IRIS Scientific Group

2nd Global Webinar on

Food Science and Nutrition

&

Plant Science and Research

February 26, 2021

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ABOUT US

Iris Scientific Group

Iris Scientific Group is started to fulfill the requirements and to seek after aggregate objectives of the scientific community particularly focusing in the field of Science and technology to support the efforts to exchange knowledge and ideas which encourage the cooperation between the researchers, scientists, academicians and analysts of interdisciplinary research or same field.

We are expert in conducting conferences, workshops, seminars, and meetings with the peerless and inspired speakers all around the world. We are here to provide you and your association with the opportunities to connect with others, explain your research and make your unique identity in front of others. Our conferences and workshops are known as the sea of learning where we help you to swim and learn everything you want.

In a very short period, Iris Scientific Group became successful in developing a unique platform for experts, budding researchers and professionals from different universities, countries, research institutions, hospitals, companies and industries. Here we provide an opportunity to easily discuss and socialize their techniques of research, goals, facts, latest science discoveries and news.

SCIENTIFIC PROGRAM

26-February-2020

Webinar Time Zone (GMT)	Speaker Time Zone	
12:00-12:10		Introduction
Sessions on: Food Science and Nutrition		

Keynote Presentations

12:10-12:50	17:40-18:20	Title: Food-Secure Future **Govindan Venkataramani,** Agricultural communications and knowledge-sharing specialist, India
12:50-13:30	18:20-19:00	Title: Integrated soil fertility management in fruit crops: An-overview **Anoop Kumar Srivastava,** ICAR-Central Citrus Research Institute, India

Oral Presentations

13:30-13:50	14:30-14:50	Title: Unravelling polyphenolic composition in complex food and natural products by comprehensive two-dimensional liquid chromatography **Francesco Cacciola,** University of Messina, Italy
13:50-14:10	14:50-15:10	Title: Evaluation of chemical bioactive compounds in three cultivars of Brassica Juncea L. by HPLC-PDA/ESI-MS **Yassine Oulad El Majdoub,** University of Messina, Italy
14:10-14:30	22:10-22:30	Title: Food culture: Wild edible plants (WEPs) used by Tamang and other ethnic communities in Nepal Himalayas **Arjun Chapagain,** City University of Hong Kong, Hong Kong
14:30-14:50	20:00-20:20	Title: Designing of foods and processes using innovative extrusion approaches for nutrition and health **Amit Baran Das,** Tezpur University, India

14:50-15:10	17:50-18:10	Title: Provide nutritional support to socially vulnerable layers of the population due to the agricultural resources of the region in the context of overcoming the consequences of the pandemic. **Viktor Fedorovich Stukach,** Omsk State Agricultural University, Russia
15:10-15:30	16:10-16:30	Title: Dietary supplementation of jute leaf (Corchorus olitorius) modulates hepatic delta□aminolevulinic acid dehydratase (δ□ALAD) activity and oxidative status in high□fat fed/low streptozotocin□induced diabetic rats **Jamiyu Ayodeji SALIU,** Adekunle Ajasin University Akungba Akoko, Nigeria
15:30-15:50	18:30-18:50	Title: Bioactive constituents of Moringa oleifera leaves and prevention of degenerative chronic diseases **Opiro Lakuma Kenneth,** Homeopathy and Herbal Centre, Uganda

Sessions on: Plant Science and Research

Keynote Presentations

15:50-16:30	21:20-22:00	Title: Indian spices (medicinal and aromatic plants/herbs) for prevention of Life Style Disorders (LSD) or Non Communicable Diseases (NCD) **Gunvant Hari Yeola,** Dr. D. Y. Patil College of Ayurved and Research Center, India
16:30-17:10	18:30-19:10	Title: Using resurrection plants as models for production of extremely drought tolerant crops **JM Farrant,** University of Cape Town, South Africa

Oral Presentations

17:10-17:30	17:10-17:30	Title: Design thermal comfort in greenhouses environment **Abdeen Omer,** Energy Research Institute (ERI), UK
17:30-17:50	20:30-20:50	Title: Rapid generation advance in chickpea for accelerated breeding gain in Ethiopia: What speed breeding imply? **Asnake Fikre,** Ethiopian Institute of Agricultural Research (EIAR), Ethiopia

17:50-18:10	01:50-02:10	Title: Spatiotemporal epidemiology and temperature correlation of anthracnose-twister disease of onion in production areas of Sto. Domingo, Nueva Ecija **Dan Charlie Joy C. Pangilinan,** Central Luzon State University, Philippines
18:10-18:30	21:10-21:30	Title: The effects of climate change on organic vegetable farming and the environment **Funda Yoldas,** Ege University Odemis Technical High School, Turkey
18:30-18:50	19:30-19:50	Title: Secondary metabolites content and genetic stability analysis in new lines of purple coneflower selected via somatic embryogenesis **Justyna Lema-Rumińska,** UTP University of Science and Biotechnology in Bydgoszcz, Poland
18:50-19:10	21:50-22:10	Title: Induction of callus from anther and ovary explants of Leklek variety of common bean (Phaseolus vulgaris L.) **Dilek Tekdal,** Mersin University, Turkey
19:10-19:30	14:10-14:30	Title: Sugar based biopolymers: Novel representative of multifunctional Poly(Sugar Acids) - Poly[3-(3,4-Dihydroxyphenyl) Glyceric Acid] from medicinal plants of boraginaceae family, its synthetic analogues and their therapeutic efficacy **Vakhtang Barbakadze,** Tbilisi State Medical University I.Kutateladze Institute of Pharmacochemistry, Georgia

Poster Presentations

19:30-19:40	19:30-19:40	Title: Biofuel production from phytoremediation derived sunflower biomass **Ana P.G.C. Marques,** CBQF – Centro de Biotecnologia e Química Fina, Portugal
19:40-19:50	20:40-20:50	Title: Phytochemical screening, Phenolic content and antioxidant activity of Lavandula species extracts from Algeria **Farah HADDOUCHI,** Abou Bekr Belkaïd University, Algeria
19:50-20:00	20:50-21:00	Title: Antioxidant, haemolytic activities and phenolic composition of needle extracts from Juniperus oxycedrus subsp. Oxycedrus **Tarik Mohammed Chaouche,** Abou Bekr Belkaïd University, Algeria

IRIS Scientific Group

KEYNOTE FORUM

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FOOD SCIENCE AND NUTRITION

&

PLANT SCIENCE AND RESEARCH

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Anoop Kumar Srivastava
ICAR-Central Citrus Research Institute, India

Integrated soil fertility management in fruit crops: An-overview

Fruit crops offer a strong sink for sequestration of atmospheric carbon dioxide, thereby, aid in moderating the impact of climate change-related issues. The paradigm shift from purely inorganic to either organic fertilizers or in combination with chemical fertilizers started gaining wide-scale use for enhanced biogeochemical nutrient soil cycling. This change of concept later formed the basis for Integrated Soil Fertility Management (ISFM) -based strategy involving three basic components viz., microbial inoculants (biofertilizers), inorganic fertilizers, and organic fertilizers. Better responsiveness of soil microbial biomass over a chemically available nutrient pool of soil to nutrient input has led to an increased interest in measuring the quantum of nutrients held microbially. This has advocated a possibility of using changes in microbial biomass as a potential diagnostic tool of fertility measurement under ISFM practices, as best for improved organic carbon sequestration and soil microbial indices in addition to the post-harvest shelf life of fruits compared to fruits raised on exclusive use of chemical fertilizers. Development of microbial consortium (microbial reactor)exploiting the native and natural microbial synergisms (with twin roles as a growth promoters and antagonistic to soil-borne pathogens) is one of the popular methods of managing multiple soil fertility constraints occurring within the rhizosphere. Such rhizosphere specific consortia (often called crop-microbiome) could further engineer rhizosphere's nutrient demand and supply through loading with organic manures in a much value-added form using a widely accepted concept like ISFM, considered very close to climate-resilient soil fertility management, a gateway to sustainable quality production.

Audience Take Away:

- Fruit crops as carbon sink
- Development of rhizosphere specific microbial consortium
- Integrated soil fertility module for citrus
- Nutrient-microbe-plant synergy

Biography

Dr. A.K. Srivastava, Ph.D in Soil Science from Banaras Hindu University (India). He has handled 30 projects, credited with 161 peer reviewed publications, life member of 33 academic societies, fellow of 11 academic societies, and associated with editorial board of ten high SCI journal . He is author of books like Citrus: Soil and Climate, Citrus Nutrition and editor of books entitled Advances in Citrus Nutrition and Fruit Crops: Diagnosis and Management of Nutrient Constraints. . He is adjunct faculty at three universities in India. He is visiting professor at HZAU and Yangtze University, China and AREEO, Iran.

Research interests: Nutrient constraints analysis of citrus orchards by developing DRIS-based soil-plant nutrient diagnostics, orchard efficiency modelling, targeted yield-based site specific nutrient management exploiting spatial variability in soil fertility, citrus rhizosphere specific microbial consortium and soil carbon loading, INM module, fertigation scheduling, nutrient mapping using geospatial tools, nutrient dynamic studies, transformation of soil microbial biomass nutrients within citrus rhizosphere and soil fertility map as decision support tool for fertilizer recommendation.

Gunvant Hari Yeola
Dr. D. Y. Patil College of Ayurved and Research Center, India

Indian spices (medicinal and aromatic plants/herbs) for prevention of Life Style Disorders (LSD) or Non Communicable Diseases (NCD)

The incidence of lifestyle diseases are on the rise with every passing day and this needs to be tackled properly before the situation becomes grave. Lifestyle diseases are those that appear at any age due to a faulty lifestyle. They include diseases like hypertension, diabetes mellitus, dyslipidemia, overweight/obesity, cancer and many more. According to recent reports 70% of these diseases are related to non-communicable diseases (NCD) and are also known as 'Diseases of Civilization'. Ancient Ayurved treatises vividly expressed views about these disorders and suggested preventive measures as well as treatments to cure these diseases. According to Ayurved principle, treatment for these diseases includes bio-purification and palliation treatment. Since these diseases are a result of excess nutrition, reduction therapy is required. Stop or reduce causative factors (Dietary as well as behavioural) is the first line of treatment and Rasayan (rejuvenation) treatment which is beneficial for non-recurrence of disease comes next in the treatment line. 3 Pillars and 3 Sub-pillars of life mentioned in Ayurved viz. Vata, Pitta and Kapha are three main pillars and Ahar (food and nutrition), Nidra (sleep and sleep pattern), Bramhacharya (celibacy or well controlled sexual act) are three sub-pillars of life. In this presentation, the focus is on Ayurvedic food culture which is one of the sub-pillars of life. Ayurveda suggests food for body, food for mind and food for well-being of soul. A balance of these should be maintained for a healthy living and Indian spices (medicinal and aromatic plants/herbs) are used while preparing food to make it more balance and to take care of life style disorders and also to increase immunity. Traditional Indian Spices and aromatics are the heart of Indian cooking and have been used since ancient times. Their use has been mentioned in the ancient Hindu scriptures called the Vedas. These have always been believed to have healing qualities. They have been used to cast spells, as incense in religious rites, to embalm corpses, to add aroma to perfumes and as aphrodisiacs. At some point of time in history, they have often been more valuable than gold or other precious stones. Below are mentioned some spices which plays important role in treating and curing lifestyle diseases. Turmeric (Curcuma longa), Asafetida (Ferula asafoetida Linn), Fenugreek (Trigonellafoenum-graecum), Garlic (Allium sativum), Ginger (Zingiberofficinale), Cardamom (ElettariaCardamomum), Cinnamon (Cinnamomumverum), Cloves (Syzygiumaromaticum), Cumin (Cuminumcyminum), Mustard seeds (Brassica nigra) and Saffron (Crocus sativus). Ancient Ayurvedic proverb is very appropriate to explain the importance of food and to follow certain basic principles while preparing food. It says "When diet is wrong, medicine is of no use. When diet is correct, medicine is of no need".

Biography

Professor Dr. GunvantYeola is Principal and Head of Department of ayurved medicine at Dr. D. Y. Patil College of Ayurved and Research Center, Pune, India. He is Director of International Academy of Ayurved, Pune, India. He is M.D.; Ph.D. in Kayachikitsa (Ayurved) and M.A. in Sanskrit. He is having 20 years of teaching experience and is a Post Graduate teacher/guide. He is recognized Ph.D guide in Kayachikitsa of Maharashtra University of Health Sciences, Nashik; Tilak Maharashtra Vidyapeeth (University), Pune and Dr. D. Y. PatilVidyapeeth, Pune (Deemed to be University).He is visiting professor at Suddha Dharma Mandalam, Sao Paulo - Brazil, AMAYUR, Lisbon – Portugal and Vedika Global Inc., San Francisco – USA. Frequently invited and visited for lectures on Ayurved at Brazil, USA, UK, Germany, Portugal, Belgium, Spain, Dubai and Israel.

Research interests: Reverse pharmacology. Repurposing of drugs, Life style disorders

JM Farrant
University of Cape Town, South Africa

Using resurrection plants as models for production of extremely drought tolerant crops

Drought is one of the greatest threats to world agriculture and it has been predicted that, due to effects of global warming, there will be considerable aridification in current food producing areas. To safeguard food production, it is essential to improve drought tolerance in crops. The vegetative tissues of current crops, including orphan the more resilient orphan crops, are intolerant of extreme water loss, dying upon loss of between 30 and at most 50% of cellular water. While efforts have been made to improve resistance to water loss, these mechanisms inevitably fail under severe drought conditions. Resurrection plants possess vegetative desiccation tolerance (vDT), surviving drying to 5% of cellular water for extended periods without loss of viability. Angiosperm resurrection species occurring in Southern Africa also survive extreme heat; conditions which severely limit current agricultural practices. We use a multidisciplinary systems biology approach to gain a detailed fundamental understanding of the mechanisms whereby several different resurrection plant species tolerate these extreme conditions, with the view and practise of introducing such characteristics into crops for improved tolerance of extreme drought. In this presentation an overview of some of the molecular, subcellular and physiological processes associated with tolerance of extreme water loss, and which are of relevance to production of more drought tolerant crops, will be given.

Audience Take Away:

Evidence that vDT in angiosperms evolved by "rewiring" of genes associated with desiccation tolerance in seeds in their roots and leaves.
Despite this vDT is not a "one size fits all" strategy. While core similarities exist, there are significant differences in implementation thereof among genera and species.
Latest insights into how drought induced senescence is suppressed in resurrection plants and how this process might be "repurposed" to elicit flowering immediately after rehydration.
Evidence of and insights into molecular mobility and metabolic activity at extremely low water contents.

Biography

Jill Farrant is an acknowledged world leader in the field of plant desiccation tolerance, holding a rarely given A rated status by the South African National Research Foundation. She has received considerable recognition for her research, achieving 10 national and international awards, including the L'Oréal-UNESCO award in life sciences (2012) that 'recognizes women whose exceptional careers in science have opened up new and sometimes revolutionary ways of improving human well-being'. Her work has been featured in several local and International documentaries, which can be found on her website http://www.mcb.uct.ac.za/mcb/people/staff/academic/farrant. She has graduated36 MSc students and 30 PhD students during the 27 years she has been an academic.
Research Interests: Fundamental understanding ofnumerous aspects of plant drought and desiccation tolerance. This includes the disciplines of biochemistry, biophysics, cell biology, ecology, molecular biology (all the omics) and physiology. I am also interested in microbes (endophytes and root associates) associated with vDT and the use of biotechnology for production of climate smart agriculture.

Govindan Venkataramani

Agricultural Communications and Knowledge-Sharing Specialist, India

Food-Secure Future

This presentation will discuss the need for upscaling time-honored indigenous wisdom and fine-tuning frontier food technologies to pave way for a food-secure future. What will be needs and aspirations of future generations to avoid wastage of nutritious food and how they should be integrated in an innovative and sustainable way.

Biography

***Awardee, ChoudryCharan Singh Award for Excellence in Journalism in Agricultural Research and Development instituted by the Indian Council of Agricultural Research, Government of India. July 2001.

*** Awardee, Millenium ICRISAT Science Award 2002 as the Outstanding Journalist in recognition of the contribution to disseminating scientific information through creative journalism.

*Freelance Agricultural Communications and Knowledge-Sharing Specialist (from August,2009 to till date).

** Wrote the authorized biography of Dr. Dr. SanjayaRajaram, the 2014-World Food Prize laureate; "MR. GOLDEN GRAIN---The life and work of the MAHARAJA of WHEAT- Dr. SanjayaRajaram". It took five years of intensive research and interviews with over 250 scientists and staff of the world's leading wheat research centres in Mexico, Syria and India to complete the book. The book was launched by Prof. M. S. Swaminathan at MSSRF, Chennai, India, on June 21, 2015.

*Working as the Secretary for the Centre for Research on Sustainable Agriculture and Rural Development (CRSARD) at the MS Swaminathan Research Foundation (MSSRF) Chennai, India, from 2013.

*Member of the Research Advisory Board of Shri AMM MurugappaChettiar Research Centre (MCRC), Chennai, India, from 2005.

*Until August 15, 2009, (from 2007 to 2009) I was working as the Water Management Communications and Knowledge-Sharing Specialist at the Integrated Water and Land Management Program (IWLMP) of the International Center for Agricultural Research in the Dry Areas (ICARDA) in Aleppo, Syria.

* Worked as the Agriculture Correspondent of "THE HINDU", a leading national English daily published from Chennai: From September 1979 till May, 31, 2005.

The job included reporting on the developments in agriculture and allied disciplines; on environmental issues; writing a weekly column "For the Farmers' Notebook" every Thursday; and editing a weekly page exclusively devoted to natural science, agricultural research and development.

In addition, the job involved compilation and editing of a specialized annual publication: "THE HINDU Survey of Indian Agriculture". I helped in the concept and production of the first volume of "THE HINDU Survey of Environment".

* Worked as a Visiting Fellow at the MS Swaminathan Research Foundation, Chennai, coordinating an FAO-sponsored program on Integrated Intensive Farming Systems (IIFS) in India and developing a multi-media database on CD-ROM of IIFS since April1994.

* Worked as Consultant on Public Awareness and Media Relations at ICRISAT, Patancheru, Hyderabad, India, from February, 1997 to February 1998, December 12 to 17, 1999, June 01 to July 30, 2000.

* Worked as a Visiting Editor in the Communications and Publications Department at the International Rice Research Institute (IRRI), Philippines from September to December 1986.

IRIS Scientific Group

SPEAKER SESSIONS

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PLANT SCIENCE AND RESEARCH

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Designing of foods and processes using innovative extrusion approaches for nutrition and health

AmitBaran Das

Tezpur University, India

The extrusion process is the most versatile food processing technique. Extrusion allows the combination of various unit operations to occur simultaneously on the biopolymer and, therefore, the physical and chemical transformations of the biopolymer occurred in a single step and continuously. In the present study, extrusion cooking was used to develop probiotic fruit leather as well as extrusion cooking process was modified to develop extrudate from red rice flour. For the probiotic fruit leather, encapsulated Lactococcuslactis AMD17 probiotic was incorporated in bastard oleaster (Elaeagnuslatifolia) fruit juice and followed by extrusion. The optimized condition for the extrusion was: screw speed 67.49 rpm and temperature 65.19°C with having microbial count 1.04×106 CFU/ml, total phonic content 203.12 mg GAE/100g and moisture content 15 % in fruit leather. On the other hand, to develop expanded extrudate from red rice flour at low temperature, the extrusion process was modified using a vacuum chamber. The vacuum-assisted extrudate showed higher expansion and phytochemical retention as compared with the conventional extrusion process. The study manifested that innovative extrusion approaches can be used to develop designer food for nutrition and health.

Audience Take Away:

- Audience can use their knowledge on extraction for the development of new food product well as new process technology.
- Obviously the research outcome will help the audience in the respective job. It will help to develop new food products as well as troubleshoot for various processing.
- These research could help other faculty to expand their research and teaching knowledge.
- These research provide practical solution to a problem related to the extrusion cooking
- It will provide new information to assist in a design of new food and process.

Biography

Dr. AmitBaran Das is currently Assistant Professor of Department of Food Engineering and Technology, Tezpur University, India. Dr. Das received his Master's from Indian Institute of Technology Kharagpur and Ph.D. from Indian Institute of Technology Guwahati.
Dr. Das is working in the field of extrusion, food rheology, and machine design. His group is also working on the application of ionic liquid and deep eutectic solvents in the food system. Dr. Das has been published more than 25 research articles, 6 book chapters, and one book. He has designed and developed two food processing machine and patented. Dr. Das also serving as a subject expert and coordinator of the various national committee.

Food culture: Wild edible plants (WEPs) used by Tamang and other ethnic communities in Nepal Himalayas

Arjun Chapagain[1*], Srijana Shah[2], Udit Bhatta[3], Kamal Nepali[4], Prem Subedi[5], Laxmi Joshi[6], Rajesh Tamang[7]

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[2] Ministry of Forests and Environment, Singh Durbar, Kathmandu, Nepal

[3] VajraAcademy, Nepal

[4] National Botanical Garden, Nepal

[5] Green Foundation Nepal

[6] Shuklaphanta National Park, Nepal

[7] Ministry of Industry, Tourism, Forest and Environment, Province No. 1, Nepal

The Himalayan mountain region is rich in ethnic and bio-cultural diversity. Hundreds of ethnic communities harboring the dynamic Himalayan landscape have developed their own livelihood strategies rich in food culture based on the wild edible plants and their derivatives. Wild food plants not only make the local livelihood of Himalayan dwellers, these also serve as the life sustaining resources during natural calamities and environmental extremes. Both fermented and non-fermented food varieties made from wild edible plants have been widely used by the ethnic communities of Himalaya. In this paper, we highlight uniquely developed food cultures of ethnic communities residing various parts of Nepal Himalaya. The present study was conducted in nine districts and eleven sampling sites in north-central and north-eastern Nepal. The Tamangbeing the dominant ethnic community, a total of eight ethnic communities were consulted. Altogether 108 species of wild plants belonging to 87 genera and 53 families were recorded to have local food value. Among these, the dominant Tamang community was found to use about half of the total reported food plants (65 species belonging to 58 genera and 40 families). The ethnic communities were found to use all the life forms of wild plants as source of food. Trees were the most used life forms followed by herbs, shrubs and climbers. Harvesting culture of the communities was mostly found sustainable as non-destructive harvesting was the common food culture throughout the sampling districts (harvesting of fruits, leaf, flower and seeds accounted for 79% of the total harvesting cultures). For Tamangand all other ethnic communities non-fermented wild food plants were the most widely used plants followed by raw and fermented, and fermented only plants. Diverse ethnic communities in Himalaya have developed their own food cultures which are important to build socio-ecological and economic resilience of mountain dwellers. Sustainable food cultures as harbored by the ethnic communities have important roles in plant genetic resources conservation and build resilient mountain communities. Improved access to resources, sustainable harvesting procedures and bio prospecting are some of the important areas of future discourse.

UnravellingPolyphenolic Composition in Complex Food and Natural Products by Comprehensive Two-dimensional Liquid Chromatography

Francesco Cacciola[1], Katia Arena[2], Paola Dugo[2,3], Luigi Mondello[2,3,4,5]

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[5]BeSep s.r.l., c/o Department of Chemical, Biological, Pharmaceutical and Environmental Sciences, University of Messina, Messina, Italy

Food and natural products do contain polyphenolic compounds which are associated to various pharmacological effects on human health. The do show important functions e.g. protection against UV radiation, inhibition of pathogen development, as well as industrial applications. For such a reason different studies dealt with the chemistry and bioactivity of these molecules in various food products, paving the way for the discovery of "novel" challenging compounds. For such a reason, sensitive but also innovative analytical methods are needed for their determination. Comprehensive two-dimensional liquid chromatography (LC×LC) has emerged in the last thirty years as a valuable analytical tool for the analysis of complex samples. Two stationary phases are usually coupled thus leading to an increased overall separation power compared to the one-dimensional liquid chromatography. Various LC×LC methodologies with complementary column sets (e.g. NP×RP, RP×RP and HILIC×RP) along with dedicated software for data processing have been successfully developed by our research group. In this study some LC×LC applications for determination of the polyphenolic content in complex food and natural products are highlighted and discussed.

Acknowledgment: The authors are thankful to Shimadzu and Merck Life Science Corporations for the continuous support. The researches were performed within the framework of the Research Project PRIN 2017: At the forefront of Analytical ChemisTry: disrUptive detection technoLogies to improve food safety – ACTUaL, supported by the Italian Ministry of University and Scientific Research, no. Prot. 2017RHX2E4.

Audience Take Away:

- Food analysis is the discipline dealing with the development, study and application of analytical procedures for the characterization of the properties of foods and their constituents. Emerged more than 20 years ago, comprehensive two-dimensional liquid chromatography (LCxLC) represents a valuable and powerful tool for the analysis of very complex samples. The application of such methodology to food analysis is very challenging. In fact LC×LC can be of valid aim in providing information about a wide variety of different characteristics of foods, including their composition, structure, physicochemical properties and sensory attributes.
- The use of advanced liquid chromatography technologies for food purposes does certainly give the wider scientific community the possibility to consider such an approach for getting a very detailed description of the samples under investigation. The applications of comprehensive two-dimensional liquid chromatography are very broad ranging from omics sciences, to different heterogeneous sectors e.g. environmental, petrochemical, pharmaceutical, etc.
- The proposed topic will be especially directed to food and natural product analysts confident in liquid chromatography. Also, beginners with a sufficient knowledge of liquid chromatography could be interested and attracted. The highest degree of interest might be foreseen for Ph.D. and post-doctorate students, permanent-position academia researchers, as well as liquid chromatography specialists.

Biography

Prof. Dr. Francesco Cacciolais Associate Professor of Food Chemistry at the University Messina, Italy. His research interests include the characterization of food bioactive molecules by conventional and innovative liquid chromatography techniques and hyphenation to mass spectrometry. In 2018 he was short-listed in the "Top 40 under 40" The Analytical Scientist "Power list". He is member of the editorial board of Journal of Essential Oil Research (Taylor&Francis) and Molecules (MDPI). He has published 127 research articles in SCI(E) journals in the field of food analytical chemistry.

Evaluation of chemical bioactive compounds in three cultivars of Brassica Juncea L. by HPLC-PDA/ESI-MS

Y. Oulad El Majdoub[1*], F. Alibrando[2], F. Cacciola[3], K. Arena[1], E. Pagnotta[4], P. Dugo[1,2], L. Mondello[1,2,5,6]

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Brassica juncea (B. juncea) is considered as the main oilseed crop, providing nutritional benefits, in addition to several health effects owing to its wealth of biological compounds which has recently attracted a special attention due to their potential biological effects. In this study, different parts namely leaves, stems, roots, flowers and defatted seed meals (DSM) of three cultivars of B. juncea, ISCI 99, ISCI Top and Broad-leaf collected on two phenological stages were analyzed by HPLC-PDA/ESI-MS. Most of the identified polyphenols were found bound to sugars and phenolic acids and belong to three different classes quercetin, kaempferol and isorhamnetin derivatives. Among the three cultivars, B. juncea ISCI 99 flowers turned out to be the richest one. The most abundant bioactive compound identified was represented by Is 3,7diglucoside (683.62 µg 100 mg-1 DW in ISCI 99, 433.65 µg 100 mg-1 DW in ISCI Top, and 644.43 µg 100 mg-1 DW in Broad-leaf). The overall evaluation of the entire B. juncea parts of three cultivars, through the chemical analysis of the non-volatile compounds can be advantageously taken into consideration for their future employment as dietary supplements and nutraceuticals in food matrices.

Acknowledgment: The authors are thankful to Shimadzu and Merck Life Science Corporations for the continuous support. The researches were performed within the framework of the Research Project PRIN 2015: Securing and ensuring sustainable use of agriculture waste, co- and by-products: an integrated analytical approach combining mass spectrometry with health effect-based biosensing, supported by the Italian Ministry of University and Scientific Research, no. 2015FFY97L

Audience Take Away:

This study would involve all audience either students, researchers and entrepreneurs by introducing basic knowledge about the technique of extraction of bioactive compounds from a plant matrix and basic analysis of plant matrix by HPLC-MS.

Biography

YassineOulad El Majdoub is a PhD student in Chemistry at the University Messina, Italy. His studies are focused on sample preparation techniques and characterization of food bioactive compounds in different matrices by liquid chromatography coupled to mass spectrometry, and their bioavailability in the gastrointestinal tract. In 2015 he graduated in Food Sciences (Master's degree). He has published 9 research articles in (MDPI, Elsevier and Springer) in the field of food and analytical chemistry.

Rapid Generation Advance in Chickpea for Accelerated Breeding Gain in Ethiopia: what speed breeding imply?

Asnake Fikre[1,2,*], Tulu Degefu[2], Tesfaye Geleta[1], Mahendar Thudi[3] , Pooran Gaur[3], Chris Ojiewo[4], Lee Hickey[5], Rajeev K. Varshney[3]

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Chickpea (Cicer arietinum L.) is grown in a wide range of environments and cropping systems and its maturity ranges from 80 to 180. Time-saving breeding is key to responding to the dynamics of demands and environmental changes. The study employed Single Seed Descent (SSD) technique in advancing the generation, supported by an independent observation of chickpea seed germination and seedling establishment in the seed lab. The filial generation nursery was derived from 46 initial crosses with the aim of enhancing drought and yield response of otherwise commercial 10 cultivars. Between 5 December 2017and 20 December 2018 we were able to obtain four rounds of working chickpea seeds (F2-F5) using two research locations. The average time required to obtain early matured pods varied from 80 to 85 days. Harvesting four generations in an annual cycle enables a saving of at least 50% time in variety release, which has the potential to double the rate of genetic gain and variety replacement. As long as measures are taken to reduce risk associated with extreme weather events or animal damage, this low-cost rapid cycling approach could be adapted for large-scale breeding programs to fast track the development of more productive varieties.

Induction of callus from anther and ovary explants of Leklek variety of common bean (Phaseolus vulgaris L.)

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Bean is one of the most cultivated edible legume plants in the world. To increase bean production is necessary to develop varieties with high yield and quality as well as resistance to biotic, and abiotic stress factors. One of the biggest problems encountered in classical breeding studies is the length of the breeding process. However, few findings have been achieved with legumes, especially with the genus of Phaseolus. This study aims to determine the possibilities of using in vitro haploidization techniques in breeding programs. This study's objective was to explore and develop haploid plant induction methods from the common bean's reproductive organs. Leklek, a local bean genotype, was selected in the study's scope due to a lack of information on its in vitro cultivation. Murashige and Skoog's medium supplemented with different concentrations and combinations of growth regulators; 2,4-D and Kinetin (0, 0.5, 1, and 2 mg L-1) were used to induce callus from in vitro cultured immature anthers and unfertilized ovaries of Leklek. By flow cytometry analysis, polyploidy levels of induced callus samples were studied. Spontaneous doubling of the chromosomes during the early induction stage was found in the calli flow cytometric study. Callus induction rate of the anthers and unfertilized ovaries were determined and obtained data was statistically evaluated by applying the variance analysis in the MSTAT-C statistical package program. The highest callus induction ratio was found in the medium, including Kinetin (2.0 mg L1) and 2,4-D (0.5 mg L-1). A high cytokinin level is sufficient to induce callus from anthers and ovaries in the common bean. When the anther- and ovary-derived calli were transferred to the regeneration medium, rhizogenesis was observed.

Audience Take Away:

With this study, the audience is expected to learn the basic principles of haploidization. It is aimed to increase the knowledge of the audience about plant tissue culture techniques and the importance of plant tissue culture in plant science.

Biography

As a scientist for her entire life, Dr. Dilek Tekdal observes and investigates the plants. She was a Biotechnology Department faculty member at Mersin University, where she leads the research group that works on plant tissue culture, plant biotechnology, and breeding in plants. At Mersin University, Dr.Tekdal teaches undergraduate courses in plant sciences. She has many publications and fellowships.
Research interests: Plant Tissue Culture Techniques, Plant Biotechnology, Plant Breeding

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Secondary metabolites content and genetic stability analysis in new lines of purple coneflower selected via somatic embryogenesis

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Purple coneflower (Echinacea purpurea (L.) Moench) of the Asteraceae family, is a plant species of high ornamental and medical value, and for these reasons, appreciated all over the world. The ornamental traits of this species are associated with a long flowering period and big inflorescences composed of two flower types: purple ray florets and purple-brown disc florets. Echinacea purpurea is also an important source of raw material for the phytopharmaceutical industry. Medical use of the plant is associated with immunomodulatory and antitumor effects, sincethe extract ofpurple coneflower activates human macrophages, stimulates the production of cytokines and tumor necrosis factor α (TNF-α), which are protecting the host against viruses and cancer. Currently, there is lack of standardized plant material with an increased content of secondary metabolites in purple coneflower. The following research meets the expectations of the industry, as new purple coneflower lines were obtained by selection of somatic-embryogenesis-derived lines. The plant lines were analyzed both in terms of the content of main secondary metabolites by HPLC, as well as the genetic stability within the line and the genetic distance between lines using ISSR and RAPD genetic markers. A higher mean polymorphism rate (>90%) was found with the RAPD technique, with a total of 1427 scorable bands produced (142.7 products per one primer). Unlike the RAPD analysis, ISSRs detected mostly monomorphic loci (63.4%), followed by polymorphic ones (36.6%), while there were no specific loci present. Cluster analysis of both marker systems showed that the tested genotypes were grouped according to their respective lines. Significant differences were found in the relative percentage composition of individual phenolic acids in the tested plant material. Among six selected lines of Echinacea purpurea, three yielded higher cichoric acid content. The research has shown that the obtained lines can provide an enhanced content of secondary metabolites in purple coneflower.

Audience Take Away:

- Among six selected lines of E. purpurea, three yielded higher cichoric acid content
- Genetic stability of the somatic-embryogenesis-derived lineswas confirmed by molecular markers
- Higher polymorphism rate was found with the RAPD technique compared to ISSR markers
- This data can be used to enhance the secondary metabolites production in E. purpurea by the industry

Biography

Dr. Justyna Lema-RumińskaPh.D, DSc is an associate Professor in the Laboratory of Ornamental Plants and Vegetables, at Faculty of Agriculture and Biotechnology, at UTP University of Science and Technology in Bydgoszcz, Poland. She mainly works on plant tissue culture, especially in somatic embryogenesis of ornamental and medicinal plants, identification of the cultivars of plant on molecular level, study on secondary metabolites of plants, especially plant pigments, genetic stability of plants propagated in vitro.

Research interests: Biotechnology of plants, secondary metabolites, molecular markers, somatic embryogenesis, breeding

Sugar Based Biopolymers: Novel Representative of Multifunctional Poly(Sugar Acids) - Poly[3-(3,4-Dihydroxyphenyl)Glyceric Acid] from Medicinal Plants of Boraginaceae Family, its Synthetic Analogues and their Therapeutic Efficacy

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Novel representative of sugar based biopolymers [poly(sugar acids)] is the main chemical constit¬uent of high molecular (>1000 kDa) water-soluble preparations from medicinal plants of Symphytumasperum, S. caucasicum, S. officinale, S. grandiflorum, Anchusaitalica, Cynoglossumofficinale and Boragoofficinalis (Boraginaceae). According to data of liquid-state 1H, 13C NMR, 2D 1H/13C HSQC, 2D DOSY and solid-state 13C NMR spectra this biopolymer was found to be poly[oxy-1-carboxy-2-(3,4-dihydroxyphenyl)ethylene] or poly[3-(3,4-dihydroxyphenyl)glyceric acid] (PDPGA). The polyoxyethylene chain is the backbone of this polymer with a residue of 3-(3,4-dihyd¬roxyphenyl)glyceric acid as the repeating unit. 3,4-Dihydroxyphenyl and carboxyl groups are regular substituents at two carbon atoms in the chain. This compound represents a new class of na¬tu¬¬ralpolyethers. PDPGA as a 3,4-dihydroxyphenyl derivative of poly(2,3-glyceric acid ether) belongs to a rare class of poly(sugar acids) as well. Its basic monomeric moiety glyceric acid is an oxidative form of the aldotriose glyceraldehyde. Poly(2,3-glyceric acid ether) chain is the backbone of this polymer and 3,4-dihydroxyphenyl groups are regular substituents at carbon atoms in the chain. We have no information on the biosynthesis of PDPGA, but from the chemical viewpoint, this process can be conceived as the epoxidation of the double bond in caffeic acid followed by the polymerization of the resulting epoxide. PDPGA as a unique natural polyether contains aliphatic ether groups in its polymer backbone. Lignin contains ether links between two aromatic rings or between an aromatic ring and an aliphatic moiety. However, reports concerning polymers that contain aliphatic ethers as repeating unit are missed. Basic monomeric moiety of PDPGA contains three functional groups, two phenolic hydroxyl groups in ortho-position and one carboxyl group. Multifunctionality of PDPGA should be a reason of its wide spectrum of biological activity. PDPGA exhibited anticomplementary, antioxidant, anti-inflammatory, wound healing and anticancer properties. The monomer was synthesized via asymmetric dihydroxylation of trans-caffeic acid derivative using a potassium osmate catalyst. Synthetic methylated derivative of PDPGA was synthesized via ring opening polymerization (ROP) of 2-methoxycarbonyl-3-(3,4-dimethoxyphenyl)oxirane using a cationic initiator BF3•OEt2. Oligomers of PDPGA were synthesized by "green" chemistry ROP enzymatic polymerization of methyl 3-(3,4-dibenzyloxyphenyl)glycidate using lipase from Candida rugosa and further dep¬rotection. The structure elucidation of synthetic monomer of PDPGA, synthetic methylated analogue and synthetic oligomers of PDPGA using chemical and enzymatic catalysts, respectivaly, was carried out according to data of different techniques of NMR spectroscopy and mass-spectrometry (ESI, MALDI-TOF). Hyaluronidase (Hyal-1) degrades high molecular mass hyaluronic acid into smaller fragments which stimulate inflammation. PDPGA possesses the ability to inhibit the enzymatic activity of Hyal-1 completely. Consequently, PDPGA exhibited anti-inflammatory efficacy. PDPGA and its synthetic monomer exerted anticancer activity in vitro and in vivo against androgen-dependent and -independent human prostate cancer (PCA) cells via targeting androgen receptor, cell cycle arrest and apoptosis without any toxicity, together with a strong decrease (87%) in prostate specific antigen level in plasma. The anticancer efficacy of PDPGA against PCA cells is more compared to its synthetic monomer. Methylated PDPGA did not show any activity against PCA. Thus, PDPGA was identified as a potent agent against PCA without any toxicity.

Audience Take Away:

- Variuos water-soluble crude and pure polysaccharides from different species of families Lorantaceae, Liliaceae, Dioscoreaceae, Crassulaceae, Amarylidaceae, Araliaceae, Cucurbitaceae, Iridaceae, Taxaceae and Boraginaceae for their immunomodulatory effects in vitro were tested. Only a unique polysaccharide poly[3-(3,4-dihydroxyphenyl)glyceric acid] (PDPGA) isolated from several species of Boraginaceae family is endowed with intriguing pharmacological activities as immunomodulatory (anticomplementary), antioxidant, anti-inflammatory, wound and burn healing and anticancer properties. Such biopolyether has not been known and has been identified for the first time. This unusual biopolymer could be a chemotaxonomic marker for genera of Boraginaceae and biosynthetic pathway responsible for this compound might also be unique for species of Boraginaceae family.
- in vitro and in vivo Studies identifies PDPGA as a potent agent against prostate cancer without any toxicity and supports its clinical application.
- The monomer of PDPGA was synthesized via Sharpless asymmetric dihydroxylation of trans-caffeic acid derivatives using a potassium osmate catalyst. This compound is a new finding in sugar acids.
- Recently methylated analogue of PDPGA was synthesized using ring opening polymerization (ROP) of 2-methoxycarbonyl-3-(3,4-dimethoxyphenyl)oxirane. An unsymmetrically 2,3-disubstituted oxirane monomer was obtained from veratraldehyde by Darzen reaction and polymerized into poly[2-methoxycarbonyl-3-(3,4-dimethoxyphenyl)oxirane] using BF3•OEt2 as cationic initiator.
- One of the aim of present study was obtaining of the analogues of PDPGA by enzymatic polymerization. Starting oxiranes for enzymatic ROP polymerization were synthesized using Darzen and Shi reactions. Oligomeric analogues of polymer poly[2-methoxycarbonyl-3-(3,4-dihydroxyphenyl)oxirane] was synthesized by "green" chemistry ROP enzymatic polymerization of methyl 3-(3,4-dibenzyloxyphenyl)glycidate using lipase from Candida rugosa. Obtained mixture of oligomers is enzymatically obtained analogues of natural polyether and causes interest for diverse biological tests.
- It should be mentioned, that enzymatic polymerization is a "green" chemistry alternative to classic chemical synthesis as it utilizes processes that minimize the use and generation of hazardous substances. That is why it is the method of preference for the synthesis of biologically active natural polyether analogues. PDPGA is unique natural polyether, as it contains aliphatic ether groups in its polymer backbone. Many biocatalytic polymerizations have been exploited for the synthesis of polymers in vitro. Furthermore, the biocatalytic synthesis of ethers in vitro and in vivo is well-known. Naturally occurring ethers include small molecules such as antibiotics, or aromatic polymer such as lignin. In the latter case, peroxidases initiate the radical coupling of monolignols to lignin, yielding ether links between two aromatic rings or between an aromatic ring and an aliphatic moiety. However, reports on the synthesis of polymers that contain aliphatic ethers as repeating unit are sparse. The biosynthesis of the rather rare class of natural polyethers that PDPGA belongs to has not been reported.

Biography

Dr. VakhtangBarbakadze has his expertise in isolation and structure elucidation of biologically active plant polysaccharides and polyethers. In 1978 and 1999 he has completed his Ph.D and D.Sci., respectively. He is the Head of Department of Plant Biopolymers at the Tbilisi State Medical University Institute of Pharmaco-chemistry. In 1996 and 2002 he has been a visiting scientist at Utrecht University (The Netherlands) by University Scholarship and The Netherlands organization for scientific research (NWO) Scholarship Scientific Program, respectively. He has published more than 100 papers in reputed journals. In 2004 he was Georgian State Prize Winner in Science and Technology.

Research interests: Structure elucidation of sugar based biopolymers [poly(sugar acids)], synthesis of their analogues using chemical and enzymatic catalists and investigation their biological activities.

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Biofuel Production from Phytoremediation Derived Sunflower Biomass

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There are presently more than 3 million contaminated sites all over EU, according to the EEA (report 25186 EN). Heavy metal contamination is of particular concern, as metals are not degradable. Phytoremediation is gaining attention from the public and is an attractive low cost alternative for soil requalification, by establishing a vegetation cover which will stabilize the site, avoiding dispersion of contamination and simultaneously removing pollutants. Although the fate of harvested biomass is a common obstacle for its implementation, it may represent an opportunity for producing energy. This work presents a novel integrated strategy comprising the utilization of all plant parts for the generation of biodiesel. Combinations of sunflower and plant growth promoting microbiota were assessed growing in agricultural and metal contaminated soils. Harvested plant tissues were analysed and it was possible to observe that accumulation of Zn and Cd was made mainly in the roots, followed by the stems and the flowers, with the values registered for plants grown in contaminated soils being higher than the reported phytotoxic levels described in literature. Also, plants grown in the agricultural soil presented higher biomass rates. Sunflower seeds were then used for oil extraction and it was possible to observe efficiencies of up to 20 ml oil/m2, with only the oil from plants grown in industrial soil presenting levels of 1.8 mg Zn/l. Plant stems were used for bioethanol fermentation with yields of up to 280 and 162 ml/m2 for plants growing respectively in agricultural and industrial soils. Once again only plants grown in the industrial soil presented detectable levels of 1.1 mg Zn/l (and no Cd). Biodiesel was then produced via transterification of the extracted oil with the produced ethanol, allowing the complete production of a biofuel from this phytoremediation derived biomass. Reference parameters and heavy metal levels were determined and compared for both the biodiesel derived from plants grown in industrial and agricultural soils.

Audience Take Away:

This presentation will help the audience to understand that the use of biomass grown in degraded and abandoned soils, not involving agricultural soils for energy crop cultivation, may increase the sustainability of utilizing biomass for energy generation, while it may allow for increasing the available agricultural soil through the consequent gradual decontamination of such brownfields.

Biography

Ana Marques has completed her PhD in Biotechnology and her potdoctoral studies fromthe Portuguese Catholic University. She has been involved in research activities since 2000, when she was a researcher at Technical University of Denmark working on the production of bioparticles for biofilm applications. Since 2002 she has been developing work at CBQF concerning the remediation of disturbed soils using plant-based technologies, with the application of biological tools. She has published 2 book chapters and 22 papers in international peer reviewed journals, participated in numerous conferences and has been serving as a reviewer in several reputed scientific journals.

Research interests concern the remediation of disturbed soils using plant-based technologies, with the application of biological tools (mycorrhizal fungi, plant growth promoting bacteria, endophytes, organic amendments, etc) and wastewater biological treatments. The fate and application of produced biomass in phytoremediation strategies is the most recent focus of research.

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