WSCSE 2026

ABSTRACT BOOK

2nd World Summit on

Crop Science and Engineering

March 26-28, 2026 | Rome, Italy

wscse@scientificsummits.org https://cropsciencesummit.com/

FOREWORD:

Dear Esteemed Guests, Researchers, Innovators, and Industry Leaders,

On behalf of the organizing committee, we welcome you to the 2nd World Summit on Crop Science and Engineering (WSCSE – 2026). This summit unites a dynamic community of scientists, engineers, agronomists, technologists, and sustainability advocates who are shaping the future of agriculture. As we confront growing challenges in food security, climate resilience, and sustainable land management, the collaboration and innovation nurtured here are more vital than ever. As an electrical engineer and a novice in farming, I gained substantial knowledge about smart agriculture during the last summit; in fact, I formed a new and significant partnership for my startup company focused on smart farming.

Throughout the 2026 summit, we expect engaging discussions, innovative research presentations, and collaborative workshops that explore new frontiers in crop genetics, soil health, precision agriculture, bioengineering, and regenerative farming systems.

Whether you are here to share your research, build new partnerships, or learn about the latest advancements, we invite you to engage fully, ask questions, challenge ideas, and contribute to shaping solutions that benefit both people and the planet.

Once again, welcome, and thank you for being an essential part of this important gathering.

Organizing Committee Members	
Tet Yeap	University of Ottawa, Canada
Elena Baldi	University of Bologna, Italy
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Barbara Sawicka	University of Life Sciences in Lublin, Poland
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Ana Marques	Catholic University of Portugal, Portugal
Rahim Zahedi	University of Tehran, Iran
Norvienyeku J	Hainan University, China

PLENARY SPEAKERS

Tet Yeap and Iluju Kiringa

School of Electrical Engineering and Computer Science, University of Ottawa, Ottawa, Canada

Transforming African Savannas to Arable Land

Abstract:

The African savannas are among the world's most iconic ecosystems, known for their expansive grasslands punctuated by scattered trees and a remarkable diversity of flora and fauna. These vast landscapes, primarily found in tropical and subtropical regions of the continent, support not only wildlife but also the livelihoods of hundreds of millions of people who depend on them for grazing, fuelwood, and subsistence farming. As global food security becomes an increasing concern and arable land becomes scarcer, attention has shifted toward the potential of savannas for sustainable agricultural growth. However, transforming uncultivated or semi-cultivated savanna land into productive farmland creates significant environmental and practical challenges that require innovative solutions. Traditional land conversion methods—such as burning, mowing, full tillage, and the use of chemical herbicides—have proven problematic. While effective at quickly clearing land for farming, these techniques often lead to long-term soil degradation, a decline in biodiversity, and increased greenhouse gas emissions. Fire and intensive tillage destroy soil organic matter, compact the soil, and disrupt native ecosystems, making it harder for sustainable agriculture to succeed over time. Additionally, reliance on herbicides can be costly, harmful to non-target species, and unsustainable for smallholder farmers with limited access to inputs. Considering these challenges, there is growing global interest in ecologically sound methods for land preparation that prioritize minimal soil disturbance and reduced chemical usage. One promising approach is roller/crimper technology, originally developed for terminating cover crops in conservation agriculture. This method, widely adopted in South America, particularly in Brazil, involves using a heavy roller with evenly spaced, blunt bars that crimp and crush plant stems without cutting them. The process effectively kills the plants by disrupting their vascular systems, leaving a mulch layer that protects the soil, conserves moisture, and suppresses weed growth. Engineers, computer scientists, and agronomists at Area X.O. (www.areaxo.com), the US Department of Agriculture, and AgriSmart Technologies Inc. are revolutionizing sustainable agriculture with a high-efficiency fertilization method (Seed-placed Banding) farming practice and roller/crimper technology designed to terminate cover crops in conservation agriculture. Our goal is to make advanced farming methods accessible, affordable, and scalable. After three years of rigorous field validation, our technology has demonstrated reductions of up to 90% in nitrous oxide emissions, 33% less fertilizer use, and a 30% increase in crop yields.

To complement our planter and adapt to the grassy savanna terrain, in collaboration with the National Soil Dynamics Laboratory, Auburn, Alabama, of the US Department of Agriculture, we are also developing a novel roller/crimper as the second product to support weed suppression, reduced tillage, and enhance regenerative practices in African savannas. We are launching pilot operations in Ottawa (Canada), Auburn (Alabama), and 10,000 – 100,000 hectares of savannas near Kinshasa, Democratic Republic of the Congo (DRC), where the unique plateau-to-savanna sandy terrain presents an ideal environment for our planter and roller/crimper technologies.

Keywords:

African Savannas; Arable Land; Sustainable Agriculture; Seed-placed Banding; Roller/ Crimper

Biography:

Tet Yeap is a professor at the School of Electrical Engineering and Computer Science at the University of Ottawa and the School of Automation at the Beijing University of Posts and Telecommunications. He received a B.A.Sc in electrical engineering from Queen's University in 1982, followed by a master's and a doctorate in the same field from the University of Toronto in 1984 and 1991, respectively. He is also the inaugural director of the Bell Advanced Research Laboratory in Ottawa (BARLO). He directed the BARLO Laboratory from 1996 to 2010, focusing on telecommunications research and development. He has published three book chapters, 35 journal and transaction papers, and 71 conference papers. He is also the holder of 75 patents. He was also the holder of the Bell Canada IP award in 2004 and the Joseph Whitward Award, Institute of Mechanical Engineers, in 2005.

Dai-Yeun Jeong

Director of Asia Climate Change Education Center, South Korea; Emeritus Prof. at Jeju National University South Korea

How to Overcome the Limitations Inherent in Sustainable Development

Abstract:

Sustainable development is the ideology and practical strategy of the present and future socio-economic development in harmony with nature. A wide range of policies and practical activities have been launched at a global, national and regional level in order to achieve sustainable development since its concept and implication emerged in 1987 by WCED. In 2015, United Nations adopted a set of sustainable development goals to be achieved over the next 15 years as a follow-up action plan of millennium development goals. However, it is true that sustainable development is not being achieved as successfully as planned. Its evidences that we are still faced with challenges such as climate change and natural disasters. This would mean that sustainable development includes limitations in its concept and implication. Nonetheless, it is quite rare to conduct research on the limitations inherent in sustainable development. In such a context, this presentation aims at exploring the limitations inherent in sustainable development and how to overcome them.

This presentation will first examine the emergence process of sustainable development, and followed by its concept and implication, the critical debates on its concept and implication in the late 1990s and early 2000s, and the concept and implications of sustainable development goal launched in 2015. Based on the findings from the above review, this presentation will explore the limitations inherent in the concept and implications of sustainable development and examine what and how to overcome the limitations.

The conclusion of this presentation will focus on what the existing concept and implications of sustainable development should be supplemented. The significance of this presentation lies in proposing a new direction of the coexistence between humans and nature for achieving sustainable development.

Keywords:

Concept of Sustainable Development; Implications of Sustainable Development; Horizontal Framework of Sustainable Development; Limitations of Sutainable Development; Sutainable Development Goal

Biography:

Prof. and Dr. Dai-Yeun Jeong is presently the Director of Asia Climate Change Education Center and an emeritus professor at Jeju National University in South Korea where he served as an environmental professor from 1981 until his retirement in 2012. He received BA and MA degree in sociology from Korea University (South Korea), and PhD in environmental sociology from the University of Queensland (Australia).

Throughout his distinguished career, he has held key leadership and advisory roles, including President of the Asia-Pacific Sociological Association, Teaching Professor at the University of Sheffield in the United Kingdom, and the Acting Director of the Jeju Secretariat for the UNESCO World Network of Island and Coastal Biosphere Reserves.

He has also contributed to national policy as a member of the Presidential Commission on Sustainable Development of the Republic of Korea, and as Research Associate of the Environmental Policy Commission for Sustainable Development at the National Assembly of the Republic of Korea. He has represented the South Korean government delegate as a delegate to the United Nations Framework Convention on Climate Change (UNFCCC) and to the OECD Environmental Meetings.

An esteemed academic and researcher, he is the author of 13 books including Environmental Sociology, and has published 60 academic papers in both domestic and international journals. He has conducted over 100 environmental research projects supported by domestic and international organizations.

Srinivasa Rao Mentreddy

Alabama A&M University, USA

Cold Plasma: A Novel Technology for Improving Crop Productivity and Seed Safety

Abstract:

Cold atmospheric plasma (CAP), a weakly ionized noble gas consisting of free electrons and positively charged ions, reportedly breaks seed dormancy, enhances plant growth and yield, and mitigates seed-borne pathogens. This study evaluated CAP at 7 kV, 1 µs pulse width, and 5 kHz frequency, for the purposes of: i) to enhance turmeric rhizome sprouting and seed germination, growth, and nutrient quality of microgreens, and ii) to mitigate seed-borne pathogens on pepper and spinach seeds. Experiment 1a: five turmeric varieties, each exposed to Helium (He) CAP for 90 seconds were assessed for days to sprouting, rate of sprouting, and plant height. Experiment 1b: fifteen microgreen species' seeds were exposed to either Argon (Ar) or Helium (He) CAP for 0 (Control), 30, 60, or 90 seconds and then assessed for moisture imbibition rates in the laboratory. Similarly treated mustard greens' seeds were assessed for seedling growth and nutrient profiles in a greenhouse experiment. Experiment 2: pepper seeds coated with bacteria Xanthomonas campestris pv. vesicatoria and spinach seeds, with and without infection from Stemphyllium botryosum, were treated with He CAP for 0 (Control) or 15 seconds. Similarly treated fungal conidia of S. botryosum strain 406 were cultured on V8 juice agar. Both treated and untreated seeds were incubated at 25 ± 2°C for germination. Experiment 1a Results: The plasma-treated rhizomes sprouted ten to fifteen days early, achieved 100% sprouting two weeks earlier, grew faster, and were 27% taller than the Control. Experiment 1b, ra dish, buckwheat, and scallion seeds treated with He CAP for 90 seconds exhibited significantly improved moisture imbibition, while spinach and Pac Choi showed similar response in the 30-second treatment with Ar. Cilantro, scallion, and mustard greens responded positively to both Ar and He CAP. Broccoli, cabbage, and fenugreek showed no response. In the greenhouse trial, the Ar 30-second treatment increased plant height by 98% compared to the Control, while the He 60-second treatment increased the growth rate by 94.3%. Biomass improved by 78.2%, 63.2%, and 51.6% for Ar and He 60-seconds, and Ar 30-second treatments, respectively. The He 90, Ar 60, and He 60-second treatments enhanced total phenolic content by 32.6%, 27.6%, and 24.8% over the Control. Antioxidant power increased by 24.3%, 23.6%, and 23.2% with Ar 90, Ar 30, and He 90-second treatments, respectively, compared to the Control.

More pronounced effects of CAP were observed on the pathogens. The S. botryosum conidia exposed to plasma germinated but did not exhibit significant mycelial growth compared to the untreated conidia, which grew normally. The CAP treatment suppressed fungal mycelial growth and prevented conidia production. Additionally, He CAP destroyed X. campestris pv. vesicatoria by distorting the cells and damaging cell walls. In contrast, the untreated bacteria remained rod-shaped and intact. The research concludes that cold plasma is a novel green technology for improving crop productivity and nutritional value; and effectively sanitizes seeds by destroying seed-borne pathogens.

Biography:

Dr. Srinivasa Rao Mentreddy, an Indian-born American citizen, is a Professor of crop science at Alabama A&M University, Alabama, USA. Dr. Mentreddy earned a BS in Agricultural Science, an MS in Agronomy from the Andhra Pradesh Agricultural University, India, and a Ph.D. in Agronomy from the University of Tasmania, Australia. As an agronomist by training and specializing in crop physiology, his research focuses on developing cover crop-based sustainable crop management practices for field, vegetable, and medicinal herbs in the open field and agroforestry systems; evaluating low-temperature plasma for ensuring food safety and improving crop productivity; and climate-smart agricultural practices using cover crops and alley cropping. He has several years of research experience in variety evaluation using crop growth, radiation use efficiency, and competitive abilities for a wide range of field crops. Dr. Mentreddy introduced pigeon pea, mungbean, turmeric, Virginia mountain mint, and medicinal basil, which have known antidiabetic properties for cultivation in Alabama. Dr. Mentreddy has more than 15 years of research experience evaluating turmeric, mountain mint, canola, food-grade soybean – tofu, vegetable, natto type, transgenic corn, sweet potato, cassava, and Irish potato. He teaches several crop science courses at the undergraduate and graduate levels and advises Ph.d. and MS students in their thesis/dissertation research across disciplines. His international honors include serving as a specialist in assessing the status of agriculture in Agona Duankwa district in Ghana, lecture tour of six universities in China by invitation from the Chinese Ministry of Agriculture, serving as a technical expert on a USAID-funded project in Uganda for three weeks educating and training farmers and extension service professionals in sustainable agriculture; and climate-smart cultivation practices for turmeric in Nepal. Dr. Mentreddy is widely published with 148 peer reviewed journal articles and more than 200 conference abstracts and serves as an editor or reviewer in many international journals.

T.S. Kornecki

Adjunct Prof, Biosystems Engineering Dept. Auburn University, Research Scientist (Retired) USDA-ARS, National Soil Dynamics Lab., Auburn, AL 36832. USA

Equipment Development for Sustainable Farming Operations

Abstract:

To stop soil degradation while maintaining current crop production, producers need to adopt no-till farming practices using cover crops to prevent soil erosion and increase soil organic carbon, soil moisture, and infiltration. Cover crops must be managed appropriately by flattening them at an appropriate growth stage to create a uniform layer of mulch on the soil surface. Thus, effective termination of cover crops is a key for successful planting of cash crops directly into dried residue cover, typically 21 days after its termination to eliminate competition with main crop for resources.

Several rollers/crimpers (largest is 9.1 m wide, and smallest is 0.9 m wide) have been developed and patented at the National Soil Dynamics Lab., in Auburn, AL, USA to provide farmers with choices for various farm sizes. Multi-stage roller/crimpers (two-stage and four-stage) were developed to operate with different tractor sizes. In addition, a roller/crimper for elevated beds was also conceived to terminate cover crops both on row-tops and in furrows. Many inquiries from farming communities in the USA and abroad have been received to provide engineering drawings for specific roller designs.

Synthetic herbicides are prohibited in organic systems. Thus, mechanical termination of cover crops by rollers/crimpers must be as efficient as with chemical application. This requires repeatable rolling crimping operations over the same cover crop area with the ability to adjust crimping force by changing spring tension for a specific cover crop and different biomass amount produced.

In no-till vegetable production systems, field operations are often conducted on small beds. Due to this constraint, an innovative powered roller/crimper and two-stage roller/crimper for small walk-behind tractors were developed that allows growers to successfully manage cover crops. This concept can be utilized not only in the USA, but also in other countries including Asia and Africa where most farms are small and use low power equipment such as walk-behind tractors.

Data from several field experiments conducted over many growing seasons in USA at different locations indicated that these new roller/crimper concepts were very effective in terminating cover crops across different farm sizes. For example, termination rates for cereal rye exceeded 90% three weeks after rolling without the use of herbicides and in dry growing seasons conserved soil water due to the mulch effect of cover crop residue.

To provide small farms with proper no-till planting equipment for cash crops, a no-till transplanter was developed and patented for an Italian made BCS 853 walk-behind tractor at the USDA-ARS, NSDL in Auburn, Alabama. In addition, this concept was also adapted for a 4-wheel utility or specialty tractors (Oggun tractor for vegetable production) using a 3-point hitch system. Transplanter effectiveness was evaluated on different soil types (sandy loam and clay soil) in replicated field experiments during 2017 and 2018 (Auburn, AL, USA) by transplanting tomatoes directly into desiccated cereal rye residue cover. The no-till transplanter operated as expected without any mechanical breakdowns and exceeded 90% uniformity for transplanted tomato seedlings. This specialized equipment has been displayed at various workshops and field demonstrations in the USA, Cambodia and Philippines with a goal to be adopted and utilized on small farms worldwide.

Keywords:

Cover crop; roller/crimpe;, conservation agriculture; no-till transplanter

Biography:

Dr. Ted S. Kornecki, P.E. is an Agricultural Engineer with over 45 years of experience, including 31 years with the USDA-Agricultural Research Service (ARS) and 14 years in academia. He currently serves as Adjunct Faculty in the Department of Biosystems Engineering at Auburn University and as a Senior Research Scientist (retired) at the USDA-ARS National Soil Dynamics Laboratory, Auburn, Alabama. A licensed Professional Agricultural Engineer in Louisiana since 2001, Dr. Kornecki holds an M.S. in Agricultural Engineering from the Agricultural University of Wroclaw, Poland, and a Ph.D. in Biosystems Engineering from Oklahoma State University, USA. His research focuses on developing innovative equipment for conservation agriculture, including rollers/crimpers for cover crop management. He has authored 134 peer-reviewed publications, 5 book chapters, and holds 8 U.S. patents with 2 additional patent applications.

KEYNOTE SPEAKERS

Ahmed Diab Mohamed Ahmed El Esawy
Drinking Water and Sanitation Company, Sidi Salem 33743, Kafr El Sheikh, Egypt

Antibacterial Activity of Bioactive Compounds Extracted from the Egyptian Untapped Green Algae Rhizoclonium Hieroglyphicum

Abstract:

Finding alternative powerful antibacterial drugs of natural origins is, today, a crucial prerequisite due to the resistance of some bacterial strains to commercial and widely-used medications. Algae are characterized by their bioactive constituents and have a wide spectrum of biotechnological aspects, particularly antibacterial implications. During this study, four concentrations (5, 10, 20, and 40 mg mL–1) of the Egyptian untapped green algae Rhizoclonium hieroglyphicum (Chlorophyta) were prepared using the polar solvents ethanol, methanol, and acetone. The antibacterial activity of the above-mentioned extracts was assessed, using the agar disc diffusion technique against three pathogenic bacteria, Staphylococcus aureus ATCC 6538, Escherichia coli ATCC 8739, and Pseudomonas aeruginosa ATCC 9027, which was compared to standard antibiotics. The minimal inhibitory concentrations (MICs) were also assessed and determined using a broth dilution assay. Our findings revealed that the R. hieroglyphicum ethanolic extract exhibited the most potent antibacterial effect and its MICs values were 0.533, 2.25, and 5.34 mg mL–1 against P. aeruginosa, E. coli, and S. aureus, respectively. A gas chromatography–mass spectrometry (GC–MS) approach to the crude R. hieroglyphicum ethanolic extract uncovered 30 different bioactive constituents, mainly including long-chain polyunsaturated and saturated fatty acids such as myristic (C14:0), palmitic (C16:0), stearic (C18:0), α-linolenic (C18:3; ω–3), and oleic (C18:1, ω–9) acids, which synergistically make this potent antibacterial action. The mechanism of action of these fatty acids was also discussed. Conclusively, R. hieroglyphicum could be a good candidate for the production and development of promising antibacterial agents.

Biography:

MSc Degree in Microbiology, Botany and Microbiology Department, Faculty of Science, Menoufia University, Egypt, Very good (2023), Master of Business Administration (MBA) From Brooklyn institute, USA (2024), Premaster degree in microbiology, Faculty of Science, Menoufia University, Egypt, Very good (2016), BSc Degree in Chemistry and Microbiology, Faculty of Science, Menoufia University, Egypt, Very good (2012), Diploma in Analytical Biochemistry, Chemistry Department Faculty of Science, Menoufia University, Egypt,

Very good (2013), International research publisher in scientific journals in Asia and Europe, Attended and participated as oral presentation in many scientific conferences, reviewer of many scientific articles in many international scientific journals. * Quality and Environmental laboratory manager for Chemistry and Microbiology units of Al-Haddadi plant for drinking water purification from 2021 until now, Microbiological environmental file manager for (TSM) in accordance with German standards for water and wastewater plants from 2019 until now, Visiting researcher for the Microbiology Laboratory in the Algae Unit at the Soil, Water and Environmental Research Center, (2019 – 2023), Microbiologist responsible for the environmental situation at the main central laboratory (2018 – 2021), Director of Tiba laboratory for Chemical and Microbiological Medical analysis from 2013 until now.

Elena Baldi

Department of Agricultural and Food Sciences, University of Bologna, Viale Fanin 46, Bologna, Italy

The Use of Organic Matter in Orchards: Effect on Soil and Plant Performance

Abstract:

The rise of world population and urbanization is leading to increasing demand for food with a consequent increase of the production of urban organic waste. In the meanwhile, soils suffer from fertility degradation mainly due to a loss of soil organic carbon (SOC). The transformation of organic waste obtaining end-products like compost could allow, on one hand, to recycle properly urban biowaste (Cerda et al., 2018) and, on the other hand, to obtain a valuable nutrient-rich product that could be used for sustainable field fertilization management (Hargreaves et al., 2008; Aylara et al., 2020). During composting, organic wastes are biologically stabilized under controlled aerobic conditions to form a stable, humus-like final product (Tondello et al., 2020) whose nutrient composition, organic carbon (C) content and microbial activity could vary in relation to its sources (Hargreaves et al., 2008; López-González et al., 2015).

The supply of organic matter enhances SOC that is, in agricultural systems, one of the main drivers of soil quality and functionality. Consequently, an adequate level of SOC must be preserved in order to achieve multiple agroecosystem services, including mitigation of carbon dioxide emissions to the atmosphere, reduction of soil erosion, and increase of soil nutrient reservoir (Paustian et al., 1997; Robertson and Swinton, 2005). The use of organic amendments (e.g. compost) is one of the agricultural practices able to increase soil C in the short- and medium-term. Consequently, organic fertilization should be included in orchard management strategies to improve physical, biological, and chemical soil properties (Hargreaves et al., 2008) as well as C sequestration (Lal, 2004).

In detail, on a long-term experiment on peach, it was evidenced a positive effect on C and N accumulation (Baldi et al., 2018; Toselli et al., 2019) and stabilization (Gioacchini et al., 2024) also in the deeper layers indicating an increase of long-term soil fertility and C storage. In addition, plants showed the same yield a mineral fertilizer and an increase of root growth (Baldi et al., 2010). Similarly, also on grape and walnut it was observed an increase of soil fertility and plant performances. However, attention should be paid to the release of nitrate that, in some experiment was excessive with possible pollution of ground water. After 7 years of continuous compost supply in a vineyard it was observed a different composition of microbial biomass and a variation of soil enzyme activity.

In addition, the microbiome of berries and their effect on vine was evaluated.

Keywords:
fruit trees; soil organic matter; soil microbiome; nutrient availability

Biography:
Prof. Dr. Elena Baldi is an agronomist with a degree in agriculture from the University of Bologna (110/110 with laude) and a doctoral degree in fruit trees and woody plant sciences from the University of Bologna (Italy). From 2006 until 2021 had a postdoctoral position at Department of Fruit Tree and Woody Plant Science of the University of Bologna. From September 2021 to August 2024 senior assistant professor and from September 2024 associate professor (Academic discipline: Arboriculture and Fruticulture) at Department of Agricultural and Food Sciences of the University of Bologna, Italy. Since 2009 she was responsible for several courses teaching subjects such as Basic Horticulture, Fruit Science and General Arboriculture, Plant morphophysiology and Sustainable Fruit Tree Management. Her research focuses on the following main research topics: fruit tree root morphology and physiology; mineral nutrition of fruit tree in relation to environmental aspects and fruit quality; effect of organic matter on chemical and biological soil properties and plant performances; plant physiology in response to mineral and organic fertilization; precision irrigation of fruit trees. She is involved in several Italian and International projects and has several cooperation with University all over the world.

Irene Maja Nanni

University of Bologna, Department of Agricultural and Food Sciences, Bologna, Italy

Expanding the Toolbox for Crop Protection: Dogs in Early Plant Pathogen Detection

Abstract:

Early detection is essential for effective crop protection and plant health management. Alongside established approaches such as visual inspection and molecular diagnostics, innovative tools are being explored to improve early pathogen detection. This keynote will present the potential role of trained detection dogs in identifying plant diseases through odour cues associated with infection, and discuss how canine detection could complement existing surveillance strategies.

Biography:

I am a Biologist with a PhD in Microbial Ecology/Plant Pathology, as well as advanced degrees in Microbiology and Virology. My research has centred on molecular detection of fungicide resistance in plant pathogens, and I have been awarded grants and undertaken international collaborations, including research at EMBL Hamburg. Over eight years, I have applied advanced techniques such as ddPCR within agricultural systems. Beyond molecular research, I am also a certified dog trainer specialising in rehabilitation activities and scent detection, particularly for the early identification of plant diseases, bridging canine science with plant pathology. At present, I collaborate with institutions such as ISPRA, NEIKER, and academic partners in Australia to advance sustainable agriculture by integrating molecular and canine approaches.

Tharwat Mamdouh Al-Bataineh
Food Regulatory, Specialist Food Safety and Halal Regulations

Innovative Environmental Resource Technologies for a Healthy Halal Lifestyle: Advancing Sustainability, Safety, and Circular Agriculture

Abstract:

A global sustainability system that leverages advanced environmental resource technologies can significantly enhance food safety, reduce waste, and optimize agricultural productivity. By integrating cutting-edge innovations such as precision agriculture and (Ecodrum) technology systems, organic waste can be transformed into high-quality compost and other valuable byproducts, contributing to safer and more sustainable food production.

Integrating Halal standards into this sustainability framework ensures that all resources, processes, and products comply with Islamic guidelines. Halal requirements within sustainability emphasize ethical sourcing, responsible production, and conscientious consumption. A Halal-aligned sustainability system prioritizes environmental protection and the ethical treatment of animals, water resources, and plant life, ensuring that production processes remain eco-friendly and avoid unnecessary harm to living beings.

Ecodrum technology plays a pivotal role in waste management by offering controlled, efficient, and scalable solutions for breaking down complex organic matters. This process yields compost that is safe for human use, improves soil health, and enhances crop yields, supporting resilient agricultural systems. Additionally, compost can be repurposed for animal bedding, aligning with best practices in animal welfare and farm hygiene.

Emerging biotechnologies further enable the conversion of agricultural and animal waste into biofuels, fertilizers, and even animal feed, reducing reliance on raw materials and mitigating environmental degradation. These innovations support circular resource use, minimize overexploitation of land and water, and preserve biodiversity.

This presentation examines the full Ecodrum technology process; from raw material input to final product; highlighting its advantages in food safety, environmental impact reduction, and agricultural innovation. It also addresses key challenges such as risk management, regulatory compliance, and operational scalability.

In summary, the integration of environmental resource technologies into food systems offers a transformative pathway toward safer, more efficient, and sustainable agricultural practices. These innovations not only advance waste management but also reinforce global efforts to secure food safety and environmental resilience.

Keywords:
Animal Waste Index; sustainability; Ecodrum; waste management

Biography:
Dr. Tharwat Al-Bataineh is a highly respected veterinary specialist with over 27 years of governmental experience in animal health, food safety, biosecurity, and halal practices. She holds advanced degrees in veterinary medicine, microbiology, and halal food auditing, and has served in senior leadership roles at the Ministry of Agriculture in Jordan and the Ministry of Climate Change and Environment in the United Arab Emirates for more than two decades.

Renowned for her strategic acumen in risk management, trade facilitation, and policy development, Dr. Al-Bataineh has played a pivotal role in shaping national and international food systems. Her contributions span high-level committees and cross-border initiatives, where she has helped design inspection protocols, disease surveillance frameworks, and food security strategies aligned with global health and regulatory standards.

A champion of innovation and sustainability, Dr. Al-Bataineh advocates for ethical, science-based approaches to food governance. She actively supports the responsible trade of halal-certified products and the adoption of cutting-edge laboratory technologies, including traceability systems, feed safety screening tools, and digital platforms for halal verification

Her thought leadership continues to influence the future of food science and halal compliance, as she curates insights on emerging laboratory technologies and novel food developments. With a rare blend of regulatory expertise and visionary thinking, Dr. Al-Bataineh remains a trusted voice in advancing resilient, inclusive, and technologically empowered food systems worldwide.

A strong advocate for reducing food waste and transforming animal and crop by products into valuable resources, Dr. Al Bataineh champions circular economy solutions that strengthen environmental sustainability and agricultural resilience. Her thought leadership continues to shape the future of food systems and halal assurance worldwide.

Thompson Ogunsanmi
International Institute of Tropical Agriculture (IITA), Ghana

Promoting Gender-Inclusive Practices: Insights on AKILIMO Use and Uptake in Nigeria, Ghana, and Tanzania

Abstract:

A global sustainability system that leverages advanced environmental resource technologies cThe integration of digital innovations into agricultural extension services presents unique opportunities to address both the extension–farmer ratio and persistent gender disparities in access to information and inputs. AKILIMO, a suite of site-specific agronomic decision-support tools (DSTs), has been deployed across Nigeria, Ghana, and Tanzania to enhance farmers' productivity. This study focuses on the gender dimensions of AKILIMO use and uptake, highlighting both achievements and barriers from field-level dissemination and survey data. To date, AKILIMO has strengthened grassroots extension through the training of 8,561 extension agents (17% women) and directly reached over 1.8 million farmers, with women representing 38%. Among 513,886 unique farmers who engaged with AKILIMO, 76% (390,553) adopted at least one recommendation, most notably Fertilizer Recommendations (FR) and Best Planting Practices & Weed Management (BPP-WM). This uptake has contributed to a 22% increase in cassava root yield (against baseline) and the application of improved practices across 441,500 hectares, underscoring AKILIMO's transformative potential. However, gender gaps remain significant. Women face challenges such as limited digital access, lower literacy levels, cultural barriers, and under representation among extension staff. These constraints reduce their access to inputs and decision-making power, shaping differentiated adoption outcomes between men and women. To foster inclusive scaling, AKILIMO emphasizes partnerships that embed gender-responsive strategies, including the use of local languages and digital delivery mechanisms (IVR, USSD, AI chatbots). Such approaches strengthen equity in extension systems and contribute to a more gender-transformative model for digital agriculture.

Biography:

Thompson Ogunsanmi is a development practitioner and Scaling Specialist with over 20 years of experience advancing agricultural innovations, value chain development, and multi-stakeholder partnerships across Africa. He currently serves with the International Institute of Tropical Agriculture (IITA), where he leads the scaling of AKILIMO and related initiatives in Nigeria, Ghana, and Tanzania. Thompson's expertise lies in partnership management, innovation diffusion, and inclusive agribusiness development.

Over his career, he has successfully established and managed partnerships with more than 300 organizations, including private companies, NGOs, government agencies, and farmer associations. His leadership has facilitated the uptake of AKILIMO by over 500,000 farmers directly and 1.8 million cumulatively. By embedding advisory tools into business models, he has helped organizations link agronomic advice with input supply, financial services, and market access, ensuring real value for smallholder farmers. Before joining IITA, Thompson was Country Team Lead for the 2SCALE project at the International Fertilizer Development Centre (IFDC), where he managed agribusiness clusters with multinationals, strengthened over 200 SMEs, and improved market opportunities for thousands of farmers. His earlier roles with GIZ, Cadbury, and Olam broadened his expertise in value chain development, public–private partnerships, and sustainable farming systems. Thompson holds a PhD in Agricultural Management and two MBAs in Entrepreneurship and Food Security. A fellow of the Institute of Agribusiness Management Nigeria, he is also active in several international working groups. Passionate about inclusive, gender-responsive, and sustainable approaches, he continues to co-create solutions that empower smallholder farmers and strengthen agricultural systems across Africa.

INVITED SPEAKERS

Aghapy Yermans Yakoup
Zewail City for Science, Technology, and Innovation, Egypt

The Synergistic Effect of Using Bacteriophages and Chitosan Nanoparticles Against Pathogenic Bacteria as a Novel Therapeutic Approach

Abstract:

Public health and environmental security are seriously at risk due to the growing contamination of pathogenic microorganisms. Therefore, effective antimicrobials are urgently needed. In our study, the antimicrobial effects of three types of nanoparticles were investigated with phage. The biosynthesis of nanoparticles was confirmed based on the color change and shapes, which tended to be mono-dispersed with a spherical shape with a size range of 20–35 nm for Ag-CS-NPs; 15 30 nm for Phage-CS-NPs (Ph-CS-NPs); and 5–35 nm for Propolis-CS-NPs (Pro-CS-NPs). Nanoparticles displayed peaks between 380-420 nm, 335–380 nm, and below 335 nm for Ag-CS NPs, Pro-CS-NPs, and Ph-CS NPs, respectively. Throughout the three synthesized nanoparticles, Ag-Cs-NPs represented a higher antibacterial effect in combination with phages. It showed MIC against S. sciuri, S. Typhimurium, and P. aeruginosa between 31.2 and 62.2 µg/mL and MBC at 500, 62.5, and 31.2 µg/mL, respectively, while in combination with phages showed MIC at 62.2, 31.2, and 15.6 µg/mL, respectively and MBC at 125, 62.2, and 15.6 µg/mL, respectively. Furthermore, a significant killing efficiency was observed with 16.5–30.1 µg/mL of Ag-CS NPs combined with phages. In conclusion, Ag-CS-NPs with phages present potential bactericidal and inhibitory effects against Gram-positive and Gram-negative bacteria, as well as against the production of biofilms.

Biography:

Aghapy Yermans Yakoup is a graduate, batch 2023, with a biomedical sciences major (BMS) (medical sciences concentration) from Zewail City for Science, Technology, and Innovation. In addition, I have worked as a junior researcher assistant (jRA) in the Center for Microbiology and Phage Therapy (CMP) in Zewail City for Science, Technology, and Innovation from Fall 2021 until Summer 2023. I am working currently as an R&D specialist in Pharmaplast company. I am interested in finding new solutions to get rid of multi-drug-resistant bacteria and inventing new compounds that can be alternatives to antibiotics. Also, I am interested in the medical microbiology field. In the future, I am planning to enroll in a Ph.D. program that aims to find new applicable solutions for infectious diseases in different body systems like the nervous system and cardiovascular system.

Armando Villa-Ignacio1, Maria Chavez2, and Jennifer BousseloT1
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Evaluating Leafy Green Production in a Colorado Rooftop Agrivoltaic System

Abstract:

Combining green roofs with solar modules can protect plants and produce energy in cities. Growing crops in this system is called rooftop agrivoltaics (RAV) and can complement current urban agriculture efforts. We evaluated a group of five high cash value leafy green crops (arugula, kale, lettuce, spinach, and Swiss chard) under different solar modules over two years at two locations. Data measurements were taken for fresh and dry weight (FW, DW) stomatal conductance (SC), plant size at harvest (PSH), and microclimate data. Treatments included a polycrystalline opaque silicon module, a cadmium telluride (CdTe) frameless opaque module, a 40% semi-transparent CdTe module, and a full sun control. Four of the five leafy greens produced higher FW and DW under the 40% semi-transparent modules compared to other treatments and the full sun control, except spinach. Most species also produced larger PSH under the PV module treatments compared to the full sun control. Leafy greens under the module treatments resulted in lower SC, however, lettuce and Swiss chard grown under the semi-transparent module treatment produced higher SC compared to all other treatments. This research shows that incorporating photovoltaics on rooftop gardens influences the yield and stomatal conductance of select leafy green crops. While FW and DW mostly decreased under the deep shade treatments (opaque module, frameless module, and bifacial module) SC decreased, possibly due to less solar radiation on the leafy greens, reducing water use. Understanding the growth characteristics and growing environment of high value crops like leafy greens will increase understanding of what food crops are suitable for RAV systems.

Keywords:

green roof, rooftop agrivoltaics, leafy greens, photovoltaic modules, urban agriculture

Biography:

Armando Villa-Ignacio is a Ph.D. candidate in the Department of Horticulture and Landscape Architecture at Colorado State University. His dissertation research investigates the ecological and horticultural dynamics of rooftop agrivoltaic systems, with a focus on fruit crop production in urban settings. By studying how specialty crops respond to the interplay of solar infrastructure, microclimate, and resource constraints, his work aims to advance sustainable urban agriculture while contributing to renewable energy integration. Beyond his academic research, Armando is committed to science communication and public engagement, helping connect the future of food systems to innovative approaches in plant and environmental sciences.

Bijendra Singh
Central University of Gujarat, India

Solar-Driven Photochromatic Immunity System in Plants for Sustainable Disease Resistance and Pathogen Elimination

Abstract:

Crop productivity and ecological sustainability are increasingly threatened by plant pathogens including bacteria, viruses, fungi, and protozoans. Recent advances in plant photobiology indicate that sunlight-regulated photoreceptors—especially phytochromes and chloroplast-mediated signaling—play a crucial role in regulating plant growth, immunity, and pathogen defense. Plants absorb solar radiation through pigments such as chlorophyll and carotenoids, converting light energy into biochemical energy via photosynthesis while simultaneously regulating gene expression related to immune pathways.

This research proposes a Photochromatic Solar-Immunity Model (PSIM) in which plant color pigments and phytochrome-based photoreceptors convert solar energy into biochemical signals that enhance plant immune responses and suppress pathogens. Phytochromes absorb red and far-red light and regulate transcription factors and hormonal pathways involved in plant defense against pathogens.

The study integrates solar-energy absorption, chloroplast-based immunity, and photoreceptor signaling to develop a sustainable crop protection framework. The model proposes that optimized spectral light conditions and engineered pigment pathways can improve resistance to pathogens and increase crop productivity while reducing chemical pesticide dependence.

Biography:

Dr. Bijendra Singh is an accomplished researcher whose work primarily focuses on photogalvanic cells (PGCs) and their applications in solar energy conversion. His research aims to advance the development of clean, renewable, and environmentally sustainable energy systems. He has also contributed significantly to the field of photoelectrochemical cells (PECs), working toward improving the efficiency of solar energy conversion and energy storage technologies.

In addition to his work in renewable energy, Dr. Singh's research interests extend to the application of nanomaterials in biomedical science, water treatment technologies, pharmaceutical applications, and the recovery of valuable minerals from waste materials with a focus on environmental sustainability.

Dr. Singh earned his Ph.D. from the Central University of Gujarat, India, and completed his M.Phil. at the School of Chemical Sciences, Central University of Gujarat, India. He has authored more than 30 research papers in reputed international journals and has delivered over 24 oral presentations at national and international conferences.

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GC-MS study of soursop (Annona muricata L.) seed extracts: biofungicidal potential on Cercospora malayensis pathotypes affecting okra (Abelmoschus esculentus [L.] Moench)

Abstract:

Cercospora malayensis is a destructive pathogen of okra, causing significant yield losses in fields. In Cameroon, the diversity of C. malayensis populations is poorly studied, resulting in resistance to synthetic fungicides, which are costly for humans and the environment. The objective of this study was to determine the phytochemicals in Annona muricata seed extracts as an alternative to chemical control of C. malayensis pathotypes. The phenotypic characteristics of C. malayensis conidia were studied. Four types of extracts from A. muricata seeds were prepared: ethyl acetate, acetone, methanol, and water. Each of these extracts was tested in vitro at four different concentrations (7.5; 15; 30; 60 µl/ml) against C. malayensis conidia from two localities. A control without extract and a synthetic fungicide treatment (Metalaxyl and Mancozeb at 3.33 g/l) were used, all in triplicate. GC-MS was performed to identify the phytochemicals present. For the tests, morphological and morphometric characteristics of the spores of the different isolates (length, width, length/width ratio) were determined to distinguish the forms of C. malayensis. The evaluation criteria included spore germination, percentage inhibition, minimum inhibitory concentrations (MIC, MIC 50 and MIC 90) as well as fungicidal concentrations to evaluate the antifungal efficacy of the extracts. GC-MS analysis revealed the presence of several bioactive compounds in each extract: 30 compounds

in the acetone extract, 33 in the aqueous extract, 18 in the ethyl acetate extract, and 18 in the methanol extract. Among them, eight molecules with antifungal activity were identified, including hexadecanoic acid methyl ester, hexadecanoic acid ethyl ester, hexadecane, n-hexadecanoic acid, octadecanoic acid ethyl ester, phytole, and 12-octadecadienoic acid (Z,Z) methyl ester. Six morphological forms of C. malayensis were observed: amidaliform, allantoic, fusiform, navicular, obovoid, and cylindrical. The extracts were effective in inhibiting spore germination. At concentrations of 30 and 60 µl/ml, spore germination was significantly reduced, with rates ranging from 0 to 12%, compared to the control where it reached 88.5 to 100%. The low MIC values (4.2 and 3.41 µl/ml) confirm the antifungal potential of A. muricata seed extracts. They can therefore be integrated into the biological control program against okra leaf spot.

Keywords:
Cercospora malayensis; pathotypes; Annona muricata seed extracts; germination inhibition

Pooja Parvathy Preetha,
Assistant Professor of Civil and Environmental Engineering, Alabama A&M University, USA

Remote Sensing–Driven Modeling of Crop and Cover Management for Enhanced Soil Erosion

Abstract:

Soil erosion poses a persistent threat to environmental sustainability by degrading water quality and accelerating the loss of nutrients and sediments. A critical parameter in quantifying erosion risk is the crop and cover management factor (C-factor), which reflects the influence of agricultural practices on soil loss. This study presents a dynamic, remotely sensed data–driven framework to model the variability of the C-factor at the watershed scale. By integrating satellite-derived indicators such as soil moisture content (AWC), enhanced vegetation index (EVI), leaf area index (LAI), and fraction of photosynthetically active radiation (FPAR) within the Soil and Water Assessment Tool (SWAT), the approach captures temporal changes in land cover and management practices. The results demonstrate improved accuracy in predicting erosion risk and highlight the potential of remote sensing to support sustainable crop management and precision conservation strategies.

Biography:

Dr. Pooja Parvathy Preetha is a distinguished environmental and water resources engineer with an experience of more than 10 years. She currently serving as an Assistant Professor of Environmental and Water Resources Engineering at Alabama A&M University, USA, since 2020. With a deep commitment to advancing environmental sustainability, Dr. Preetha's academic and professional journey has been marked by significant achievements and contributions to the field of water resources engineering. Dr. Preetha holds a Ph.D. in Civil & Environmental Engineering, specializing in water quality modeling, from the University of Alabama in Huntsville (UAH). She also earned a Master's in Hydraulics and Water Resources Engineering from the prestigious Indian Institute of Technology, Madras (IIT), and another Master's in Civil and Environmental Engineering from UAH, further strengthening her expertise in the field.

Dr. Preetha's research interests are broad and interdisciplinary, spanning GIS, remote sensing, water quality modeling, environmental health, hydrological systems, integrated groundwater management, and data analytics. Throughout her career, Dr. Preetha has made significant scholarly contributions, authoring 22 peer-reviewed journal articles, 30 conference proceedings, and delivering 15 presentations at national and international forums. She has also played an active role in the academic community by serving as a reviewer, editor, and session chair for numerous journals and conferences.

Dr. Preetha has participated in and led multiple research projects, many of which have secured funding from esteemed organizations such as the National Science Foundation (NSF), Massachusetts Institute of Technology Lincoln Laboratory (MIT LL), and United States Department of Agriculture (USDA). Her research is dedicated to tackling some of the most pressing challenges in water resource management, environmental health, and sustainability. She strives to translate her findings into practical solutions that can improve water quality, enhance environmental protection, and promote sustainable practices globally.

As a passionate educator and researcher, Dr. Preetha's work continues to make a meaningful impact on both the academic community and society at large. Her dedication to advancing knowledge in environmental and water resources engineering underscores her commitment to fostering a more sustainable and resilient future.

Qian Wang and Ying Yang
Hunan University of Technology and Business, China

Fatigue Properties of Bamboo Scrimber

Abstract:

To investigate the effect of multi-source uncertainties on the fatigue performance of bamboo scrimber, multi-stress level bending fatigue tests were carried out on bamboo scrimber to determine the stress-fatigue life curves and analyze the distribution characteristics of fatigue life. The laws of stiffness degradation and energy dissipation of bamboo scrimber under the influence of uncertainties were quantified, and a fatigue failure probability model considering uncertainties was established and validated based on the Weibull distribution. The results show that material, geometric and load uncertainties have a significant impact on the fatigue performance of bamboo scrimber, and the established model can effectively characterize the discreteness of its fatigue performance. This study provides experimental and theoretical support for the anti-fatigue design and durability improvement of bamboo scrimber structures.

Biography:

Dr. Qian Wang is an Assistant Professor of Hunan University of Technology and Business, specializing in sustainable materials, with a focus on timber and bamboo. She earned her Ph.D. from Sapienza University of Rome, where her research centered on optimizing mechanical and structural properties of eco-friendly materials. Currently, Dr. Wang investigates bio-based alternatives to carbon-intensive construction materials, employing advanced computational modeling and experimental techniques to evaluate their durability and performance. She is a committee member of the Biomass Branch at the Architectural Society of China and a member of the Hunan Artificial Intelligence Society. Joining the Intelligent Engineering Management Lab, she mentors students in sustainable civil engineering. Her contributions include over 10 peer-reviewed articles and six software copyrights. Dr. Wang currently directs a project funded by the Hunan Provincial Education Departmen's Science Foundation, aiming to improve the long-term mechanical resilience of timber and bamboo. Her work underlines the role of natural resources in building zero-carbon infrastructure.

Serhiy Roslyak

Freelance Researcher, Associate Professor, Ukrainian State University of Food Technologies, Kyiv, Ukraine

Prevention and Treatment of Viral Diseases Using Bee Products in the Context of the Antibiotic Therapy Crisis

Abstract:

The problem of treating viral diseases, including coronavirus, caused by the use of pharmaceuticals remains unresolved. As a practical consequence, the use of bee products (propolis, royal jelly, wax cappings, and wax moth) that inhibit viral activity is expanding. We have developed and tested the following:

1. A treatment regimen for patients in the early stages of the disease.
2. Treatment plan for patients with moderate illness.
3. Viral disease prevention plan.

Results: 1. Timely treatment with propolis oil and propolis tincture stopped the progression of the disease and shortened the treatment period. 2. The use of wax moth tincture stabilized the condition of patients with moderate illness and subsequently ensured almost complete recovery. Rapid recovery was seen in the first group, within 4-5 days; in the second, within 6-7 days. There were no serious adverse effects. 3. No cases of illness were observed among volunteers who took the recommended products in 2020-2026 according to the proposed preventive regimen in the autumn-spring period for 1.5 months and again after 4.5 months.

This approach should become a paradigm shift in therapeutic tactics during a viral pandemic. Strengths of the study: high efficacy, reasonable cost of the drugs, their availability, the possibility of parallel use of pharmaceuticals medications, no complications. Limitations: allergic reactions to bee products occur in approximately 5-7% of the population, and clinical studies are insufficient. Most importantly, most patients rely on a "magic pill" and do not realize the need to take full responsibility for their health and the health of their loved ones.

The viral disease prevention scheme developed and tested over eight years is the only effective strategy for combating the pandemic.

Abdala Kamal Adam
Yangzhou University, China

Genetically Modified Crops

Abstract:

Drought and osmotic stress have an impact on rice, a staple meal for half of the world's population. A stress-tolerant genotype is necessary to maintain quality and quantity. The study aimed to identify rice varieties capable of maintaining high survival rates and productivity in the face of drought and osmotic stress by activating transcription factors and overexpressing stress genes. Both non-transgenic (Nipponbare) and transgenic (CATA-RNAi-Line7) were utilized. The findings demonstrated that under abiotic stress, transgenic L7 CAT interference exhibited noticeably greater survival rates than Nipponbare. Lack of water reduced height and leaf angle, shortened planting times, decreased relative water content, hindered seed germination, and worsened rice growth quality in non-transgenic rice. Stress-activated transcription factors may aid rice survival during droughts, potentially enhancing yields and quality. The study found that, hydrogen peroxide signaling assists in drought stress response, reactive oxygen species (ROS) did not significantly degrade the antioxidant system. Although L7 transgenic rice produced somewhat more H2O2, it also had more genes that respond to stress and antioxidant enzymes. Rice may benefit from drought stress if OsCAT activity is reduced and abiotic tolerance genes are overexpressed. Non-transgenics exhibited greater levels of CAT activity and RAB16 than transgenics expressing 6His-tag, CATA, and CATC together. Overexpressing genes in transgenic rice may boost ROS activity while decreasing CAT activity in photosynthetic cells, giving better protection against drought-induced stress. The study suggests that cloning stress-activated transcription factors is a viable strategy for increasing rice crop yields by boosting their ability to tolerate drought and osmotic stressors.

Keywords:

Abiotic stress tolerance; Catalase genes; Drought stress; Hydrogen peroxide signaling; Transgenic rice

Abiala Abiala Alatise1, Olawumi Akinyode Timothy2 and Abass Adewale Ibrahim3
Yangzhou University, China
1Department of Agricultural Economics and Extension, Tai Solarin University of Education, Ijagun, Ogun State, Nigeria,
2Department of Tourism and Hospitality Management, Tai Solarin University of Education, Ijagun, Ogun State, Nigeria
3Department of Agricultural Economics and Extension, Tai Solarin University of Education, Ijagun, Ogun State, Nigeria

Genetically Modified Crops

Abstract:

This study investigates the impact of awareness, adoption and usage of postharvest technologies in achieving food security among farming households in southwestern Nigeria. The study specifically examined the extent to which awareness facilitate the adoption and usage of postharvest technologies in achieving food security among arable farming households in the study area. The study employed a descriptive survey design. A multi-stage sampling technique was used to select 660 farming households. At the first stage, 3 states namely Ogun, Oyo and Ekiti States were purposively selected among the 6 States that constituted the southwestern Nigeria due to their predominance in arable farming. At the second and third stages, the arable farming households were divided into 2 clusters and 330 arable farming households who were aware, adopted and used postharvest technologies and 330 who did not adopt the usage of postharvest technologies in the study area were randomly selected through their zonal Agricultural Development Projects in each of the 3 States. Data were collected using a well-structured questionnaire tagged “Impact of Awareness, Adoption and Usage of Postharvest Technologies Questionnaire (IAAUPTQ)” (r = 0.86). Data were analyzed using descriptive statistics, Households’ Food Security Survey Module (HFSSM) and inferential statistics such as T-test, Probit and Tobit regression models. The results suggested that most of the farming households were male (74.6%), married (91.2%), possessed formal education (57.7%), access to agricultural extension services (59.5%), technology awareness (63.1%), postharvest technologies’ adoption and usage (49.2%), access to credit facilities (57.9%), cooperative membership (60.5%), moderate household size (55.1%) and 71.1% earned income below N450,999 and 28.9% earned income above N1,450,999 annually. HFSSM revealed that 28.5% of the farming households had high food security status, 22.5% had low food security and 49.0% had very low food security status due to non-adoption and usage of postharvest technologies. T-test showed a significant difference between the income of farming households who adopted andused postharvest technologies and farming households

who did not ($t = 12.56$, $p<0.05$). Probit regression revealed that formal education ($\beta = 1.121$, $p < 0.01$), access to information ($\beta = 0.652$, $p < 0.01$), farm size ($\beta = 1.943$, $p < 0.01$) and access to credit facilities ($\beta = 0.735$, $p < 0.01$) significantly increased farming households' likelihood of adopting postharvest technologies. Conversely, lack of awareness ($\beta = -0.632$, $p < 0.01$) and high cost of postharvest technologies ($\beta = -0.926$, $p < 0.01$) remained barriers to adoption and usage. Tobit regression further indicated that trainings received on usage of postharvest technologies ($\beta = 1.547$, $p < 0.01$), technology awareness ($\beta = 1.326$, $p < 0.01$), harvest ($\beta = 1.022$, $p < 0.01$) and income ($\beta = 1.391$, $p < 0.01$) positively impacted the extent of adoption and usage of postharvest technologies and improved their food security status in the study area. However, 10 major constraints were identified and ranked as threats to adoption and usage of postharvest technologies in achieving food security in the study area. These were high costs of postharvest technologies (1st), limited access to information (2nd), illiteracy (3rd), financial inability (4th) and inadequate extension services (5th) respectively. It is concluded that farming households with higher education, high level of awareness, adoption and usage of postharvest technologies earned higher income and were more food secured than those who were not. The study, therefore, recommended that increased awareness on adoption, training and usage of postharvest technologies coupled with affordable technologies, accessible credit facilities and supportive government policies should be in place for farming households in southwestern Nigeria.

Keywords:
Postharvest; technologies; food security; farming households

Biography:
Dr. ABIALA, Abiala Alatise studied Agricultural Science Education at the University of Ibadan, Nigeria and graduated as a B.Ed holder in 2004 and M.Sc in 2009 in Agricultural Extension and Rural Development. He then joined Professor Banjo S. O. and Professor Olawumi, A. T. for academic research works at College of Agriculture and Hospitality Management, Tai Solarin University of Education, Ijagun, Ogun State, Nigeria, West Africa. He received his PhD degree in 2024 at the same institution. He has obtained a lecturing position in the same University in 2025. He has attended and presented papers at local and international meetings and conferences and has published more than 10 research articles in scientific journals.

Serhiy Roslyak

Freelance Researcher, Associate Professor, Ukrainian State University of Food Technologies, Kyiv, Ukraine

Prevention and Treatment of Viral Diseases Using Bee Products in the Context of the Antibiotic Therapy Crisis

Abstract:

The problem of treating viral diseases, including coronavirus, caused by the use of pharmaceuticals remains unresolved. As a practical consequence, the use of bee products (propolis, royal jelly, wax cappings, and wax moth) that inhibit viral activity is expanding. We have developed and tested the following:

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This approach should become a paradigm shift in therapeutic tactics during a viral pandemic. Strengths of the study: high efficacy, reasonable cost of the drugs, their availability, the possibility of parallel use of pharmaceuticals medications, no complications. Limitations: allergic reactions to bee products occur in approximately 5-7% of the population, and clinical studies are insufficient. Most importantly, most patients rely on a "magic pill" and do not realize the need to take full responsibility for their health and the health of their loved ones.

The viral disease prevention scheme developed and tested over eight years is the only effective strategy for combating the pandemic.

Yves Cedrix NGODJI

Team Leader, Milling Department – Africa Food Manufacture, Cameroon

Impact of Storage Silo Pests on Wheat Quality and Milling Performance: A Case Study in an Industrial Mill in Cameroon

Abstract:

In tropical regions, wheat storage in silos faces significant challenges related to rodent and insect infestations. This case study was conducted in a 350-ton/day industrial flour mill located in Douala, Cameroon. It aimed to evaluate the impact of pests on the quality of stored wheat and the consequences for flour production. Observations were made on three silos containing wheat lots of the same origin but exposed to different hygiene conditions. The parameters analyzed included visible infestation rate, percentage of damaged grains, moisture content, and flour yield after milling. The results showed that wheat stored in poorly protected silos suffered a mass loss rate of 4 to 6%, a high percentage of broken or soiled grains, and a decrease in milling yield of about 2.5%. The technological quality of the flour was also affected, with lower protein levels and a grayer appearance. The study highlights the strategic importance of reinforcing hygiene practices around storage silos, including regular rodent control, preventive cleaning, and access control. A rigorous approach would help not only preserve wheat quality but also improve milling performance.

Zoubida Belmahi
National Institute of Agricultural Research, Morocco

Morphological and Genetic Diversity Assessment of cultivated Thymus satureioides (endemic specie) of Morocco

Abstract:

Promoting green chemistry with nature's diversity, the integration of medicinal and aromatic plants with green chemistry is a significant and promising area, particularly in utilizing renewable resources. These natural plants offer a sustainable alternative to synthetic substances in pharmaceuticals and cosmetics, aligning with green chemistry's goals of reducing environmental impact and fostering sustainable practices. The Mentha genus stands out as a particularly relevant example, renowned for its richness in polyphenols and terpenic compounds. The polyphenols found in Mentha are known for their antioxidant properties, while the terpenes contribute to the plants' distinctive aromas and therapeutic virtues. The chemical diversity within the Mentha species is not only intriguing from a botanical perspective but also has practical implications. Each species within this genus possesses a unique chemical profile, leading to a wide range of applications, especially in the field of essential oils and extracts. These essential oils and extracts are highly prized in various industries, from pharmaceuticals to cosmetics and even in culinary arts, for their therapeutic properties and flavor profiles. This versatility highlights the significant role of the Mentha genus in both traditional and modern applications, which is in line with the principles of sustainable resource utilization as championed by green chemistry. The present research focuses on evaluating the chemical diversity of essential oils and quantifying total polyphenols, flavonoids, and tannins of extracts, from different species within the genus Mentha, in order to investigate their antioxidant activities. By harnessing the potential of naturally regenerating and reproducing plants, we minimise our dependence on non- renewable resources and promote a more harmonious approach to the environment. Furthermore, the use of these plants is part of an environmentally friendly production and extraction framework that fortifies the connection between medicinal botany and the principles of green chemistry. In summary, aromatic medicinal plants are a valuable resource for human health and can be a crucial tool in the hunt for more sustainable, greener chemistry. Audience Take Away Notes • Attendees will gain insights into the complex polyphenolic and terpenoid compositions of various Mentha species.

The presentation will explore how these compounds are utilized in pharmaceuticals, cosmetics, and even culinary arts, providing practical insights for professionals in these fields • The talk will highlight how the use of these natural resources aligns with the principles of green chemistry, emphasizing sustainable and eco-friendly practices.

The presentation could inspire new research directions, particularly in exploring the untapped potential of the Thymus satureioides.

Attendees will have the chance to network and discuss potential collaborations for future research or product development.

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