in the regulation of plant physiology and stress responses. The role of NO interaction with H₂O₂ in the regulation of NADPH oxidase (RBOL2) for the induction of autophagy and in *Chlamydomonas reinhardtii* was determined. Illumination of *C. reinhardtii* cells under a high light (HL, 1,600 $\mu\text{mol m}^{-2} \text{s}^{-1}$) condition induced a NO burst through NO synthase- and nitrate reductase-independent routes, and cell death. The abundance of CrATG8 protein, an autophagy marker of *C. reinhardtii*, increased after HL illumination along with a linear increase in the transcript abundance of autophagy-associated genes, which can be suppressed in the presence of an NO scavenger, 2-(4-carboxyphenyl)-4,4,5,5-tetramethylimidazole-1-oxyl-3-oxide (cPTIO). The cells were treated with NO donor, S-nitroso-N-acetyl-penicillamine, under a normal light (50 $\mu\text{mol m}^{-2} \text{s}^{-1}$) condition to elucidate the role of NO in autophagy activation and cell death. Treatment with 0.1 mM NO donor increased the abundance of ATG8 protein and CrATG transcripts, which can be suppressed by cPTIO, but did not influence cell viability. Treatment with 1 mM H₂O₂ and 0.1 mM NO donors enhanced autophagy induction and resulted in cell death after 24 h. This implies that NO is critical for the interaction of H₂O₂ and NO that induces cell death and autophagy. Furthermore, RBOL2 mutant showed enhanced autophagy expression and an exposure of RBOL2 mutant to 0.1 mM NO donors induced a higher autophagy expression. In conclusion, the present findings demonstrated that the NO interacts with H₂O₂ for HL-induced cell death and RBOL2 mediates the NO-induced autophagy in *C. reinhardtii*.

Audience Take Away:

- This study shows a model for the interaction of nitric oxide and reactive oxygen species in the regulation of autophagy under control of NADPH oxidase-mediated signaling in the model green alga *Chlamydomonas* under high light stress
- The present results open the way for future study on the components of the NO-mediated signaling pathway in the modulation of autophagy.
- The future work on how NADPH oxidase (RBOL2)-mediated signalling links to NO action on autophagy expression

Biography:

Dr. Lee studied Crop Physiology in Department of Agronomy of National Taiwan University, Taipei, Taiwan and graduated as MS in 1984. I then joined the crop physiology stress research group of Prof. Chu at the Institute of Agronomy, National Taiwan University and received my Ph.D degree in 1990. After four-year postdoctoral research on photosynthesis and protease function supervised by Dr Hsieh and Dr. Lin at the Institute of Botany, Academia Sinica, Taipei, Taiwan, I obtained the position of an Associate Professor at the National Sun Yat-sen University, Kaohsiung, Taiwan, and promoted to Distinguished Professor since 2013. I have published more than 75 research articles in SCI(E) journals.



Food production x irrigation x natural resources in Brazil: Successful case and challenges for environmental sustainability

Danilo José Fanelli Luchiari

GTACC – Grupo Técnico de Assistência e Consultoria em Citros, Brazil

Brazil is a country with a strong vocation for agriculture, owing to its abundance of the two main inputs needed to produce plant protein, namely sun and water. Tropical weather, high solar intensity and large extent of fertile soils are the ideal conditions for producing food at a low cost. Such conditions enabled Brazil to largely increase its food production to supply the world and resulted in two distinct consequences: increased yield per unit of area and increased physical farming areas, pressuring the occupation of part of forest areas.

This study presents a synthesis of priority strategic macro-actions that should be adopted in Brazil in order to increase the production of food at a low cost, alongside the best development manner, environmental sustainability and preservation.

The basis for this study was an actual success case of introducing irrigation in citrus grown for processing, which resulted in increased yield along with high environmental sustainability. The citrus planted area has been reduced to half its extent in the last fifteen years, but the same yield was maintained thanks to the increment brought by irrigation. Since the goal for our citriculture is a two-fold yield increase in the next ten years, there is a need to considerably increase the water availability to make new irrigated areas productive and to maintain the environmental sustainability.

This study compares and prioritizes the main strategic macro-actions adopted to produce food in Brazil and is aimed at serving as an example to all other developing countries with tropical weather, enabling increased food production at a low cost and eliminating world hunger, improving the quality of life of the population and guaranteeing the preservation of the environment with high environmental sustainability.

The result of this study sets the order of importance of the priority strategic macro-actions for Brazilian agriculture to increase its food production at a low cost, by prioritizing the increase in yield per unit of area in rainfed areas, then the increment in yield brought by irrigation, and lastly the physical expansion of agriculture into forest areas, with the adoption of existing legal measures and the recommendation of improvement to guarantee the environmental preservation and sustainability, for those three scenarios.

Biography:

Danilo José Fanelli Luchiari, Agronomist - UNIPINHAL (1984), with a Master's Degree in Civil Engineering – FEC/UNICAMP (1989) and Specialization in Environment - ESALQ/USP (1994). Consults for the largest irrigated citrus area in Brazil, works in Latin America. Accountable for the reintroduction of drip irrigation in Brazil. Works with fertigation of agribusiness effluents. Participates in programs to optimize river basins. Developed governmental projects for the settlement of multiple families in irrigated fruit growing regions in northern Brazil. Member of the GTACC group providing technical assistance to the largest citrus planted area in the country.



Estimation of genetic parameters of a *Miscanthus sinensis* population: A staggered-start design highlights a greater effect for climate than age

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Bioeconomy, sustained by agriculture and breeding, belongs to innovative solutions to address current challenging environmental issues. *Miscanthus*, a dedicated perennial crop, is known to display interesting traits to produce renewable resources (Clifton-Brown_et_al._2001._Agronomy_Journal): a high biomass production and quality, coupled with low inputs needs. However, the improvement of these traits requires to assess their heritabilities. Due to the perennial feature of the crop, the *year* effect confounds the age and *climate* effects, which hampers the assessment of the corresponding variances and heritabilities. In the framework of the BFF1 project, we evaluated a *Miscanthus sinensis* population focusing on two main questions. What are the plant *age* and *climate* effects on the expression of miscanthus genetic diversity? Are they different for each trait and what are the lessons for miscanthus breeding?

A *Miscanthus sinensis* mapping population of 159 genotypes was established with its two parents in France in two contrasted sites. On each site, the establishment was staggered over two years: a first group of genotypes was established in 2014 and its establishment was repeated in 2015. Such a design, called “staggered-start design” (Loughin_2006._Crop_Science) is relevant to evaluate perennial crops: it indeed allows decomposing the year effect in two components, the age effect and the climate effect. Due to plant losses and in vitro propagation recalcitrance for some genotypes, the design was unbalanced as all individuals were not established twice. For each establishment, year and location, phenotyping data consisted in biomass production and quality related traits. Corresponding genetic parameters were computed through Linear Mixed Models using breedR software (Muñoz and Sanchez. 2019).

Regarding canopy height and plant maximum height, the mean “genotype x climate” interaction variance estimates across ages were up to 1.5 times higher than the mean “genotype x age” interaction variance estimates across years, for both locations. Concerning hemicellulose (%DM) and cell-wall content, the mean “genotype x climate” interaction variance estimates across ages were respectively up to 2.5 and 6 times higher than the mean “genotype x age” interaction variance estimates across years, in Orléans. These results displayed here show substantial effects of plant age, climate and location on the expression of miscanthus genetic diversity, through all biomass production and quality traits studied. This generated variations in heritability estimates and this could imply to detect distinct QTL and to discuss the implications in breeding.

Biography:

As a third year PhD student in INRAE and AgroParisTech – ABIES doctoral school, I am really passionate about agricultural, biological and environmental sciences. I definitely think that these sciences can be used as main strengths and levers, in order to find innovative solutions to deal with one of the biggest challenges of this century, the climate change. Since I felt that as a teenager, right in the middle of the family farm, I tried to build my graduate studies following this passion.

¹BFF Biomass for the Future project (ANR-11-BTBR-0006-BFF), funded by the French National Research Agency. https://www6.inrae.fr/biomassforthefuture_eng/The-project.



Metabolism and ROS dynamics are differentially regulated by γ -aminobutyric acid in a concentration dependent manner to induce immunity against *B. cinerea* in *Arabidopsis*.

Henry Christopher Janse van Rensburg*, Wim Van den Ende

Department of Biology, KU Leuven, Leuven, Belgium

The non-proteinogenic amino acid γ -aminobutyric acid (GABA) rapidly accumulates in plant tissue in response to several biotic and abiotic stresses and has been associated with increased resistance. Besides its role in modulating the flux of carbon and energy in the TCA cycle through the GABA shunt, it is also proposed to be an effective signaling entity between cells. Previous data suggested that exogenous GABA application affected seedling development and that the expression of several genes involved in carbon, nitrogen and reactive oxygen species (ROS) metabolism were affected in a concentration dependent manner. This prompted us to investigate whether exogenous GABA application and subsequent infection with *B. cinerea* affected soluble sugar levels and nitrogen metabolism and their interplay with ROS dynamics. We found that exogenous GABA induced long-term resistance against the necrotrophic fungus *B. cinerea* in a concentration dependent manner. In contrast, lower concentrations of GABA reduced the levels of both glucose and total soluble sugars more severely compared to higher concentrations. Similarly, GABA negatively regulated both the total, and active nitrate reductase activities, and that lower concentrations affected the active form more severely. The level of H₂O₂ in plants were also reduced after GABA treatment in a concentration dependent manner by inducing the activities of both catalase and peroxidase, but not superoxide dismutase. In contrast, we showed that the bacterial elicitor flg22 induced ROS burst through NADPH oxidases were negatively affected in plants treated with low concentrations of GABA, and unaffected in those treated at higher concentrations. The level of MPK3 remained unaltered after treatment. Our data support the hypothesis that GABA differentially regulates metabolism and stress responses in a spatial and concentration dependent manner. At low concentrations, GABA most likely act as signal entity only, and at high concentrations the signaling role is most probably overshadowed by GABA metabolism through the GABA shunt. We propose that cells perceive low concentrations of extracellular GABA exported/produced by surrounding stressed cells, and subsequently reshuffle their metabolism and ROS dynamics towards stress responses.

Audience Take Away:

- GABA prime long-term plant defenses against *B. cinerea* infection
- GABA signaling and metabolism are separated in a concentration dependent manner
- GABA activates ROS scavenging enzymes in *Arabidopsis* leaves
- NADPH oxidase-mediated ROS burst is reduced by exogenous GABA at low concentrations
- Nitrogen metabolism is negatively affected by low GABA treatments

Biography:

Mr. Janse van Rensburg studied BSc Molecular Biology and Biotechnology at the University of Stellenbosch, South Africa and graduated in 2013. Thereafter he continued his postgraduate studies at the Institute for Plant Biotechnology at Stellenbosch University, South Africa obtaining his MSc in 2015. He joined the research group of Prof. Wim Van den Ende in the Molecular Plant Biology laboratory at KU Leuven in Belgium for his PhD. His research is focusing on the effect of candidate priming molecules on plant metabolism and ROS dynamics during *B. cinerea* infection. He has published 3 scientific articles in SCI(E) journals.



Recombinase polymerase amplification coupled with lateral flow tests for high sensitive detection of potato pathogens

I.V. Safenkova*, A.V. Ivanov, A.V. Zherdev and B.B. Dzantiev

A.N. Bach Institute of Biochemistry, Research Centre of Biotechnology of the Russian Academy of Sciences, Moscow, Russia

Phytopathogenic bacteria, viruses and viroids are serious threats to agricultural and natural ecosystems. Rapid, accurate and sensitive screening tests are necessary to prevent worldwide spreading of plant diseases. Control of seed materials and field plantings requires methods for on-site detection of plant pathogens. Competitive alternatives to polymerase chain reaction (PCR) and PCR-derived techniques are isothermal amplification methods such as recombinase polymerase amplification (RPA). This method has two main advantages – fixed temperature and short duration. The reaction proceeds at 30-42 °C, and its recommended time is about 20 min. Moreover, RPA may be applied for non-laboratory control of plant pathogens due to possibility of its coupling with lateral flow assay (LFA). The LFA as registration tool provides such advantages as low cost and rapidity (<10 min). Here, we present benefits of the coupled RPA-LFA assays for sensitive detection of three potato pathogens of different nature. 1) The developed assay for potato virus X (PVX) has the detection limit (DL) equal to 0.14 ng PVX per g of potato leaves and 30-min duration. The PVX assay is 260 times more sensitive than conventional LFA based on antibodies and demonstrates the same sensitivity as PCR. 2) *Dickeya solani*, one of the most significant bacterial pathogens, infects potato plants, resulting in severe economic damage. The developed RPA-LFA has DL equal to 14,000 colony-forming units per gram of potato tuber. This sensitivity corresponds to PCR, but the assay is implemented at a fixed temperature (39 °C) over 30 min. 3) Potato spindle tuber viroid (PSTVd) is the most primitive potato pathogen that causes perceptible crop damage. Its RT-RPA-LFA allows detecting 10⁶ copies of in vitro transcribed PSTVd RNA in reaction or up to 1:10⁶ diluted extracts of infected plants. The proposed adjustments for PRA-LFA can be applied for ultrasensitive and rapid detection of other plant pathogens. The study was supported by the Russian Science Foundation (grant # 16-16-04108).

Audience Take Away:

- Lean how to integrate recombinase polymerase amplification and lateral flow test strips
- Lean how to detect potato pathogens with high sensitivity
- Lean how to control plant diseases out of laboratory

Biography:

Dr. Irina V. Safenkova studied Biology and Chemistry at the Bryansk State University, Russia and graduated as MS in 2006. She then joined the research group of Prof. Dzantiev at the A.N. Bach Institute of Biochemistry, Russian Academy of Sciences, Moscow, Russia. She received her PhD in 2010 at the same institution. She is the senior researcher at the Immunochemistry laboratory, the Research Centre of Biotechnology. She has published more than 50 papers in reputed WoS journals.



Disease suppressive native strains of *Trichoderma* spp., their low cost effective mass multiplication on agro-waste substrates and shelf life enhancement on antioxidant crops

Sunita Chandel

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Carnation in India is in a declining phase under the protected environment by the continuous interference of biotic pressure exerted due to some soil borne pathogens such as *Fusarium oxysporum* f.sp. *dianthi* and *Rhizoctonia solani* mainly responsible to deteriorate the plant health and cause losses upto 40 per cent annually. Due to many adverse effect of the chemicals which are widely adopted to control the diseases in general in plants, and more particularly injudicious application of fungicides has affected the environment, plant and human health. An alternative practical and safe approach is advisable to reduce the intensity of serious economically important crops. The native strains well known *Trichoderma* spp. have been isolated from the carnation rhizosphere from different provinces for testing their antagonistic activity under *in vitro* against the pathogens in order to mass multiply the best strains of *Trichoderma* on different readily available media. Multiplication and shelf life assessment of the native *Trichoderma* species on various solid and liquid substrates such as vermicompost, FYM, cocopeat, wheat straw, cocopeat, mushroom compost, rice straw including PDB and Molasses yeast extract was studied. Wheat straw registered highest colony count followed by vermicompost as agro-based substrates while in liquid substrates; PDB (potato dextrose broth) appeared superior in supporting the growth of the native isolates. Three native species namely *Trichoderma viride* (78.10,80.87), *Trichoderma harzianum* (79.03,79.47%) and *Trichoderma virens* (71.40,72.87%) showed highest antagonistic activity against *Fusarium* and *Rhizoctonia* pathogens causing carnation wilt and stem rot diseases by giving maximum per cent mycelia growth inhibition *in vitro*. However, isolates *T. viride* (I-10), *T. harzianum* (I-5) and *T. polysporum* (I-4) also performed better over the rest of isolates by giving mycelia inhibition within the range of 64 to 70.33 per cent. Potential *Trichoderma* spp. were further grown on best solid medium which revealed the highest population count in wheat straw with 10% wheat flour and 3% jaggery at pH 6.5. Natural antioxidant crops, soybean, maize and brown rice enhanced the shelf life of *Trichoderma* spp. under storage period of four months in solid medium. In all four native species *T. harzianum*, *T. viride* and *T. hamatum* and *T. viride* (I-10) performed better and can be used in the management of wilt and stem rot devastating diseases of carnation.

Audience Take Away:

- The audience will have an access to the biological control practices of managing plant diseases
- The researcher will come to know about the well known species utilized as biocontrol agent. How these can be mass cultured on different substrates and antioxidant crops which can improve their shelf life so that their spores can live for longer period. This is the main aim in the biological application because the non-pathogenic microbes are living in nature
- How their use can suppress the most important diseases i.e wilt and stem rot of Carnation from where these were isolated i.e the novel strains of *Trichoderma* spp. from rhizospheric soils to give relief to the farmers or growers in the country or state

Biography:

A Dr. Sunita Chandel attained degree in BSc. Agriculture from Himachal Pradesh Krishi Vishvidhalaya, Palampur, India and her post graduate degrees in MSc and Ph.D in Mycology & Plant Pathology in years 1987 & 1991 from Dr.Y.S.Parmar University of Horticulture and Forestry, Naini, Solan (H.P). She joined as Assistant Professor in 1992 in Department of Plant Pathology of the same University, and presently working as Professor. She was awarded University Merit Fellowship in B.Sc Agriculture, ICAR Junior Fellowship for Master's Research, Research fellowship for Ph.D and worked as Research Associate. Selected for Commonwealth Academic Staff Fellowship (2005-06) programme at University of Aberdeen, Scotland, U.K. and worked under supervision of Steve Woodward. Received SERC Fast track research proposal of DST for Young Scientists in Life Sciences and published 105 research articles in SCI journals of National and International repute



Physiological and Biochemical characterization of GABA shunt pathway in pea (*Pisum sativum* L.) seedlings under drought stress

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The physiological and biochemical role of γ -aminobutyric acid (GABA) shunt pathway in green pea seedlings (*Pisum sativum* L.) was studied in response to soil water holding capacity levels: 80%, 60%, 40%, 20% and 10% grown under continuous light at 25°C for 7 days and 14 days, separately. Characterization of seeds germination pattern, seedlings growth (plant height, fresh weight, dry mass and chlorophyll contents), GABA shunt metabolite levels (GABA, glutamate and alanine), total proteins and total carbohydrates level and oxidative damage (MDA level) were examined. Data showed significant effect of drought stress on seed germination, plant growth, GABA shunt metabolite level, total proteins and carbohydrates contents and MDA level. A significant decline in seed germination percentage was recorded at 20% drought level, which indicated that 20% of soil water holding capacity is the threshold value of water availability for normal germination after 14 days. Seedling fresh weight, dry mass and plant height were significantly reduced with positive correlation as water availability was decreased. There was a significant decrease with positive correlation in Chl a and Chl b content in response to 7 days and 14 days of drought. GABA shunt metabolites were significantly increased with negative correlation as water stress increased. Pea seedlings showed significant increase in protein content as drought stress was increased. Total carbohydrates level increased significantly when amount of water availability decreased. MDA content increased slightly but significant after 7 days and sharply after 14 days under all water stress levels. The maximum increase in MDA content was observed at 20% and 10% water levels. Results presented in this study indicated that pea seedlings suffered minor damage under mild drought stress but severe lipid peroxidation and oxidative damage occurred as water deficit increased. The elevated level of GABA metabolites, soluble sugars and total proteins under water stress might be involve in cellular osmotic adjustment, protecting plants from oxidative stress, balancing of Carbon and Nitrogen (C:N) metabolism and maintaining cell metabolic homeostasis and cell turgor.

Biography:

Nisreen AL-Quraan graduated in 1998 with Bachelor of Science degree from the Department of Biological Sciences, Yarmouk University, Jordan. She joined the graduate program in the Department of Biological sciences, Yarmouk University and received her Master of Science degree in Plant Biochemistry and Molecular biology in 2001. After completion of her MS, she worked as research and teaching assistant for two years in the Department of Biological Sciences, Yarmouk University, Jordan. On May, 2004 she joined the Department of Biological Sciences, Auburn University, Alabama, USA to pursue her PhD degree in Plant Biochemistry and Molecular Biology working on the plant abiotic stress interaction and the role of GABA shunt pathway in plant stress tolerance. She obtained her PhD Degree in August, 2008 from Auburn University, Alabama, USA. Since September 2008, Nisreen AL-Quraan has been working as a professor in plant biochemistry and molecular biology at Jordan University of Science and Technology, JORDAN. Her research is focusing on investigating the pathways that enable plants to adapt and tolerate harsh biotic and Abiotic stress conditions. She is interested in understanding the role of GABA shunt metabolic pathway that is activated in response to the interactions between plants and its environments.



Differential expression pattern for C4 specific gene copies in rice grains and its relevance with the intermediate step in the C4 evolution

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The 'light reactions' of photosynthesis are highly conserved while the carbon concentrating mechanism (CCM) part of the 'dark reactions' have evolved many times. In Poaceae, where C4 photosynthesis was evolved, independent evolution for the C4 trait was reported to occur at least 20 times. Although the evolutionary steps involved for the C4 syndrome (neofunctionalization event) is a complex process with the genetic, anatomical, and biochemical pre-conditional requirements, since the same orthologous genes were recruited for C4 across species exhibiting a co-opt behavior, it is much feasible. Few years back, C4 photosynthesis pathway in wheat grains (without Kranz anatomy) was reported. With arguments on this issue is still unsettled, we studied for the differential expression pattern for the C4 specific orthologs and their paralogs in rice grains and leaves using RNA-seq approaches. Interestingly, two C4 specific gene copies – *aat* and *ppdk* – were significantly differentially expressed in the developing rice grains than in the leaves of all the three genotypes (APO, BAM4234, and Crossa) studied. This suggests for the initiation of the evolutionary process for a weak C4 pathway in rice itself, although could not accomplish, but successfully accomplished in wheat and barley grains. This is also associated with the weak C4 pathway in reproductive tissues of sorghum and maize, indicating its orthologous nature. Based on the recent proposal for the requirement for a rudimentary or weak CCM to act as an intermediate step, upon post-emergence optimization, leading to the efficient or strong CCM was proposed for the C4 trait evolution, with this trait is of a directional evolution process. This suits well with our report on non-Kranz NAD-ME type C4 photosynthesis in wheat grains. This also addresses the time-lag that was unanswered till date, between the reduced atmospheric CO₂ levels and C4 evolution.

Audience Take Away:

- Grain tissues of wheat and barley (BOP clade) accomplish non-Kranz NAD-ME C4 photosynthesis
- Initiation for the C4 evolutionary process in response to reduced atmospheric CO₂ levels is evident in grain tissues of rice, but not complete due to lack of anatomical pre-requirements
- Aat and ppdk genes were recruited for the C4 syndrome prior to other genes of the C4 photosynthesis
- It is the BOP clade of the Poaceae, where, the intermediate and weak C4 photosynthesis (non Kranz) had evolved, and upon post-emergence optimization, evolved for a strong C4 photosynthesis (Kranz) in leaves of PACMAD clade members

Biography:

Dr. Parimalan Rangan studied Agriculture (PBG) at TNAU, Coimbatore for post-graduation (2003), and did PhD in Biotechnology at CSIR-CFTRI, Mysuru (2008). Joined ICAR in 2009 as Scientist at ICAR-NBPGR, New Delhi. Through DBT funded IACBGF scheme, had two years post-doctoral fellowship at Prof. Robert Henry lab of the QAAFI, The University of Queensland, Australia (2014-16) to work on transcriptome approaches for grain quality in wheat under the impact of heat stress. After which, continuing at ICAR-NBPGR. Identified the accomplishment of non-Kranz C4 pathway in wheat grains, with wheat being a C3 plant.



Engineering defense response in plants through miRNA mediated suppression of regulatory factors

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Non-coding RNAs are prominent modulators of transcriptional and post-transcriptional expression of genes in a wide range of biological processes. However, the repertoire and functions of microRNAs largely remains unexplored with respect to defense against fungal phytopathogens. In this study, we performed a comparative small RNA profiling of susceptible (Arka Lohit-AL) and resistant (Punjab Lal-PL) chilli cultivars to identify 35 differentially expressed miRNAs responsive to *Colletotrichum truncatum*, the most belligerent anthracnose pathogen. Excitingly, a novel microRNA can-miRn37a was significantly expressed in PL but reduced in AL genotype post pathogen attack. Overexpression of can-miR37a in transgenic pepper revealed enhanced resistance to *C. truncatum* as evidenced by decreased fungal growth, up-regulated expression of defense-responsive genes and down-regulated expression of the target regulatory genes encoding ethylene response factors (ERFs). Can-mir37a mediated regulation of ERFs was further confirmed through transient co-repression in *Nicotiana benthaminana*. Furthermore, knock-out analysis of the ERF transcription factors revealed their role in fungal colonization and immune suppression in chilli. Overall, the present study authenticates can-miR37a as a potential miRNA that engineers anthracnose resistance in chilli pepper.

Audience Take Away:

- The audience will have a firsthand knowledge about the regulatory role of small RNAs in plants
- The identified miRNAs could be used as markers for diagnosis of critical plant diseases at an early stage
- Exploration of the small RNA mechanism in plants will pave the way for miRNA based molecular breeding for crop improvement

Biography:

Raj Kumar Joshi is Associate Professor at the Dept. of Biotechnology, Rama Devi Women's University, India where he teaches graduate level courses on Plant Genomics and Genetic Engineering. He also serves as the Group Leader of the Plant Functional Genomics Group, and in that capacity he supervises the overall research activities on the functional aspects of molecular plant-microbe interactions. He has been awarded with the prestigious SERB early career grant and SERB extramural grant from the Dept. of Science and technology, Govt. of India and CREST award from Dept. of Biotechnology, Govt. of India. Dr. Joshi is currently running a successful programme on the delineation of molecular networks in the interaction between plants and fungal phytopathogens. His recent forays into genome editing and precise base editing towards improvement of these crops has been highly productive.



Ethylene alone may play a key role in modulating induction of isoflavonoids, an important defense against herbivore insects in field-grown soybean

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Solar radiation can enhance protection against insect pests and increase yield of crops, studies of plant secondary metabolites induced by solar UV-B radiation get more and more attention in the context of potential utilization in agriculture for increasing crop resistance to herbivore insects. However, the mechanism and traits involved in the UV-B mediated increment of plant resistance are largely unknown in crops species, such as soybean. Here we determined in undamaged and damaged leaves by *Anticarsia gemmatilis* larvae and in pods attached by stink bugs of two soybean cultivars (cv.) grown under attenuated or full solar UV-B radiation changes in jasmonates, ethylene, salicylic acid, trypsin protease inhibitor activity, flavonoids and mRNA expression of genes related with defenses. Ethylene emission induced by herbivory was synergistically increased in plants grown under solar UV-B radiation and was positively correlated with malonylgenistin concentration, TPI activity and expression of IFS2 and the defensive protein PR2, while was negatively correlated with leaf consumption and stink bug damage. The precursor of ethylene ACC applied exogenously to soybean was enough to strongly induce leaf isoflavonoids. Our results showed that in field-grown soybean isoflavonoids were regulated by both herbivory and solar UV-B inducible ET, while flavonols were regulated by solar UV-B radiation and not by herbivory or ET. Traditionally ET has been considered an important modulator of plant responses against herbivores with a secondary participation in induction of defenses and capable of trigger a synergistic effect on defense induction in combination with jasmonic acid. However, our study suggests that although ET can modulate UV-B-mediated priming of inducible plant defenses, some plant defenses, such as isoflavonoids are regulated by ET alone.

Audience Take Away:

- I present important results related with regulation of plant defenses against pest insects, and in the future this information can be used into Integrated Pest Management Control programs
- In this presentation I showed that the defense hormone ethylene can regulate isoflavonoid production in soybean crops, which is an important defense against insects. Although traditionally ethylene has been considered an important modulator of plant responses against herbivores with a secondary participation in induction of defenses, here I showed for the first time that isoflavonoids are regulated by ET alone

Biography:

Dr. Zavala studied Agronomy at the University of Buenos Aires and graduated in 1994. He then joined the research group of Prof. Baldwin at the Max Planck Institute for Chemical Ecology, Jena, Germany, where he received his PhD degree in 2004. After two years of postdoc at the same institution, he moved to the University of Illinois for 2 years to work under the supervision of Profs Berenbaum and DeLucia. Currently he is Associate Professor of Biochemistry at the school of Agronomy, University of Buenos Aires. He has published more than 50 research articles in SCI(E) journals.



Assessment of aphrodisiac activity of *Bryonia laciniosa* and its ameliorative potential against chemically induced reproductive toxicity in male Wistar rats

Ranjeeta Mourya*, A. G. Telang

Women Scientist, DHR-ICMR Project

Toxicology Laboratory, CADRAD, Indian Veterinary Research Institute, Izatnagar, Bareilly (UP) India

Bryonia laciniosa is a climber herb distributed throughout India and commonly known as “Shivlingi”. The present study was conducted with the objectives to investigate the aphrodisiac and pro-fertility activity of ethanolic seed extract of *Bryonia laciniosa* as well as to examine its ameliorative potential against chemically induced reproductive toxicity in male rats. **Phase-I study:** Male Wistar rats were randomly divided in four groups (I-IV) containing six rats each. Rats in group I received vehicle (10 ml/kg) and served as control. Group II – IV served as experimental group and received ethanolic seed extract of *Bryonia laciniosa* at dose levels of 100, 200 and 400 mg/kg body weight (orally) respectively for 45 consecutive days. At the end of the experimental period sexual behaviour parameters were evaluated in rats from all the groups. Rats were sacrificed to evaluate sperm related parameters and to study microanatomy of the reproductive organs.

Results-: All doses of the extract stimulated male sexual behaviour. Rats treated with extract showed significant increase in mount, ejaculation, and intromission frequencies with significant prolongation of ejaculatory latency as compared to control ($p < 0.05$). Mount and intromission latencies were significantly reduced ($p < 0.05$). Maximum effect was observed in dose 100 mg/kg. Evaluation of sperm related parameters revealed a significant increase ($p < 0.05$) in total sperm count; percentage live sperm in addition to increased sperm membrane integrity in extract treated rats as compared to control. Highest activity was observed with the 100 mg/kg dose. Furthermore, no histopathological alterations were evident in testes, seminal vesicle and prostate of extract treated rats. Testes sections showed improved spermatogenic activity.

Phase-II study: Male Wistar rats were randomly divided in four groups (A-D) containing six rats each. Rats in group A (control) received vehicle and group B rats received maximum effective dose of *Bryonia laciniosa* seeds extract as observed in phase-I study i.e 100 mg/kg. To induce reproductive toxicity and to examine ameliorative effect, rats in group C and D were given either Fipronil (10 mg/kg) alone or in combination with 100 mg/kg dose of the extract. All the agents were administered orally for 45 consecutive days. At end of the experimental period all the parameters as mentioned in phase-I study were evaluated.

Result: Mating behaviour in rats treated with fipronil revealed a significant decrease in parameters like Mounting frequency(MF) and Intromission frequency(IF). Further, there was marked increase in mount latency (ML), Intromission latency, Ejaculation latency (EL) and Post ejaculatory interval as compared to control ($p < 0.05$). However, when *B. laciniosa* extract (100 mg/kg) was administered to fipronil treated rats a significant increase/ decrease in the parameters which showed reduction /increase was observed. These parameters were comparable to control or even better than control values. A significant decrease/ reduction in total sperm count, motility, and number of live sperms with decreased acrosomal integrity were observed in fipronil treated rats as compared to control. However, when *B. laciniosa* extract was administered to fipronil treated rats sperm related parameters were restored to normal and even better than control values. Fipronil treatment of the rats caused several histopathological alterations in testes, epididymis and prostate. However, no such changes were observed in these organs after administration of *B. laciniosa* extract.

Conclusion: The results of the study showed that ethanolic seed extract of *Bryonia laciniosa* exerted potential aphrodisiac and pro-fertility activities without signs of toxicity in reproductive organs. Fipronil treatment exerted deleterious effect on sexual behaviour and sperm related parameters indicating reproductive toxicity. *Bryonia laciniosa* extract exerted ameliorative effect against fipronil-induced reproductive toxicity in rats.

Audience Take Away:

- The presentation will be useful for the research workers and students working in the field of medicinal plant research and even for the common people
- Researchers and others will come to know about the aphrodisiac activity of *Bryonia laciniosa* seeds which remained unexplored. It will also provide an idea for conducting further research on this aspect
- The findings of the study could be beneficial for pharmaceutical industry in developing a drug or drug formulation for improving the sexual behaviour or as an aphrodisiac agent
- From the results obtained, the use of *Bryonia laciniosa* seeds could be suggested in treatment of infertility specially caused due to exposure to various chemicals

Biography:

Dr. Ranjeeta Mourya completed her graduation and post graduation in Science in 1999 and 2002, respectively from CSJM University, Kanpur, India. Then after she joined Central Drug Research Institute, Lucknow, India for the Ph.D. programme and she was awarded Ph.D. in 2008. She has worked at different Institutes of national repute in various capacities. Recently, she was awarded Women Scientist project from Department of Health Research, ICMR during October, 2016 to March, 2020. She has been continuously working in the area of Medicinal Plant Research especially in evaluation of aphrodisiac, pro-fertility activities along with ameliorative/ protective potential of medicinal plants in reproductive toxicity. She has published several research papers in various journals. She has also authored one book on various medicinal uses of weeds.



Invertase inhibitors: A novel target for regulation of sucrose yield and quality in sugarcane

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A remarkable feature of sugarcane is its capacity to store sucrose to about 50% of its dry weight. However, at crop maturity when the sucrose concentration in the sink tissues reaches saturation, the action of invertase enzymes affects sucrose stabilization, and reduces sucrose yield. Thus, sucrose breakdown by invertases causes a major economic loss to farmers and sugar processors. Invertases [EC 3.2.1.26; b-fructosidase] are a family of enzymes known to perform diverse functions in plants in addition to hydrolysis of sucrose into glucose and fructose. In sugarcane, invertases are mainly involved in regulation of sucrose accumulation and plant development. Sucrose unloaded from the phloem in the sugarcane stalk is transported to three different cellular compartments: the apoplastic space (cell wall), cytoplasm, and vacuole. Each compartment has a specific invertase isoform: an apoplastic space located cell wall invertase (CWI), a vacuolar located acid invertase (VAI) also termed a soluble acid invertase (SAI), and a cytoplasmic located neutral invertase (NI). Invertase inhibitor (INVINH) proteins play a key role in post-translation regulation of plant invertases through which sucrose hydrolysis is controlled. INVINH proteins are small (18 kDa) members of the pectin methylesterase inhibitor superfamily and they are moderately conserved across plants. In the present study, we identified two INVINH genes from sugarcane, ShINH1 and ShINH2. In silico characterization of the encoded proteins revealed 43% sequence identity at the amino acid level, confirming the non-allelic nature of the proteins. The presence of putative signal peptide and subcellular targeting sequences revealed that ShINH1 and ShINH2 likely have apoplasmic and vacuolar localization, respectively. Experimental visualization of ShINH1-GFP and ShINH2-GFP revealed localization to the apoplast and vacuole respectively. Differential tissue-specific and developmental expression of ShINH1 between leaf, stalk, flower and root suggest that it plays a role in controlling source-sink metabolic regulation during sucrose accumulation in sugarcane. ShINH1 is expressed at relatively high levels in leaves and stalk compared to flowers and roots, and expression decreases significantly toward internodal maturity during stalk development. Whereas, expression of ShINH2 was relatively low at early stages of plant growth (up to 150 DAP) and there was a sudden increase in the transcript levels after 210 to 240 DAP. This is clearly evident that both ShINH1 and ShINH2 are likely to play important role in sucrose accumulation at crop maturity. Production of recombinant ShINH1 enabled experimental validation of protein function under in vitro conditions. Recombinant ShINH1 potently inhibited acid invertase (IC₅₀ 22.5 nM), making it a candidate for controlling pre- and post-harvest deterioration of sucrose in sugarcane. Genome wide identification of invertase inhibitor genes revealed the presence 18 gene homologues which are located at different chromosomes in the genome, indicating the diversity of invertase inhibitor gene family in sugarcane. Our results indicate that ShINH1 and ShINH2 are likely to play a regulatory role in sucrose accumulation and contribute to the improvement of sugar yield and quality in sugarcane.

Audience Take Away:

- Firstly, the audience could easily learn how to enter SARS-CoV-2 on their hosts and if the audience was an expert of medical studies like biologist or biochemist, who are able to give the some details of protein that plays a pivotal role for binding of SARS-CoV-2 on their hosts
- Second, after the learning of protein structures and binding mechanisms of SARS-CoV-2, if the audience/s are going

on researches that is related about the pharmaceuticals industry, this representation may be useful for drug or vaccine development

- If the audience were academician, she or he could give some short-brief for students, because of using scientific papers during the preparation of my presentation

Biography:

Dr. Aykut Arif Topcu studied at Medical Laboratory Program, Vocational School of Health Service at Aksaray University, Turkey. He graduated as BA from Kırıkkale University in 2006 then received his PhD degree in 2015 at the same university, in Turkey. His research areas are related about the affinity chromatography and its application areas; preparation of cryogels for protein purification and removal of toxic metabolites and biosensing platforms to sense various analytes including clinic of interest. He is currently as an Assistant Professor at Aksaray University.



Culture induced phenotype and methods to harden micro propagated plants

B N Hazarika

Central Agricultural University, India

The benefit of any micropropagation system only be fully realized if there is successful transfer of plantlets from tissue-culture vessels to the ambient conditions. A substantial number of micropropagated plants do not survive on transfer from in vitro conditions to greenhouse or field environment as plantlets developed within the culture vessels under low level of light, aseptic conditions contribute a culture-induced phenotype that cannot survive the environmental conditions when directly placed in a greenhouse or field. Plantlets or shoots that have grown in vitro have been continuously exposed to a unique microenvironment that has been selected to provide minimal stress and optimum conditions for plant multiplication. The culture conditions that promote rapid growth and multiplication of shoots often results in the formation of structurally and physiologically abnormal plants. Many a times they are characterized by poor photosynthetic efficiency, malfunctioning of stomata and a marked decrease in epicuticular wax. Understanding these abnormalities is a prerequisite to develop efficient transplantation protocols. The major abnormalities in in vitro culture of plants and the current and developing methods for acclimatization of in vitro cultured plantlets will be discussed.

Biography:

Prof. B N Hazarika, PhD presently working as Dean, College of Horticulture and Forestry, CAU, Pasighat, Arunachal Pradesh Prof. B N Hazarika guided a number of PG & Ph D students, handled several externally funded research projects and organized 90 trainings. He has published 80 research papers, published 20 books, 25 conference papers and book chapter, 11 practical manual, 25 Bulletins, edited 13 souvenir and 245 popular articles. He contributed significantly in collection, morphological and molecular characterization of diverse genotype of various fruit crops, standardized good agricultural practices for some major fruit crops; introduced new fruit crops in the region.

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Genome-wide association study on salt tolerance in rice at seedling stage under moderate salinity

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Salt threatens rice cultivation in many countries. Hence, breeding new varieties with high salt tolerance is important.

Methods: 1,332 rice accessions, including 767 *indica* accessions, 375 *japonica* accessions, 104 *aus* accessions, and 38 *aromatic* accessions from 3K Rice Genome Project were selected to evaluate salt tolerance via the standard evaluation score (SES) in hydroponics under 60 mM NaCl at the seedling stage. The GWAS in the different panels, viz. whole population and each subspecies group, were analyzed by using a Factored Spectrally Transformed Linear Mixed Model (FaST-LMM) by FaST-LLM software. The analysis was carried out with 235,210 SNPs, of which 58,800 SNPs were used to measure similarities between the accessions, and top three principal components analysis of 588,792 SNPs as covariate. The significant threshold was set at $p < 0.0001$ ($-\log_{10}$ P-value > 4). Multiple SNPs significant in a range of LD decay in the same chromosome were considered as a single QTL.

Results: A total of 12 QTLs associated with SES trait in different panels were identified by GWAS. Among them, only one QTL was detected in two different panels, and each of the 11 others in one panel only. Four QTLs previously reported as related to salt tolerance were found: one QTL in chromosome 4 (peak position at 23.2 Mb), one QTL in chromosome 5 (peak position at 28.4 Mb), and 2 QTLs in chromosome 12 (peak position at 23.6 Mb and 24.2 Mb). Among them, two QTLs were mapped in intervals containing *OsBADH1* gene and previously reported regulating salt tolerance, whereas the others were novel QTLs.

Conclusions: The identified QTLs, including well-known genes and novel QTLs, would provide useful genetic information for future genetic improvement of salt tolerance in rice.

Biography:

My name is Phan Thi Hong Nhung. I am a lecture assistant at Vietnam National University of Agriculture, and I am studying PhD at Université catholique de Louvain (Belgium). My research focuses on study physiology and genetics of rice under salt stress conditions, especially regard to salt tolerance and nitrogen use efficiency in rice. I hope the results of my research could be useful for rice breeding to find new varieties for cultivating in saline conditions and reduce negative effects on environments



The challenge of agricultural research in Mexico

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I. Definition of the Ejido

In the establishment of the starting point it is fundamental to define the ejido, according to Flores-Rodríguez (2008). “The ejido is a system of distribution and possession of the land that was institutionalized after the Mexican Revolution and that consists of granting land to a group of people for exploitation.”

II. Definition of the distribution and possession of the land

In the first instance, the distribution and possession of the land will be discussed to begin the explanation of the subject, and this is established by Trejo-Sánchez (2012); “Since evolution is a constant phenomenon that brings social changes as consequences; It should not be forgotten that agrarian property is immersed in these changes and its development is impacted by constant economic and legal transformations. Hence, it is necessary that this does not continue in the lag and can be promoted as a source of national wealth, with which all Mexicans benefit.”

In Mexico there is the National Institute of Geography and Informatics (INEGI) and Consulta Mitofsky (2008), mentions that the Mexican population is 106.7 million inhabitants; where 50.8% are women and the remaining 49.2% are men; and 76% of the Mexican population is urban and the remaining 24% is rural at the present time of 2018. These population data are of the following order: 123.5 million Mexicans; of which 51.2 are women and 48.8 are men (INEGI, 2017), the trends of the 2005 population and housing census are maintained; that is to say; Mexico has more than 25 million Mexicans who have to do directly and indirectly with the country’s agricultural issue.

This is why it is important to take into account the rural population as reported by Robles B.H. (2006); “In rural areas we have more than 5 million holders of land that have more than 185 million hectares; that is to say 5% “: At present the ejidal plot can be rented and even sold to other ejidatarios or residents of the same population nucleus; to be sold to a private individual, a step must be taken whereby the ejido accesses the full domain. Said process is carried out in a qualified general assembly where, in the presence of a public notary and a representative of the Agrarian Procurator’s Office, 75% of the ejidatarios attend and are in agreement with the change, two-thirds of the participants (Morett-Sánchez and Cossio-Ruiz, 2017).

III. Reform to Article 27 of the Constitution

Perez-Castañeda and Mackinlay (2015) question that the agrarian property in Mexico still has something of “social” and they express it in the following way: “from the moment in which the amendment of the constitutional article 27 ended the distribution of the land Upon entering into force on January 6, 1992, the agrarian reform process in Mexico was completed. Three quarters of the 20th century witnessed the gradual conversion of more than half of the national soil to the heat of the creation of ejidos and the restitution or confirmation of communities. The 1992 reform of agrarian legislation caused the metamorphosis of the Mexican ejido. From that moment on, legal features were lost and, therefore, it ceased to be one of the modalities of social ownership.

And it is in the characteristic of imprescriptible where the social of the ejido differs from the private; then, the reference authors minimally give the ejidos of Mexico the property of a private property in Moderate domain. which reflects in the faculty of the ejidatarios of:

- Transmit the use and usufruct of the land Law Agraria (LA, article 45)
- To contribute the land to the social capital of a company (LA, article 75)
- To be able to offer the lands under guarantee (LA, article 46)
- To convert lands to full dominion (LA, art 23, fraction IX)
- To agree on the termination of the ejidal regime (LA, art.23, section XII)

IV. The Tax System in the field

Once the phases of the distribution and possession of the land have been established, the land exploitation phase begins where the Mexican government in the revenue law for 2014 sought, among other things, to increase tax collection as established by Núñez Sánchez A. (2014). "In Mexico there are 118 million inhabitants of which Chiapas has more than 5 million of those 118; 53 million constitute the economically active population; that is, they are people who have the physical and productive capacity, and who perform some economic activity. Of these 53 million inhabitants, 29.6 million are in the informal economy, that is, in Mexico there are more informal workers than formal workers. There are 26 million captive salaried Mexicans who every 15 days make a withholding of income tax (ISR) on their payroll. These captives contributed last year with 401 billion pesos for public finances".

However, although it is said that the fiscal incorporation regime (RIF) is a new issue of optional taxation (Núñez Sánchez A., Op.Cit) it must be given as a reading that it is obligatory for the agricultural and fishing sector; only with the fiscal discharge of the Ministry of Finance and public credit can the producers register to the government programs to support the production and / or purchase of productive assets such as tractors, harrows, plows, new breeding feet and transport equipment to move production.

When establishing the Mexican system of fiscal obligations in the rural sector, it is considered important to establish how to comply with fiscal obligations, but also how to increase agricultural production using the extension and rural training that is offered as government support.

V. The new agricultural extensionism

Engel, (2000) states: "Extension is no longer enough as a vehicle to transmit the results of technological research to agricultural producers, extension should be positioned as an instrument to strengthen the self-learning and permanent innovation capacity of rural communities towards competitiveness and The sustainability".

According to the OECD (2010) in the early eighties in the Ministry of Agriculture, Livestock, Rural Development, Fisheries and Food (SAGARPA) there were about 25 000 government extension agents, in the nineties the Mexican government proposes implement a new extension system, which before the new millennium is transitioned from the process of classical extension to the private professional system, being in this scheme where the incorporation of knowledge capital generated by universities, research centers to carry out an efficient technology transfer.

It is essential not to focus exclusively on extensionism, because it is not only the transfer of technology that increases production in the field, but also the process of training current or existing technology where farmers are rarely observed. or rural day laborer make use of it, so it is necessary to address the issue of rural training.

Currently, the aim is to promote a new agricultural extension, because technical assistance and training services are disconnected from the results, and modern advisory services need new capacities to respond effectively to new ones. This new extension system is based on the hiring of PSP, which employs around ten thousand professionals per year.

In accordance with the rules of operation of the concurrency fund program and which is linked to the National Development Plan 2013-2018, which through the national program of crusade against hunger recognizes that “the field is a strategic sector , because of its potential to reduce poverty and affect regional development “, and that” the capitalization of the sector must be strengthened “, so that government resources destined to the agricultural, fishing and aquaculture sector should be used in a more efficient to address the problems in which the sector is immersed, because producers face constraints due to low levels of investment, productivity and lack of strategies for the aggregation of value in their economic units for primary activities.

The government established the figures of a Professional Services Provider (PSP or, as the case may be, a group of Social Services Providers (PSS).) To evaluate the transfer of technology and training of the rural sector.

Saw challenges of agricultural research in Mexico

1. Increase the level of technology transfer provided by PSPs, where production is significantly influenced by the acceptance of new technologies as well as the productive and organizational training of ejido groups.
2. The programs of concurrent funds established in the federal government should be more efficient. Administratively to avoid bureaucracy in the process of assigning projects and economic resources.
3. The results of agricultural research must be consistent with the technician’s assignment since currently the PSP is assigned untimely and considering that the productive processes are carried out throughout the year.
4. Considering that the new global environment demands to increase the access of producers to advances and technological changes, to the diffusion of innovation, to the new agrifood policies of investment in the sector, and to consider it as a basic principle to the development of capacities of the rural population.
5. The scientific research carried out in universities and experimental fields should be linked to the real problems of the field and focus on the solution of problems in the agricultural sector.
6. The processes of innovation of technology or cutting-edge technology are put into practice permanently within the sector and the beneficiary himself is the one who perceives the productive changes.

Audience Take Away:

- Definition of the Ejido
- Definition of the distribution and possession of the land
- Amendment to Article 27 of the Constitution
- The Tax System in the field
- The new agricultural extensionism
- Challenges of agricultural research

Biography:

Agronomist Fitotecnista. 1985 UAAAN. Postgraduate in Business Administration. 1998 UAdeC Doctorate in Strategic Administration. 2013 IIAE PhD Candidate in Administration and Senior Management. UAdeC Certificate in Labor Competences for the teaching of human capital training courses. CEO of the Basic and Applied Research Center of the UAAAN Research professor at the Universidad Autónoma Agraria Antonio Narro Head of the Department of Basic Sciences at the Universidad Autónoma Agraria Antonio Narro Professor of the subjects of Biostatistics and Introduction to Statistics Author of the book Biostatistics applied to veterinary medicine and livestock research in 2017. Author of the book Principles of Biostatistics in 2019. Co-author in four scientific publications in a journal indexed in 2018. Advisor in eight investigations for thesis of degree in 2018. Speaker at National and International Congresses.

Alfalfa production (*Medicago sativa L.*) fertilizing the soil with organic sources based on vermicompost

Avila-Cisneros; Rafael*, Rocha-Valdez; Juan Leonardo, González-Torres; Anselmo, Ogaz; Alfredo y González-Avalos; Ramiro

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The research work presented below was carried out in the autumn - winter cycle of 2018 in the experimental field San Antonio de los Bravos of the UAAAN-UL, in Torreón Coahuila Mexico. Under a design of random block method experiments; establishing 6 fertilization treatments with 5 repetitions each. These were as follows: 3 organic sources; vermicomposta, leachate of vermicomposta and hydroponic nutrient solution, 2 inorganic sources; MAP (phosphorus) and Magnesium Sulfate; and finally a control block in which no fertilizer was applied. The research was formed with 6 treatments (A, B, C, D, E, F) and 5 blocks for each of them; The definition of them and their doses are presented below. The sowing date was in the 4th week of October 2018 and the sowing density was 40 Kg / ha. The size of the randomized blocks was 7.5 m². For the statistical analysis of the ANOVA, the FAUANL Olivares software v. 2012 was used for an α of 5%, in addition, the analysis of the marginal utility was performed by the Palencia method (2012). With the variable green forage weight per m² for the treatments, they generated values that indicate that there is no statistical difference between them; that is $p > 0.05$, in the block location it was where a significant statistical difference was obtained between the five blocks compared; that is $p < 0.001$. Therefore within the defined blocks; It was number V that presented the highest average production. When comparing marginal utility; it was the green forage production of the control (F) that generated the greatest profit with \$ 35,375 pesos / ha, followed by the inorganic source MAP (C) with \$ 35,227 pesos / ha. ; and finally the vermicompost (A) organic source with a profit of \$ 28,084 pesos / ha.

Audience Take Away:

- The research provides a sustainable way to fertilize alfalfa (*Phaseolus vulgaris L.*); the sources of fertilizing with vermicomposts do not contaminate and have competitive marginal utility this when comparing against the synthetic sources of fertilizing
- The public may make a judgment in relation to the importance of exploiting the soil by fertilizing with organic sources that have no side effects or damage the soil or groundwater
- The audience that has contact with this invention may apply transversal thinking and may generate new lines of research to fertilize other crops with organic sources derived from vermicompost
- The lines of research presented report results with *Medicago sativa L.*; but fertilization with vermicompost can be expanded to crops not only fodder, but also to hornmental and horticultural
- Organic fertilization based on vermicompost is a 100% practical way to generate sustainability in agricultural activities; and attacks in the background the problem of fertilizing with synthetic sources derived from oil and that contaminate groundwater and groundwater

Biography:

Mr. Rafael Avila Cisneros is Ing. Agronomist in Irrigation by the Antonio Narro Agricultural Autonomous University Laguna Unit (UAAAN UL in Mexico graduated in 1991, In 1995 he finished his Master's Degree in Administration at the Autonomous University of Coahuila - Torreón Unit (Mexico); and from 2004 to 2009 he completed his doctoral studies in the Division of Postgraduate Studies FCA-UA of C UT in Administration and Senior Management. He is Professor and Researcher of UAAAN UL since 2006. Since 2014 he has a Desirable Profile SEP and in 2016 in union with 4 professors and researchers will create the academic body UAAAN-CA-34 and since that date productivity

has been reflected in 7 articles in an indexed journal, 2 books published by the Spanish Academic Editorial, Paper and articles in length of the International Administration Congresses Agropecuaría (CIAEA) 2017, 2018 and 2019, Paper and articles in extenso of the International Congresses of the 28, 29 and 30 International Week of Agronomy of the Faculty of Agriculture and Zootechnics of the Juárez University of the State of Durango (Mexico). He currently serves as Deputy Director of Planning and Evaluation of the UAAAN U.L.



Six sigma an option in bean production in Northern Mexico

Rocha- Quiñones; J.L*, Ávila-Cisneros; R¹, Rocha-Valdez; J.L¹, González-Torres; A., González-Avalos; R

Professors and Researchers of the Department of Basic Sciences and Members of the Academic Body UAAAN-CA-034 of the UAAAN-U.L. Highway to Santa Fe and Periférico Raúl López Sánchez S / N, Col. Valle Verde, Torreón Coahuila México

Professor and Researcher of the Department of Basic Sciences of the UAAAN-U.L. and member of the Academic Body UAAAN-CA-040

In northern Mexico, the Saltillo pinto bean variety is one of the preferred varieties since the tolerance to accelerated browning of the grain provides farmers with a wider margin for the negotiation and sale of the product. The commercial success of the Saltillo pinto and its long shelf life allow farmers to obtain greater economic benefits derived from bean production (Sánchez-Valdez and Collaborators; 2009).

The Durango Institute of Agricultural and Livestock Forestry Research (INIFAP) registered the variety pinto Centauro that was generated through a genetic cross from pinto mestizo and pinto Saltillo; this variety has registered average yields of 1220 kg / ha. When comparing the pinto Centauro with the pinto Saltillo, it was found that Centauro was earlier (90 to 94 days) and presented larger grain size, the average height of the canopy is 32 cm and the guide grows up to 68 cm (Rosales-Serna and Collaborators; 2012).

Bean varieties (*Phaseolus vulgaris*) in the last 30 years have shown a decrease in their average yields per hectare, generating economic damage to producers in the social sector.

The objective of this study is to present an alternative to reduce the variability and / or eliminate the failures / defects throughout the process, through the analysis of statistical data of the product, the bean varieties in their variables plant height, number of green beans and dry grain production, using the minitab statistical package and various quality tools that will allow us to identify, standardize and control the process, starting from the DMAIC stages.

The experiment was developed in the summer of 2018 in the experimental field San Antonio de los Bravos of the UAAAN-UL in a geographic location of North Latitude: 25° 33' 21", West Longitude: 103° 22' 36". With three varieties of beans (*Phaseolus vulgaris*): Pinto Centauro (A), Pinto Saltillo (B) and Pinto Criollo (C) by means of a random block design with three repetitions each.

The three varieties of beans analyzed in the research (pinto Saltillo, pinto Centauro and pinto Criollo) The three functions created presented a correlation coefficient of 0.98, which is explained in a very good correlation between the time of the vegetative cycle and the height of the plant. In relation to the variables: number of pods, dry grain production per block and average dry grain production per plant, there was no statistical difference between the varieties.

Audience Take Away:

- Present an alternative to reduce variability and / or eliminate failures / defects throughout the process that may be applicable to any agricultural production system
- Use the minitab statistical package and various quality tools that allow the identification, standardization and control of different agricultural processes, starting from the DMAIC stages

Biography:

Industrial Engineer with a specialty in Quality and Productivity. 2017 ITL. Postgraduate in Business Administration Quality and Productivity. 2019 Universidad Tec Milenio Certified in Green Belt SIGMA PRO INC. 2019 Research professor of the subjects of Biostatistics and Introduction to Statistics at the Antonio Narro Autonomous Agrarian University Co-author of the book Principles of Biostatistics in 2019.



Metabolomic changes in overweight and obese people associated to the seasonality of plant-based products consumption

Lucía Gayoso*^{1,2}, Usune Etxeberria^{1,2}

¹BCC Innovation, Centro Tecnológico en Gastronomía, Basque Culinary Center, Donostia-San Sebastián, Spain

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Obesity has become a global epidemic and a major problem of public health due to its high impact on morbidity, mortality, quality of life and healthcare expenditure. Health policies have been focused on recommending healthy lifestyles, including diet and exercise. However new nutritional strategies are needed to counteract this epidemic. In this sense, “omics” technologies, which include metabolomics, are helping to understand the mechanisms by which foods may influence the metabolism and how they may contribute to host health. Nowadays, globalization allows populations to buy food from distant countries and eat seasonal fruits and vegetables all year long, independent of the season of the consumer. According to the xenohormesis theory, animals receive signals from plants that give clues about the changing environment, and thus, depending on the season of the year, animals develop physiological changes to adapt in advance to the seasonal changes. This means that the consumption of fruit and vegetables from a specific season or photoperiod could have different effects on metabolism, depending on the

season of consumption, which could contribute to the development of obesity and related disorders. However, only a limited number of animal studies have been performed up to now, and no research has been conducted in humans, thus, more evidence is needed to analyze the influence of food seasonality on health parameters. In this study, thirty overweight and obese participants were recruited, and a two-week dietary intervention based on a Mediterranean diet was conducted in spring and autumn. Participants were provided with seasonal fruit and vegetables each week during spring intervention and with the same type of vegetable products (out of season) during autumn intervention. The aim of this research was to study the influence of seasonal vs. out of season vegetable products consumption in the metabolic profile of participants.

Audience Take Away:

- The effect of a seasonal vs. out of season vegetable consumption on metabolic profile of overweight and obese people
- The effect of the dietary intervention based on a Mediterranean diet on health parameters
- The importance of the consumption of seasonal fruits and vegetables from a health point of view

Biography:

Dr. Gayoso holds a BSc. Degree in Food Science and Technology, BSc. Degree in Human Nutrition and Dietetics, Master of Advanced Studies in Food Science and Engineer, MSc. Degree in Food Science, Nutrition and Metabolism and PhD in Food Science, Physiology and Health. Her research areas have been focused on functional foods, bioaccessibility of bioactive compounds, antioxidant activity and obesity in different research centers (University of Navarra, Heidelberg University, Health Research Institute of Santiago de Compostela, Maastricht University, University of Santiago de Compostela). Currently, she is working as a researcher at BCC Innovation in the field of health and gastronomy.



Epidemiology and control of emerging viruses in protected horticulture

Leticia Ruiz*, Almudena Simón, Oscar Crespo, Dirk Janssen

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The cultivation of solanaceous and cucurbit crops is of great economic importance in Spain, and most of the production is located in the south-east part of the country. Tomato leaf curl New Delhi virus (ToLCNDV) is an important bipartite begomovirus that affects crops belonging to the family of *Cucurbitaceae* (melon, watermelon, squash, and cucumber) and *Solanaceae* (tomato and pepper), it was first described in India in 1995 but gradually also in other parts of Asia. It is transmitted by the whitefly *Bemisia tabaci* and produces puckering, distortion, curling, vein clearing and yellow green mosaic in leaves. In Spain, a new strain of ToLCNDV was detected during the summer of 2013, causing an outbreak especially in commercial squash fields and afterwards in other cucurbit crops such as melon and cucumber. In *Solanaceae* crops such as tomato, the virus caused mild symptoms but its presence has to be considered as a source of inoculum. Cucumber green mottle mosaic virus (CGMMV) belongs to the genus *Tobamovirus*, family *Virgaviridae*. It is transmitted by contact and causes systemic mottle and mosaic symptoms on leaves and fruits of cucumber, melon and watermelon. CGMMV was first described infecting cucumber in England in 1935. In Spain, it was first detected in the 1990's in cucumber crops in the province of Almeria but its incidence has increased during the last five years, being responsible for small outbreaks in cucumber and watermelon crops. CGMMV isolates are grouped in two clusters based on biological differences and genome sequences: a first cluster constitutes the European strain, and a second one is formed by isolates from Asian countries. Spain is actually the first country where both strains are present, co-infecting the same crops and in the same region. Until now, no commercial plants with effective resistance to ToLCNDV and CGMMV are available by the growers. To control the ToLCNDV disease, measures were directed to control the virus vector. Today, the control of CGMMV disease depends on the correct management crops that includes the correct disinfection of working tools, which can transmit the virus during the crop cutting and pruning, as well as protocols that determine the movements of ordinary and specialized workers.

This work was supported by project AVA2019.015 from IFAPA and FEDER.

Audience Take Away:

- Current situation of insect-transmitted viruses such as ToLCNDV in Spain
- Epidemiology of contact-transmitted viruses such as CGMMV in cucurbit crops
- Genetic differences between Asian and European CGMMV strains
- The audience can learn strategies to manage virus transmitted by whitefly and by contact in horticultural crops
- These strategies can be used in their own crops

Biography:

Dra. Leticia Ruiz is a researcher at IFAPA La Mojonera (Almería, Spain). She is a specialist in the molecular characterization and epidemiology of emerging diseases transmitted by viruses in horticultural crops and author of more than fifty research (SCI) and educational articles, as well as speaker in numerous scientific talks and seminar within the horticultural sector.

KEYNOTE FORUM

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FOOD SCIENCE VIRTUAL 2020 -2ND EDITION

SEPT 10-11, 2020

FOOD SCIENCE VIRTUAL 2020





Ezendu Ariwa

University of Wales Trinity Saint David, UK

Green Technology and Agriculture-Food Science Mechanization Sustainability: The global CSR perspectives

Green Technology and Agricultural mechanization remains great challenge for recent development of the future generation digitalization and communication technologies which contributes towards industrialization and commercialization of product development in terms of Sustainability and Corporate Social Responsibility (CSR).

The virtual applications and service delivery of green technology driven agriculture through the internet for the purpose of cost benefit and usability of business and enterprise services. The main focus for development of knowledge hub and Computing and Corporate Social Responsibility for Agricultural Sustainability.

Agriculture and digital technology may be integrated to benefit from best practice and innovation based on skills, vocationalization, competence and allied collaboration. Digitalization and Internet of Things (IoT) really created a great revolution in the field of traditional agriculture but when mapped across the new age e-agriculture, e-dimension, application agribusiness and allocated corporate social responsibility (CSR), agriculture efficacy and skill orientation.

Digital agriculture and CSR forms the basis of global sustainability and diversity in business applications, community development and capacity building. The digital disruption due to lack of innovation, transformation, systematic risk and socio-economic policy designed for growth in agricultural productivity.

Biography:

Professor Ezendu Ariwa is a Chartered Fellow of British Computer Society (BCS) and Chair of IEEE Consumer Electronics & Broadcast Technology Chapter, UK and Ireland. He holds the position of Postgraduate Research Supervision at the University of Wales Trinity Saint David, London campus, UK and previously held the Academic Supervision at Warwick University, UK and also co-ordinating international research and Director of Studies for project supervision, with good project supervision and curriculum development records and Doctoral completion rates including External Examination roles in the UK and internationally. He also undertakes international research and sponsored consultancy projects including Executive Training Workshops for top Government Executive. In addition, he holds the position of Deputy Vice Chancellor, Academic and International Outreach at University of Management and Technology (UNIMTECH), Sierra Leone; and various academic and professional positions with many years of experience in the United Kingdom and Internationally He has achieved good collaboration with multicultural SMEs in the United Kingdom, with respect to mentoring and working on joint professional development on ICT enterprise programmes.

He has experience of doctoral research supervision and consultancy as well as doctoral external examiner for various Universities both in the UK and internationally on Information Risk Management and applicable computing in Smart Cities and Healthcare. He has a good research profile and the Founding Editor-in-Chief of the International Journal of Green Computing (IJGC), Editor-in-Chief of the International Journal of Computing and Digital Systems (IJCDS), Journal of E-Technology, and the Associate Editor of the International Journal of E-Politics and the Associate Editor of International Journal of Distributed Systems and Technologies (IJDST) Ezendu is author of a number of books and papers published in international journals and conference proceedings. He has also delivered keynote speeches at various international conferences. He recently published a book on Green Technology Applications for Enterprise and Academic Innovation, Publisher: IGI Global, USA.

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FOOD SCIENCE
VIRTUAL 2020 -2ND EDITION



SEPT 10-11, 2020

FOOD SCIENCE VIRTUAL 2020



Therapeutic ketosis and the broad field of applications for the ketogenic diet: Ketone ester applications & clinical updates

Raffaele Pilla

G.d'Annunzio University, Italy

It has been recently shown that nutritional ketosis is effective against seizure disorders and various acute/chronic neurological disorders. Physiologically, glucose is the primary metabolic fuel for cells. However, many neurodegenerative disorders have been associated with impaired glucose transport/metabolism and with mitochondrial dysfunction, such as Alzheimer's/Parkinson's disease, general seizure disorders, and traumatic brain injury. Ketone bodies and tricarboxylic acid cycle intermediates represent alternative fuels for the brain and can bypass the rate limiting steps associated with impaired neuronal glucose metabolism. Therefore, therapeutic ketosis can be considered as a metabolic therapy by providing alternative energy substrates. It has been estimated that the brain derives over 60% of its total energy from ketones when glucose availability is limited. In fact, after prolonged periods of fasting or ketogenic diet (KD), the body utilizes energy obtained from free fatty acids (FFAs) released from adipose tissue. Because the brain is unable to derive significant energy from FFAs, hepatic ketogenesis converts FFAs into ketonebodies-hydroxybutyrate (BHB) and acetoacetate (AcAc)-while a percentage of AcAc spontaneously decarboxylates to acetone. Large quantities of ketone bodies accumulate in the blood through this mechanism. This represents a state of normal physiological ketosis and can be therapeutic. Ketone bodies are transported across the blood-brain barrier by monocarboxylic acid transporters to fuel brain function. Starvation or nutritional ketosis is an essential survival mechanism that ensures metabolic flexibility during prolonged fasting or lack of carbohydrate ingestion. Therapeutic ketosis leads to metabolic adaptations that may improve brain metabolism, restore mitochondrial ATP production, decrease reactive oxygen species production, reduce inflammation, and increase neurotrophic factors' function. It has been shown that KD mimics the effects of fasting and the lack of glucose/insulin signaling, promoting a metabolic shift towards fatty acid utilization. In this work, the author reports a number of successful case reports treated through metabolic ketosis.

Biography:

Raffaele Pilla, Pharm.D., Ph.D., Doctor Europaeus, received his Master's degree in Pharmacy at G.d'Annunzio University in Chieti-Pescara, Italy in 2005, where he also served internships at the CellPhysiology Laboratory and Molecular Biology Laboratory. Prior, he was an Erasmus Student at Faculté de Pharmacie de Reims in Reims, France. He received his Doctor Europaeus in 2010 from Pitié-Salpêtrière Institute in Paris, France. Also in 2010, he received his Ph.D. in Biochemistry, Physiology, and Pathology of Muscle at G. d'Annunzio University in Chieti-Pescara, Italy. He was hired as a Postdoctoral Scholar in the Department of Pharmacology and Physiology at the University of South Florida in Tampa, on two research grants funded by the Office of Naval Research (US Navy) and Divers' Alert Network. He has written and lectured widely worldwide. He has been involved in ongoing research at the University of South Florida with the use of ketone esters.



Importance of understand foods and water energy in prevention of hospital infection and treatment of all kinds of diseases

Huang Wei Ling

Medical Acupuncture and Pain Management Clinic, Brazil

Humanity's diet has, over the years, been greatly influenced by technological developments in production, agriculture, industry, transport, distribution and consumption of food. The changes in society's food consumption, with the increase in the consumption of industrialized foods, food outside the home and changes in lifestyle, have resulted in the emergence of new food-related diseases, which include chronic non-communicable diseases such as the case of diabetes, cardiovascular disease and obesity. In Western medicine, nutrition studies the composition of food in relation to protein, carbohydrates, lipids, vitamins, etc. Whereas in traditional Chinese medicine, food is viewed from an energetic point of view, being separated into Cold, Neutral, Warm and Hot food. Currently, studies show that the measures taken to control nosocomial infections manage to reduce infections by one third, with two thirds still unable to be prevented, as the causes are not yet known. The author of this study proposes, through several congresses presented on hospital infection control and infectious diseases, that currently treated diseases are seen at leaf level when comparing the point of view of Western medicine with traditional Chinese medicine in a representation of the figure of the tree where traditional Chinese medicine looks not only at the leaf, but at the entire tree including its root which is not normally visible to the naked eye. In addition, it takes into account the external pathogenic factors that may be affecting this tree (Wind, Cold, Heat, Dryness and Humidity). Through the treatment of energy imbalances found at the root of the tree, represented by the theories of Yin and Yang and the Five Elements, one of the primary factors for energy rebalancing is the use of the right food for health. Following the thoughts of Hippocrates who says that we owe our food as our medicine and our medicine as our food. Water, the main component of the human body, also plays a major role in maintaining health. The author, through various scientific publications, affirms the need to ingest the water at a temperature that does not cause an energy imbalance in the Spleen-pancreas meridian, and should be ingested at a temperature of 32 degrees Celsius and, thus, prevent the beginning of formation and maintenance various diseases, infectious or non-infectious such as diabetes, obesity, cancer, pain in general, etc. In this study the author will present the various works already published by her on the treatment of various diseases and the importance of adequate food and water in the prevention and treatment of these diseases.

Biography:

Huang Wei Ling, born in Taiwan, raised and graduated in medicine in Brazil, specialist in infectious and parasitic diseases, General Practitioner and Parenteral and Enteral Medical Nutrition Therapist. Once in charge of the Hospital Infection Control Service of the City of Franca's General Hospital, she was responsible for the control of all prescribed antimicrobial medication and received an award for the best paper presented at the Brazilian Hospital Infection Control Congress (1998). Since 1997, she works with the approach and treatment of all chronic diseases in a holistic way, with treatment guided through teachings of traditional Chinese medicine and Hippocrates.



Could your eating habits be affecting your sleep and how can we treat it without using drugs?

Huang Wei Ling

Medical Acupuncture and Pain Management Clinic, Brazil

Insomnia is a sleep disorder that regularly affects millions of people worldwide. Individuals with insomnia find it difficult to fall asleep and stay asleep. It commonly leads to daytime sleepiness, lethargy, mood swings, anxiety, stress and a general feeling of being unwell, both mentally and physically. The purpose of this study is to demonstrate that erroneous eating habits can be one of the causes of insomnia, and that it can be treated with correction of eating habits, according to the energy of each food, whether Yin or Yang. An oriental type of treatment using auricular acupuncture was also approached, in order to rebalance the internal energy. With this, this study demonstrates that the effectiveness of these treatments can be achieved without the use of any allopathic or psychotropic medication.

Methodology & Theoretical Orientation: To prove that insomnia can be treated without medication, a research of over 1500 patients was made. 55 (3.66%) of these patients were selected on the basis of having insomnia and then engaged in Auricular Acupuncture treatment associated with dietary counselling all according to the teachings of traditional Chinese medicine. Findings: Of the total amount, 30 (83.33%) considered their insomnia as a main symptom which affected their lives daily. The patients with insomnia who ingests Yang food energy at night time, tends to have difficulty inducing sleep, being it shallow and not restful.

Conclusion & Significance: The majority of patients who had undergone auricular acupuncture associated with dietary counselling for the treatment of insomnia, had been completely cured or had significant improvement. The study also concluded that patients not compromised by dietary changes did not achieve the same positive results as those who set out to comply with treatment.

Biography:

Huang Wei Ling, born in Taiwan, raised and graduated in medicine in Brazil, specialist in infectious and parasitic diseases, General Practitioner and Parenteral and Enteral Medical Nutrition Therapist. Once in charge of the Hospital Infection Control Service of the City of Franca's General Hospital, she was responsible for the control of all prescribed antimicrobial medication and received an award for the best paper presented at the Brazilian Hospital Infection Control Congress (1998). Since 1997, she works with the approach and treatment of all chronic diseases in a holistic way, with treatment guided through teachings of traditional Chinese medicine and Hippocrates.



Analysis and prediction method for core temperature during heat sterilization of packaged foods with ATS program

Shoichi Inaba*, Keiji Yabukawa¹

Package and Heat Sterilization, Toyo Institute of Food Technology, Kawanishi, Hyogo, Japan

In the analysis of the temperature in retort processing, Ball's formula has been used for nearly a hundred years, and has undergone improvements. While it is considered a reliable method, other tools should also be explored for use in the 21st century. The ambient temperature slide (ATS) method is a numerical analysis and prediction method proposed by Mukai in 2006. This method applies to two types of parameters (two delay-times and two heat-transfer coefficients) to calculate the retort core temperature profile from the retort ambient temperature profile after a trial retort, similar to Ball's method. The ATS method has the potential to be one of the most progressive methods for analyzing and predicting the temperature of retort processes. The calculating program of the ATS method has been significantly improved by Toyo Institute of Food Technology. For example, the parameters can now be acquired automatically within a short period of time. Subsequently, the core temperature profiles can be calculated using the acquired parameters for various ambient retort temperature profiles; the computations can be performed for as many cases as desired using a PC. Finally, the optimized ambient temperature profile, core temperature profile, F0 value, C0 value, and total process time are obtained as the results of the prediction for limited specifications of the retort device.

In this presentation, I will explain the theory behind the ATS method and review the result of the comparison between the estimated and the measured values of the test sterilization performed on a packaged 6% corn starch glue solution used as a model food. In this case, the parameters were obtained at the retort temperature of 120°C and the predicted retort temperatures were 117 °C and 123 °C for the same F0 value.

The results of the examination for the metal cans, retort pouches, and plastic cups, which were treated by the steam type and shower type retort devices, will also be presented. Midway through the presentation, I will give a demonstration of our program using real retort data.

Audience Take Away:

- With the help of this program, food technologists will be able to reduce the time and material involved in the trial runs of the new packaged products
- Upon improving the retort process (for example, by having a shorter time continuously with the same F0 value), it can be reviewed repeatedly with various ambient temperature patterns on a PC
- This program operates on the Visual Basic Application™ of Microsoft Excel™; hence, the obtained digital data can be used easily
- The results of the prediction are rather accurate for all cases with the exception of a few specific food packages

Biography:

Mr. Inaba graduated from the faculty of electrical engineering of Keio University in 1984. He then joined the corporate R&D of Toyo Seikan Group, which manufactures various kinds of food packages such as metal cans and retort pouches. After working there for 20 years, he moved to the technology development division of Toyo Seikan Co., Ltd. as the manager of the Customer Solution department, where he engaged in the development of technology for the filling, sealing, and sterilization of food and beverage packages. In 2015, he joined Toyo Institute of Food Technology as a senior research manager.



***Saccharomyces cerevisiae* and *Hanseniaspora osmophila* with probiotic potential**

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²Instituto de Investigación en Ciencias de la Alimentación (CIAL). Food Biotechnology and Microbiology Department, Madrid, Spain

The The intestinal microbiota is the most populated community of the human body in which trillions of microorganisms live in symbiosis, contributing to the normal functioning of the organism through its interactions with the host. However, a dysbiosis can cause multiple alterations. One of the most widely used current approaches in the modulation of intestinal microbiota balance is based on the administration of probiotics.

Currently, a wide range of probiotic products are marketed, almost all of them are bacteria, but there is also a probiotic yeast (*Saccharomyces boulardii*). For this reason and due to the increased of researching in this field, the aim of this work was to study the behavior of potential probiotic yeasts, already selected by previous works, under in vitro and in vivo conditions.

The study was carried out with 2 strains, *Saccharomyces cerevisiae* UCLM-3 and *Hanseniaspora osmophila* UCLM1056, isolated from food ecosystems and selected due to their good probiotic characteristics in vitro.

All of them underwent gastrointestinal conditions in studies in vitro through the use of Simgi® equipment. It allows the dynamic emulation of the different physiological variables (peristaltic movements, pH, gastrointestinal fluids, etc.) getting effects very similar to those occurred in humans. The results showed that the two strains were highly resistant to the process, showing a minimal loss of viability. Therefore, both strains were used for experiments in vivo with mice to evaluate the contribution to the recolonisation of gut microbiota process after the use of antibiotics. On the other hand, they showed a transitory adhesion capacity to the mucosa since their concentration decreased drastically after their administration was stopped, besides, they did not show ability to invade tissues by hyphae formation, as show the pathogenic yeasts. This strains could be used to produce probiotic products (foods and drugs). The authors wish to express their gratitude to the Junta de Comunidades de Castilla La-Mancha for funding this research (SBPLY/17/180501/000528).

Audience Take Away:

- The audience will learn about the usefulness of yeasts, beyond their conventional use in the preparation of fermented foods
- It should be taken into consideration that there has been an increasing interest on probiotic microorganisms. Currently, there is only one commercial probiotic yeast, but we have found several of them with great probiotic potential and with biotechnological properties of interest. Therefore, with the present work we want to presenter some experiments realized with the two best strains of them
- The presentation of the work will allow the audience to expand their knowledge about this new field of research

Biography:

Dra. Pilar studied Food Science and Technology at the Castilla-La Mancha University, Spain and graduated in 2015. She continued with postgraduate studies, and at the same time, she joined the research group of Prof. Ana Briones Pérez at the Yeast Biotechnology laboratory in Castilla-La Mancha University. She receiver her PhD degree in 2019 at the same institution. Currently, she obtained a postdoctoral fellowship supervised by Dra. Maria de los Llanos Palop at the Microbiology Laboratory, Toledo (Spain).



Oleuropein aglycone as amyloid β fibrils disruptor: Insight into the mechanism of action of this polyphenol from extra virgin olive oil

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In the central nervous system, extra virgin olive oil (EVOO) produces interesting effects against neurodegenerative disorders including Alzheimer's disease (AD). The valuable properties of EVOO are largely ascribable to oleuropein aglycone (OA), the most abundant phenolic constituent. In particular, it has been demonstrated that in mouse models of AD, OA produces neuroprotective effects reducing amyloid β ($A\beta$) aggregates and diminishing related cytotoxicity and inflammation. Biological data highlighted that OA is not only able to prevent $A\beta$ aggregation but also that is able to disaggregate $A\beta$ preformed fibrils. To this end, a comprehensive computational protocol for investigating the mechanism of action of OA, as $A\beta$ fibrils disruptor, at molecular level has been developed. Initially, for establishing a potential high-affinity binding site of OA within the $A\beta$ fibrils, we performed a blind docking calculation using AutoDock software. The identified binding site was used for a more accurate docking study employing Glide software using Extra Precision (XP) as scoring function. The obtained complex OA/ $A\beta$ fibrils was used for performing large-scale molecular dynamics (MD) calculations observing the behavior of the complex OA/ $A\beta$ fibrils and $A\beta$ fibrils alone for 5 μ s. MD simulation was performed, using CUDA API technology on two NVIDIA GPUs, by Desmond software in explicit solvent (TIP3P), employing OPLS3 as force field at constant temperature (300 K) and pressure (1.01325 bar) with NPT (constant number of particles, pressure and temperature) as ensemble class. Results showed that OA initially interacts with a key motif (LVFFAED) of $A\beta$ peptide, known to be extremely relevant for fibrils assembly and stability. Afterwards, the long-time MD simulation revealed that OA moved in depth within the $A\beta$ fibrils targeting the mentioned motif in each chain. This movement of OA seems to "cut" the preformed fibrils, causing a significant disruption of the ordered structure. The results demonstrated that OA leads to a structural instability due to its insertion within the $A\beta$ preformed fibrils. This event is a fundamental step for determining an effective $A\beta$ fibrils disaggregation. In this work we have described, for the first time, a detailed computational protocol useful for elucidating the mechanism of action of OA as $A\beta$ fibrils disruptor at molecular level, establishing OA as a potent anti-amyloidogenic drug. This study also highlights the possibility of further exploration of natural/nutraceutical products about their prospective application for controlling neurotoxicity, proposing food components as preventive therapeutics against AD. In fact, by using computational approaches it will be possible to evaluate potential disease-modifying anti-Alzheimer's drugs (DMADs) from natural products or food components. Moreover, this study possesses relevant implication for the rational design of DMADs for developing innovative anti-AD drugs.

Biography:

Simone Brogi is an Assistant Professor at the Department of Pharmacy at University of Pisa (Italy). He leads the Computational Pharmacology and Toxicology Unit in the research group of Prof. Vincenzo Calderone. He graduated in 2005 in Biological Sciences from the University of Siena (Italy), where he also received his Ph.D. in Pharmaceutical Sciences in 2010. From 2011 to 2019 he directed the Molecular Modeling Unit at the Department of Biotechnology, Chemistry and Pharmacy (University of Siena) in the research group of Prof. Giuseppe Campiani. His research activity is focused on computational approaches in drug discovery, with over 85 papers.



'Sedentary Behaviour' A concern in obese omani women (Age 30-49 Years): A cross-sectional study

Monika Seth

Bansthali Vidhyapith, India

The alarming rise and increasing prevalence of obesity in developed as well as developing nations has made obesity as a major health concern globally. Obesity not only predisposes to life threatening conditions like hypertension, car ry lifestyle exposing the populations to a myriad of health complications. During last forty years, most of the Gulf countries diovascular diseases, diabetes mellitus and cancer but also leads to premature mortality. Physical inactivity is a matter of grave concern globally as the whole world has switched from a demanding physically active life to a sedenta including Oman have undergone a remarkable change in the socioeconomic status and several studies reveal significant increase in adopting inactive lifestyle in the Gulf region. This presentation provides an overview of the lifestyle of Obese Omani women.

OBJECTIVE: The main purpose of this research was to study the association between sedentary lifestyle with obesity in Omani women.

METHOD: The study was carried out during the period Sep 2019 to Jan 2020 and included a sample of total 398 obese Omani women aged 30-49 years from Muscat and Batina Governorates in Oman. Assessment of sedentary behavior and obesity associated comorbidities was performed using an IPAQ questionnaire allowing self-evaluation of diverse activities.

RESULT: The physical activity parameters indicate that around 90% of the women did not indulge in any kind of vigorous or moderate physical activities and around 50% of the participants spent 10-12 hours sitting per day. Additionally, 65% of the subjects reported that they never indulged in walking or any other kind of physical activity.

CONCLUSION: Sedentary lifestyles were common among the adult Omani women in the study sample. Lack of any kind of physical activity and sedentary behavior are commonly associated with high BMI, high WHR (abdominal obesity) and the associated diseases like high cholesterol, hypertension and type 2 diabetes.

Biography:

Mrs. Monika Seth has done her post-graduation in Food & Nutrition from Kurukshetra University, India. She has 22 year's experience in weight loss management and therapeutic diets. Was Head of Department – Diet and Nutrition at Al Raffah hospital, Muscat for 8 years (Feb' 2011 to Mar' 2019) with exposure in clinical / therapeutic diets, bariatric & ESG diets, food management & weight loss programs. She has co-authored a book titled "secrets of healthy & disease free living" and conducted many workshops on health related subject. Had a regular column titled "Food Facts" in Thursday Magazine of "Times of Oman" from 2001 – 15 and currently writes for 'FACES' magazine.



The potential of legumes as a source of phytoestrogen in animal feed to improve population: Cow as a model

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³The Game Meats Company of Australia Pty Ltd, Eurobin, Victoria, Australia

The research aimed to analyze the potential of legume as a phytoestrogen source in animal feed, cow as a model with the aim of shortening the postpartum estrous. This research were done by identifying soybean, and mung bean using different methods of drying; those are using an oven (55°C) and using freeze dryer (-40°C). The level of phytoestrogen was detected using UV 254 and UV 366 to determine the Rf value (Thin Layer Chromatography Method); dry matter (DM), organic matter (OM) in vitro digestibility testing, and statistical analysis test. The parameter measured is genistein concentration. The data was analyzed descriptively and some data was tested using the “t” test. Based on the results, using UV 254 and UV 366 from the four samples were adhered to gel silica plate i.e. Soybean straw using oven dryer (SSOD), Soybean straw using freeze dryer (SSFD), mung bean straw using oven dryer (MSOD) and mung bean straw using freeze dryer (MSFD). There are only 2 samples have a color and a value of Rf that approximates of the genistein standard. i.e. 0.48 in SSOD and 0.51 in SSFD, while the genistein standard has a value of 0.50 and purple color. The results of the statistical test showed that the genistein concentration between SSOD and SSFD were significantly affected ($P < 0.05$), i.e. SSOD = 0.667g/100g and SSFD = 1.765g/100g. The study concluded that soybean straw contains high phytoestrogen, it's potentially a source of phytoestrogen as animal feed to improve the population.

Biography:

Dr. Abyadul Fitriyah studied Animal Science at Universitas Gadjah Mada, Indonesia and graduated as MP in 2004. She joined the research of Prof. Mulyoto Pangestu at Monash Institute of Medical Research, Monash University, Melbourne, Australia. She received her PhD degree in 2010 at the same institution. She also joined the research group of The Ministry of Research Technology and Higher Education, Indonesia. She has published more than 20 research articles in SCI(E) journals.)



Utilisation of the household food insecurity access scale to assess food insecurity and its determinants in central river region south, the Gambia

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²Ministry of Health and Social Welfare, The Gambia

Food insecurity is a major challenge for rural households in The Gambia. However, little is known about the determinants of food insecurity, in particular food access. Therefore, this study was aimed to determine the prevalence of household food insecurity (food access) and its determinants, specifically in the Central River Region South vicinity. **Methodology:** A cross-sectional study was conducted among 334 households which were recruited through multistage random sampling. Women, as a proxy to the household, were interviewed using the Household Food Insecurity Access Scale (HFIAS) questionnaire. Data on demographic and socio-economic characteristics of the households were also collected.

Results: During data analysis, simple and multiple logistic regressions were conducted to identify independent predictors of household food insecurity. This study revealed a high prevalence of household food insecurity (80.5%) in the study area. Out of the households, 12.3% were mildly food insecure, 15.2% and 53.0% of households were moderately and severely food insecure, respectively. Based on multiple logistic regression analysis, women's employment status (AOR = 4.00, 95% CI: 1.13, 14.13, P = 0.031), employment status of their spouses (AOR = 5.63, 95% CI: 2.47, 12.81, P = 0.001) and market access (AOR = 2.01, 95% CI: 1.06, 3.83, P = 0.033) were the factors independently associated with household food insecurity (food access).

Conclusion: Household food insecurity was prevalent in the study area. Employment status regardless of either the women or their husbands and market access were the predictors of household food insecurity. Therefore, programmes to improve job opportunities should be strengthened, in particular among women to enhance household food security.

Biography:

Mr. Wuyeh Drammeh studied Community Nutrition at the Universiti Sains Malaysia and graduated as MS in 2020.



Canned cherries made with Lactitol: An alternative to reduce its caloric value

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Polyalcohols are used in the food industry as nutritional sweeteners. They are well known for having a syrupy appearance when dissolved in water, and have prebiotic properties. This work studies the osmotically dehydrated cherries with lactitol and sucrose in different proportions in order to obtain a product with fewer calories. The cherries were candied to 55 °Brix by the slow impregnation methods. It was compared the following three formulations: T1 composed of 25% lactitol and 75% sucrose; T2 composed of 50% sucrose and 50% lactitol, and T0 composed of 100% sucrose as control. Variables measured were moisture, °Bx of the solution and of the cherry flesh. Finally, a sensory analysis was performed to measure acceptance and preference of the formulations. The acceptance test was carried out through a survey with a hedonic scale and another preference test. The finished products were analyzed by 64 randomly selected judges. The moisture was reduced to 23%, 35%, and 41% in formulations T0, T1 and T2, respectively. All treatments reached 55° Brix. The increase in soluble solids in the pulp was adjusted with a second-order polynomial equation with a high level of fit. According to the sensorial analysis, formulation T2 formulation was the most preferred, followed by T1 and T0. The study showed that it is feasible to produce canned cherries in syrup with a reduction of up to 25% when using formulation T2 and a reduction of 13% when using formulation T1. These two formulations can be considered as reduced in sugar.

Biography:

Dra. Maldonado studied Biological Sciences. She received her doctoral thesis with honors in 2004 at the Universidad Nacional de Cuyo, Mendoza, Argentina, She is Specialist in Quality Engineering. She received a lot of awards: GOLD PLATE AND HONOR DIPLOMA for National University of Cuyo, Honorary mention, Federation of University Women Argentina Merit for the Best graduate and Honorary member the Centro de Bromatólogos Mendoza. And She won 3rd MENTION in VI Food Congress XXI Conference Food, Nutrition and Health XXXIX for this work : “Use of low digestibility carbohydrates as sucrose substitutes in the production of preserved cherries” She has wrote a lot of papers in international magazines and Congress.

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The influence of prenatal inflammation on postnatal maternal and infant behavior

Nora Kearns

University of Oregon, United States

A growing body of research suggests that prenatal nutrition and adiposity influence postnatal mental health outcomes for both mother and child. Inflammation, heavily influenced by adiposity, has been identified as a potential biomarker for maternal depressive behavior, and the long-term consequences carry increasing significance as over half of women in the United States now begin their pregnancies either overweight or obese. This study examined the influence of prenatal inflammatory cytokine and polyunsaturated fatty acid (PUFA) levels on postpartum maternal behavior. Maternal BMI was obtained from medical records, and maternal inflammatory state was assessed using plasma fatty acid and cytokine levels from second and third trimester blood draws. Maternal and infant behavior at 6 months postpartum was observed in ten-minute videotaped free play interactions, which were evaluated using a well-validated coding scheme. Significant positive correlations were found between omega-3 fatty acids and positive maternal behaviors such as sensitivity, positive regard for the child, and animation. These effects generally did not translate to modifications in infant behavior. These results suggest that omega-3 fatty acid consumption during pregnancy may attenuate the potential negative effects of inflammation and contribute to more optimal maternal mental health and behavior in the postpartum period. Additionally, fatty acid supplementation may be a simple and effective intervention for preventing and mitigating post-partum depression.

Biography:

Nora Kearns is a senior undergraduate researcher majoring in Biology at the University of Oregon, where she works in Dr. Elinor Sullivan's Developmental Behavioral Neuroscience lab studying prenatal inflammation and maternal and infant behavior.

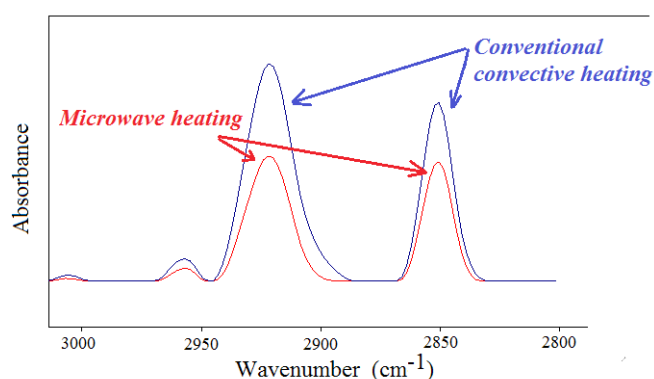


Methylene and non-hydrogen-bonded carbonyl C=O groups in maillard reaction after conventional convective cooking and microwave cooking of bovine meat

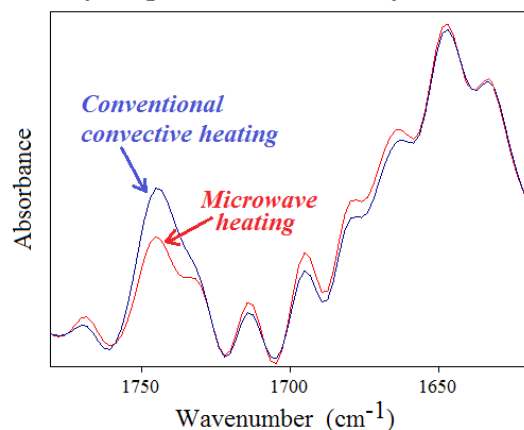
Emanuele Calabrò* and Salvatore Magazù
University of Messina, Italy

In this study Fourier Transform Infrared (FTIR) spectroscopy was used. It is a technique based on the vibrations of atoms and molecules which can provide relevant information on organic compounds under applied stress agents. It was used to compare meat cooking by conventional convective oven with meat cooking by microwave oven, in order to highlight how much Maillard reaction occurs in these cooking methods. Maillard reaction consists of some chemical reactions that arise from the interaction between the carbonyl group of a reducing sugar and a free amino group of an amino acid or a protein, producing complex chemical reactions that give rise to the formation of pigments and compounds responsible for browning, texture and flavor during baking and roasting. The most important products of this reaction during meat cooking are methylene group and non-hydrogen-bonded carbonyl C=O. Methylene stretching vibrations can be observed in the region 2925-2850 cm^{-1} and non-hydrogen-bonded carbonyl C=O can be observed around 1740 cm^{-1} in the IR region. In this study, samples of minced bovine meat were cooked in a conventional convective oven for 15 minutes at 170 °C and other minced bovine meat samples were cooked in a microwave oven for 3 minutes at 800 W. Both sets of samples were subjected to FTIR spectroscopy analysis. It resulted that methylene stretching vibrations in the region 2925-2850 cm^{-1} and non hydrogen-bonded carbonyl C=O band at 1740 cm^{-1} increased in intensity after convective cooking of bovine meat in a conventional oven more than after microwave cooking, showing that Maillard reaction occurs in a conventional oven more than in a microwave oven (cfr. Fig. 1 and Fig. 2).

Methylene stretching vibration bands



Non hydrogen-bonded carbonyl C=O band



This result confirms that cooking meat by microwave oven is not able to produce Maillard reaction.

A suggestion for future research is to search natural resonance frequency in meat that could be used in order to increase temperature to induce Maillard reaction in meat using microwave oven. Hence, in addition to heating at 2450 Hz in a microwave

oven, further heating could be carried out at higher temperature using a microwave generator working at a frequency close to a natural resonance frequency of meat. Indeed, heating meat by electromagnetic radiation close to a resonance frequency should amplify molecular vibration of proteins content in meat, giving rise to an increasing in temperature more than that obtained by microwave heating at 2450 MHz. Once a resonance frequency of a type of meat have been found, it can be produced by a variable frequency power generator inserted in the microwave oven, working at that fixed frequency coupled to the main frequency at 2450 MHz.

Biography:

Emanuele Calabrò is Full Professor of Physics at the Technological Technical Institute of Messina (Italy). He received the National Qualifications as University Professor in Applied Physics and in Experimental Physics of Matter. He received the International Prize for Excellence in Research by the Academic Brand Awards-2018. He has published more than 100 refereed papers in ISI journals, monographs and book chapters.



Safety evaluation of yeasts with probiotic potential

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In Spain there is currently only one yeast strain marketed as a probiotic (CNCM I-745, Ultra-Levura), belonging to *Saccharomyces boulardii* species, although in recent years there have been numerous research studies about probiotic capability in yeasts that have revealed the great potential of certain strains. Researchers focus their attention on yeasts as they could offer a good alternative to probiotic bacteria for diversification of products. Most of the published works focus on the evaluation of adapting and colonising the gastrointestinal tract, as well as its possible mechanisms of action, nevertheless, there is very little information about their safety. Therefore, the aim of this work has been evaluate in vitro the safety aspects of 20 yeast strains, isolated from food environments, selected in previous works due to their probiotic potential. Among the different strains, there are 10 *Saccharomyces* and 10 non-*Saccharomyces* yeasts.

Before safety evaluation, differentiation of *S. cerevisiae* strains was done by PCR amplification of inter- δ region with pairs of primers $\delta 2-12$ and $\delta 12-21$, which showed that they were all different from each other and also had different profiles to *S. boulardii*. Identity at the level strain of non-*Saccharomyces* yeasts was already known by previous works. The evaluation tests carried out were antimicrobial resistance, production of biogenic amines, deconjugation activity of bile salts, and different enzymatic activities (coagulase, deoxyribonuclease, hemolysin, proteolytic and phospholipase).

None of the studied strains demonstrated coagulase, hemolytic or DNase capacity (clear virulence factors), although all of them showed protease activity, some showed phospholipase activity, and half of the yeasts were capable of conjugating bile salts. Consequently, several groups could be considered: strains with BSH and phospholipase activity (5 strains of *S. cerevisiae* and 1 strain of *Pichia anomala*), strains with BSH but without phospholipase activity (1 strain of *Lachancea thermotolerans* and 1 strain of *P. kudriavzevii*), strains without BSH but with phospholipase activity (3 strains of *S. cerevisiae*) and strains without either of them (2 strains of *S. cerevisiae*, 2 strains of *Hanseniaspora osmophila* and 1 strain of *Candida vini*), including the commercial probiotic *S. boulardii*. Regarding antimicrobial compounds, all were resistant to antibiotics but showed sensitivity to the antimycotics used. Only one strain of *P. anomala*, *P. kudriavzevii*, *H. osmophila* and *Zygosaccharomyces bailii* were excluded from their use in the food industry, due to their high biogenic amine production. All the rest could be proposed for probiotic applications as a valid alternative to the widely available probiotic yeast *S. boulardii*, as well as in fermentation processes in the food industry. Further investigation is needed to clearly define their health-promoting efficacy, as well as the appropriate dosage, following the criteria of the WHO and EFSA recommendations.

The authors wish to express their gratitude to the Junta de Comunidades de Castilla La-Mancha for funding this research (SBPLY/17/180501/00052)

Audience Take Away:

- The audience can contrast the procedures followed to determine the yeast safety parameters, as well as compare and discuss the results shown. In addition, it could provide information on how to design some experiments or it could contribute ideas for conducting new experiments, thus expanding its line of work

Biography:

Dra. Pilar studied Food Science and Technology at the Castilla-La Mancha University, Spain and graduated in 2015. She continued with postgraduate studies, and at the same time, she joined the research group of Prof. Ana Briones Pérez at the Yeast Biotechnology laboratory in Castilla-La Mancha University. She received her PhD degree in 2019 at the same institution. Currently, she obtained a postdoctoral fellowship supervised by Dra. Maria de los Llanos Palop at the Microbiology Laboratory, Toledo (Spain)



Morphological characterization of *Vigna unguiculata* (L.) Walp

Maider Zugazua*, Shuyana Deba, Paula Torán, Olaia Estrada

BCC Innovation, Centro Tecnológico en Gastronomía, Basque Culinary Center, Donostia-San Sebastián, Spain

Cowpea (*Vigna unguiculata* (L.) Walp) is a legume of the family Fabaceae/Papilionaceae. The plant is an herbaceous legume showing considerable adaptation to warm climates with adequate rainfall, and is cultivated across Southeast Asia, Africa, Southern United States, and Latin America. However, this crop is not extended in Spain and it has almost disappeared in the Basque Country, north of Spain. Cowpea has high nutritional and gastronomic value, being highly appreciated in avant-garde cuisine. Few local farmers cultivate this traditional legume in the Basque Country region, and this genetic resource runs the risk of disappearing.

Characterization and identification of plant varieties are fundamental for the development, release, and popularization of the crop varieties. In this context, the objective of this work was to carry out the morphological characterization of *Vigna unguiculata* (L.) Walp, pods and seeds adapted to the environmental conditions of the Basque Country.

Pods were evaluated based on morphological descriptors defined by International Board for Plant Genetic Resources in 1983. The selected morphological descriptors of the pods were: length, width, thickness and averaged weight, curvature degree and averaged number of seeds per pods.

In addition, cowpea seeds axial dimensions, average geometric diameter, percentage of sphericity, superficial area, density, water absorption percentage and humidity were studied.

Results obtained for the morphological characterization of pods were: length (mm) 12.09 ± 1.28 ; width (mm) 1.17 ± 0.08 ; thickness (mm) 1.05 ± 0.10 ; weight (g) 4.18 ± 0.59 ; curvature degree 0; number of seeds per pod 6.04 ± 0.92 .

Cowpea seeds showed: length (mm) 10.39 ± 0.61 ; width (mm) 8.93 ± 0.53 ; thickness (mm) 7.95 ± 0.45 ; percentage of sphericity $86.96 \pm 0.86\%$; geometric diameter (mm) 9.04 ± 0.53 ; superficial area (mm²) 256.47 ± 0.87 ; density (g/mL) 1.38 ± 0.02 ; water absorption percentage $49.71 \pm 0.34\%$ and humidity percentage $14.97 \pm 0.15\%$.

Based on morphological descriptors, this work contributes to collect information on the adaptation of minor varieties to the edaphoclimatic conditions on the Basque Country region (Spain).

Audience Take Away:

- Through this study the importance of taking care of traditional local varieties is shown, along with the importance of a region conditions on a crop morphological characterization
- Characterization and identification of plant varieties are essential to the development, release and popularization of crop varieties
- This work is useful for a future information gathering on the adaptation of less known varieties to the edaphoclimatic conditions of different regions of the world

Biography:

Maider Zugazua Ganado has a BS in Food Science and Technology and MS in Food Quality and Security from the University of Basque Country (Spain). After the MS (2018), she started working as quality technician in a beverage factory. At the moment, she is lab technician intern at BCC Innovation, a Technological Center in Gastronomy, focusing her work mainly in the innovation and investigation projects that require physicochemical analysis.



Effect of Sodium bicarbonate and soaked time on the texture properties of cowpea beans

Shuyana Deba*, Maider Zugazua, Paula Torán, Olaia Estrada

BCC Innovation, Centro Tecnológico en Gastronomía, Basque Culinary Center, Donostia-San Sebastián, Spain

Soaking of beans before cooking is a common practice to soften texture and hasten the cooking process. Soaking has also been suggested for reducing anti-nutritional substances and improving cooking quality. The objective of this work was to study the textural properties of *Vigna unguiculata* (L) Walp beans and the effect of culinary treatments during boiling. Thus, the effect of soaking time and sodium bicarbonate addition (NaHCO_3) were evaluated. Dry cowpea beans were soaked in water under 2 conditions; tap water and sodium bicarbonate solution (0.33% w/v) and four soaked times (0, 4, 8 and 14 hours) were studied. For each treatment, cowpeas were boiled in water (33% w/v) for 120 minutes and a sample of beans ($n = 50$) was evaluated every 15 minutes to measure beans integrity and to perform an instrumental texture analysis ($n = 10$). In order to evaluate beans integrity, semi broken and broken grains percentages were determined. Texture profile analysis was performed using a TA.XT2 Plus Texture Analyser (Anname, UK). The measured quality attributes were: hardness, cohesiveness, adhesiveness, springiness, gumminess, and chewiness. The grain was brought under to a 25 % compression with a cylindrical probe (P/36R) at a crosshead speed of 1 mm s^{-1} twice in two cycles using a 30 kg load cell. Results showed significant differences during cooking associated to soaked time. Non soaked samples had the highest percentage of whole grains (50%) compared to all other studied soaked times evaluated. Texture profile analysis (TPA) results showed higher hardness, chewiness and gumminess values in no soaked beans during the first 45 minutes of cooking. However, after 45 minutes, no significant differences ($p > 0.05$) were found on the textural properties considering the different and evaluated soaked times. The incorporation of sodium bicarbonate did not have a significant influence ($p > 0.05$) on the texture profile. Sensory attributes were also evaluated by professional chefs, and 90 minutes were selected the best cooking time.

Audience Take Away:

- This poster shows the close relationship between food science, technology and gastronomy
- Effect of culinary treatments conditions (soaking time and sodium bicarbonate addition) on beans integrity and textural properties of *Vigna unguiculata* (L.) Walp beans

Biography:

Shuyana Deba Rementeria is student researcher at BCCInnovation, and PhD candidate in the Gastronomy program at Basque Culinary Center Hezkuntza. She has a B.S. degree in Biotechnology from University of Basque Country and a M.S. in Food Quality and Security. She has been recently hired by BCCInnovation to increase knowledge in the sustainability area, because of her expertise during several months working on different I+D departments in different companies. Thanks to a training grant from the Basque Government, in the scientific-technological and business environment of the Basque agricultural and food sector, her PhD studies focus on researching how fermentation and enzymes can be used in the development of high value food products. In addition to her PhD research, she works in different research and innovation activities of the BCCInnovation center.



Organic honey – transfer of chemical elements

Irina Karadjova*, Elisaveta Mladenova

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Honey is natural product widely used for nutritional and therapeutic purposes in many cultures since ancient times. Organic honey manufacturers have to meet the standards set by the national organic agriculture board in terms of bee foraging areas, bee management, extraction, processing, transportation and packaging materials. Requirements in term of organic toxic compounds might be easily achieved following good agriculture practice, however chemical elements exist naturally in the environment and might be unintentionally transferred into the final product. The mineral content of honey depends on its botanical origin for unifloral honeys (evidently based on plant physiology and biouptake from soil), geographical origin (concentration of bioavailable fraction of chemical elements) and environmental conditions (air and soil pollution from anthropogenic factors). In the present study analytical procedure was developed for accurate and reliable determination of chemical elements in honey based on optical emission spectrometry with inductively coupled plasma and massspectrometry with inductively coupled plasma. Relatively high sample amount of around 10 g was used to overcome natural inhomogeneity of honey. Concentrations of 25 chemical elements were measured in two unifloral honeys from Bulgaria with declared geographical origin. Descriptive statistic was used to present results obtained. The idea is to elucidate well known statement "honey is bioindicator for environmental pollution" or due to biological barrier honey with high quality could be produced even in relatively polluted environment. The correlation coefficient between chemical elements in two studied honeys will be calculated and discussed in connection with botanical origin and geographical origin. The influence of percentage of main flower on the concentration of chemical elements is studied and commented. In addition, the distribution of chemical elements in bee products will be discussed from the view point – where toxic elements where enriched?

Audience Take Away:

- The model of transfer of chemical elements in honey
- The distribution of chemical elements in bee products
- Correlations between concentrations of chemical elements in two type unifloral honeys from Bulgaria

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"

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.)



Honey – chemical elements bioaccessibility

Elisaveta Mladenova, Irina Karadjova*

Department of Analytical Chemistry, Faculty of chemistry and pharmacy, University of Sofia "St. Kliment Ohridski"/Affiliation, Sofia 1164, Bulgaria

Honey is accepted as a functional food used also as a medicine for the treatment of various health problems. Its antioxidant, antimicrobial, anticancer, and antidiabetic properties have been studied both in vitro and in vivo. Honey contains more than 200 compounds some of them showing high biological activity. The total chemical elements content in honey depend mainly on its botanical origin, however little is known about their speciation and bioaccessibility. The aim of this study was to investigate changes in the concentrations of essential and toxic elements after in vitro gastrointestinal digestion. Three types of unifloral honey samples with declared geographical origin were tested – some of them with Pb concentrations above the permissible limits. Analytical procedure was developed for the simulation of gastrointestinal digestion in vitro using ICP-OES and ICP-MS as measurement methods. The procedure developed is performed in two versions. In the first version standard simulation of for the gastric phase simulation, around 5 g honey sample (dissolved in distilled water) was incubated at pH 2 in the presence of pepsin for 2 hours; for the next step to aliquot of this sample pancreatin and porcine bile salts were added, pH was adjusted to 7.8 and sample stirred in dark for 4 h. The determination of bioaccessible fraction from both steps was carried after filtration through 22 μm membrane filter and measurement using ICP-OES and ICP-MS. In the second version bioaccessible fraction from both steps was obtained after dialysis through cellulose membranes (molecular weight cutoff 5,000 Da or 20,000 Da) and again measurement using ICP-OES and ICP-MS. Results obtained showed very high bioaccessibility for all studied elements by using first version – bioaccessible fraction varied between 88 and 95% from total content for all essential and toxic elements in honey, independently of botanical origin. It might be expected that bioaccessible concentrations from second version would be lower and would depend on botanical origin of honey. As a conclusion: the influence of various factors – botanical origin, geographical origin, physicochemical properties of honey on the chemical elements bioaccessibility will be commented.

Audience Take Away:

- Assessment of chemical elements bioaccessibility in honey
- The influence of factors such as botanical, geographical origin of honey on chemical elements bioaccessibility
- Dependence of bioaccessible fraction of chemical elements from physicochemical properties of honey

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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.)



Sugars dynamics during fermentation of kombucha black tea

Paula Torán*, Blanca del Noval, Maider Zugazua, Shuyana Deba, Olaia Estrada

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Recently, fermented foods demand has largely increased among modern consumers, due to their health benefits and pleasant flavour. Kombucha is a refreshing drink obtained through the fermentation of sweetened black tea and its inoculation with a previously fermented tea and a starter, a hydrogel-like known as SCOBY (Symbiotic Colony of Bacteria and Yeast). After approximately 8 days of fermentation, the product is a slightly sweet and acid, carbonated beverage numerous compounds that are produced by the symbiotic culture of microorganisms. During the process, yeasts produce enzymes that hydrolyse sucrose into glucose and fructose, which are the main carbon source of the symbiotic system; these will be transformed to ethanol, acids, cellulose, and carbon dioxide. Meanwhile, bacterial enzymes generate gluconic acid and cellulose from fructose and glucose. Consequently, while the fermentation process proceeds, the sweetness of the beverage decreases and the sourness increases.

The objective of this study was to analyse the dynamics of carbohydrates (sucrose, glucose and fructose) during fermentation process of kombucha.

The fermentation substrate was boiled black tea with and addition of 9% (w/v) of sucrose, 3% (w/v) of SCOBY and 10% (v/v) of previously fermented kombucha tea (back slope fermentation).

The static fermentation process took place at room temperature and in dark conditions. Sucrose, glucose and fructose concentration were determined during 19 days in order to have an overview of the process over a wide range of time. For sugars extraction, kombucha samples were diluted (1:500) in deionized water, homogenised for 30 minutes by mechanical agitation, and filtered (0.45 μ L Nylon filter). Sugars concentration was determined using high performance anion exchange chromatography with pulsed amperometric detection (HPAEC-PAD) with a Metrosep Carb 2 150/4.0 column and using NaOH 300 mmol L⁻¹ / NaAc 1.0 mmol L⁻¹ as mobile phase.

Sucrose concentration linearly ($R^2 > 0.98$) decreased until reaching a non-detectable concentration at the 7th day of fermentation, while glucose and fructose concentration increased, reaching maximum values of 9.43 and 7.14 g L⁻¹ at 6th and 11th day of fermentation, respectively. Once sucrose was not available for the microorganisms, glucose and fructose started decreasing until the 19th day of fermentation, when concentration was of 2.63 and 0.91 g L⁻¹, respectively. It is well known that, because of the wide variability of kombucha fermentation process, it is difficult to characterize the dynamics of the microbial metabolism. This work provides information about the fermentation process and the evolution of sugars during 19 days of fermentation.

Audience Take Away:

- Monitoring the changes in sugars concentration during the fermentation process of kombucha
- Identifying which sugars are present in the fermentation matrix during the process of kombucha
- Having knowledge of the dynamics of the fermentation process, which could help controlling and optimizing the elaboration of kombucha

Biography:

Researcher-Chef at BCC Innovation (Basque Culinary Center), Paula has an MS in Gastronomic Science, a BS in Gastronomy and Culinary Arts and a BS in Environmental Sciences. She has worked in several restaurants and participated in different research projects, most of them focusing on the development of new foods using co-products derived from the food industry and also from restaurants. Because of her background, Paula brings a differential value in the food design process, with a highlight on social and environmental aspects.



Fish waste revalorization using fermentation techniques

Blanca del Noval*, Paula Torán, Olaia Estrada

BCC Innovation, Centro Tecnológico en Gastronomía, Basque Culinary Center, Donostia-San Sebastián, Spain

Food loss and food waste is a global issue with negative impact on global environment and on the economy. FAO reported that a third of the production of food destined for human consumption is lost or wasted worldwide, which is equivalent to approximately 1.3 billion tons per year. In Europe, the sectors contributing the most to food waste are households (47 million tonnes \pm 4 million tonnes) and the processing sector (17 million tonnes \pm 1.3 million tonnes). These two sectors account for 72% of EU food waste. In general, some of these wastes are edible parts of raw materials, but society undervalues them and are not even considered in different food waste studies. At best, these by-products are used as compost. Better outputs could be obtained when an appropriate processing is used to transform these materials, increasing their added value and empowering the primary sector. In addition, an interesting approach could be using restaurants food waste for designing and developing new concepts and products which then can be piloted to industry.

In this context, the main objective of this work was to identify fish waste generated during workshops at University of Gastronomic Sciences Basque Culinary Centre (Spain) and to develop an alternative product to return it to the food chain. Approximately several kg of fish waste (bones, heads and scales) representing nearly a 25% of the total fish, was obtained from different workshops conducted at BCC. Then, a fermentation technique (garum) was used to obtain a salty fish sauce. Garum is an ancient fermentation technique to ferment the whole fish to obtain a salty fish sauce that is commonly used as condiment. Two kilograms of fish waste were mixed with koji (1 kg) and sodium chloride (17%) and kept at controlled temperature (35 °C) during one month. In order to obtain enzymes from an external source, *Aspergillus oryzae* was grown in barley to imitate the Japanese process to produce koji. Koji is widely used to produce a variety of products such as sake, miso, soy sauce, etc. Finally, the sauce was filtered and pasteurized, obtaining a final product similar to any Asian fish sauce and soy sauce. This new product based on fish waste represented a novel product, useful as condiment. This work exemplifies how to reduce food waste through new gastronomic proposals for food fish waste.

Audience Take Away:

- The importance of gastronomy research to find creative solution for the sustainable challenge of our society.
- Providing tools to reduce food waste through gastronomy
- Revaluing co-products to empower the gastronomy value chain (primary sector and industry)
- Understanding traditional culinary techniques and their application in different products to promote innovation in the food industry

Biography:

Blanca del Noval is a member of the research group of BCulinaryLAB. She works as chef researcher at BCCInnovation, Technological Center in Gastronomy of Basque Culinary Center and as Invited Professor at the Faculty of Gastronomic Sciences of Mondragon Unibertsitatea. Blanca has a BS in Gastronomy and Culinary Arts and she has been working on understanding fermentation process in order to revalue by-products and the value of wild edible plants in gastronomy during last years. She published an open source manual about how transform co-products into products with gastronomic value.

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