



2024 6TH AFSA CONFERENCE ON "FOOD SAFETY AND FOOD SECURITY"

2-4

**OCTOBER 2024
9:30AM - 5PM**

**DEPARTMENT OF FOOD TECHNOLOGY
FACULTY OF SCIENCE
CHULALONGKORN UNIVERSITY
BANGKOK, THAILAND**

To launch a Food Safety and
Food Security Conference
focusing on current trends
and needs in Asia

afsa.secretariat.thailand2024@gmail.com

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Asian Food Safety and Security Association

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Conference Program

Day 1: October 02, 2024 (Wednesday)

Time	Program
09:30-10:45	Welcome remark By Takashi Uemura, Prof. Emeritus President, Asian Food Safety and Security Association Welcome remark By the Representative from the Faculty of Science, Chulalongkorn University Address by Special guest and Chief guest Award giving ceremony Vote of Thanks by the symposium organizing Secretary
10:00-17:00	Poster session program
10:45-11:00	Refreshment break
	Keynote technical session Chair: Ramesh C. Ray (Central Tuber Crops Research Institute, India)
11:00-11:30	Keynote 1: The Challenges of Technological Innovation in Modulating Gut Microbiota and Mental Health with Fermented Functional Postbiotics By Prof. Dr. Deoghwan Oh Kangwon National University, Republic of Korea Abstract code: K-04
11:30-12:00	Keynote 2: Postharvest Strategies to Address Food Safety and Security Issues in Asia By Prof. Dr. Chandran Somasundram Universiti Malaya, Malaysia Abstract code: K-03
12:00-12:30	Keynote 3: Utilizing Pharmacokinetic Models to Assess Food Safety Risks from Drug Residues and Environmental Contaminants By Prof. Dr. Harvey Ho The University of Auckland, New Zealand Abstract code: K-02
12:30-13:00	Keynote 4: Technological Convergence-Modern Food Safety Processing for Maximum Retention of Phytonutrients in Novel Functional Food Products By Prof. Dr. Gargi Dey Kalinga Institute of Industrial Technology, India Abstract code: K-06

Time	Program
13:00-14:00	Lunch break
14:00-17:00	Oral session Technical session 1 (Food Safety) Banyen Conference Room Level 15 Maha Vajirunhis Building Technical session 2 (Food Security) Room 405/2 Level 4 Maha Vajirunhis building End of Technical Session (Day 1)
19:00-21:00	Conference Dinner – Chao Praya River Cruise

Day 2: October 03, 2024 (Thursday)

Time	Program
09:30-12:40	Oral Session Technical session 3 (Food Nutrition and Functional Food) Banyen Conference Room Level 15 Maha Vajirunhis Building
12:40-14:00	Poster evaluation and lunch break
14:00-16:20	Technical session 4 (Food Processing and Preservation) Banyen Conference Room Level 15 Maha Vajirunhis Building
16:30-17:00	Closing ceremony and award giving
18:00	AFSA dinner

Day 3: October 04, 2024 (Friday)

Time	Program
09:00-16:00	Technical tour at Kasetsart University, Kamphaeng Saen Campus Rice Science Center, Center of seeding and AgriFood Pilot Plant End of AFSA Conference

Oral Session Program

Technical Session 1: Food Safety

Banyen Conference Room Level 15 Maha Vajirunhis Building

October 02, 2024 (Wednesday)

Chair: Dr. Yasuhiro Inatsu (Institute of Food Research, (NARO), Tsukuba, Japan)

Time	Program	Abstract Code
14:00-14:20	Prof. Dr. Md. Anwar Hossain (Invited speaker) Jessore University of Science and Technology, Bangladesh Topic: Systematic Analysis of Foot-and-Mouth Disease in Bangladesh: Epidemiology, Vaccine Failure and Containment	K-01
14:20-14:40	Prof. Antonio L. Acedo Jr. (Invited speaker) University of the Philippines Los Banos, Philippines Topic: Food Safety and Food Security Policy Landscape in Underdeveloped ASEAN Countries	K-05
14:40-15:00	Yun-xi Tang Chongqing Institute for Food and Drug Control, China Topic: Contamination Characteristics and Health Risk Assessment of Poly-and Perfluoroalkyl Substances in Animal Food from Chongqing	O-14
15:00-15:20	Mrityunjoy Biswas Jashore University of Science and Technology, Bangladesh Topic: Existence of Microplastics Particles in Most Popular Bangladeshi Bottled Mineral Water and Fruit Drinks Brands and an Assessment of Human Exposure	O-06
15:20-15:40	Tea break	
15:40-16:00	Luthfunnesa Bari Mawlana Bhashani Science and Technology University, Bangladesh Topic: Food Safety Concern in Bangladesh: Food Additives in Processed Foods, Consumption Pattern and Health Risk Assessment of Children	O-08
16:00-16:20	Nobuyuki Kijima Institute of Food Research, National Agriculture and Food Research Organization (NARO), Tsukuba, Japan, Topic: Prevalence of AMR in Organic Produces	O-18
16:20-16:40	Prof. M.A. Rahim (Invited speaker) Daffodil International University, Bangladesh Topic: Food Safety and Security in Bangladesh: More Production, Minimizing Post-Harvest Loss and Food Waste	K-07
16:40-17:00	Sao Mai Dam Industrial University of Ho Chi Minh City, Vietnam Topic: Consumer Preferences, Acceptance, Nutritional Assessment, and Willingness to Purchase: A Comprehensive Analysis of Cheesecakes	O-16

Technical Session 2: Food Security

Room 405/2 Level 4 Maha Vajirunhis building
October 02, 2024 (Wednesday)

Chair: Prof. Takashi Uemura (Osaka Prefecture University, Japan)

Time	Program	Abstract Code
14:00-14:20	Ramesh C Ray Siksha 'O' Anusandhan (SOA) Deemed to be University, India Topic: Mahua (<i>Madhuca latifolia</i> L.) – A Multipurpose Tree Serving Livelihood Security for Tribal Peoples of India	O-04
14:20-14:40	Rosario A. Salas Visayas State University, Philippines Topic: Growth, Yield and Pod Quality of Different Pole Sitao (<i>Vigna unguiculata sesquipedalis</i>) Genotypes	O-11
14:40-15:00	Muhammad Manjurul Karim University of Dhaka, Bangladesh Topic: Potentiality of Using Salt-Tolerant Plant-Growth-Promoting Rhizobacteria as Biofertilizer for Climate-Smart Agriculture in the Coastal Areas	O-01
15:00-15:20	Felix M. Salas Visayas State University, Philippines Topic: Liquid Nutrient Formulations for Three Cruciferous Vegetables Grown in Aggregate Hydroponics	O-10
15:20-15:40	Tea break	
15:40-16:00	Rigil Catherine D. Rodriguez Visayas State University, Philippines Topic: Enhancing Eggplant (<i>Solanum melongena</i> L.) Productivity and Quality Through Alternative Nutrient Sources	O-12
16:00-16:20	Anafe R. Vigo Visayas State University, Philippines Topic: Productivity enhancement and fruit quality of grafted Cucumber (<i>Cucumis sativus</i> L.) As influenced by various Biostimulant substances	O-15
16:20-16:40	Kanchan Nainwal G. B. Pant University of Agriculture and Technology, India Topic: Impact of Frontline Demonstrations on Yield of Finger millet (<i>Eleusine coracana</i>) under Rainfed Conditions in Uttarakhand, India	O-17

Technical Session 3: Food Nutrition and Functional Food

Banyan Conference Room Level 15 Maha Vajirunhis Building
October 03, 2024 (Thursday)

Chair: Prof. Gargi Dey (Kalinga Institute of Industrial Technology, India)

Time	Program	Abstract Code
09:30-09:50	Aldrin P. Bonto De La Salle University, Philippines Topic: Compositional Analysis, Phytochemical Content, Antioxidant Capacity, and Digestibility of Bungulan (<i>Musa x paradisiaca</i>) Banana-Based Flour	O-07
09:50-10:10	Shakila N Khan University of Dhaka, Bangladesh Topic: Enhancing Poultry Nutrition in Bangladesh: Molecular Engineering and Cost-Effective Production of Thermostable Phytase from <i>Bacillus subtilis</i> SP11	O-02
10:10-10:30	Subodh Kumar Sarkar Noakhali Science and Technology University, Bangladesh Topic: The Detection of Gamma-Aminobutyric Acid (GABA) in Water, Methanol and Water Extracts from Three Types of Black Garlic (<i>Allium sativum</i>) using TLC Followed by Spectral Analysis and Assessment of Antioxidant Properties	O-09
10:30-10:50	Thi Yen Nhi Tran Industrial University of Ho Chi Minh City, Vietnam Topic: Evaluation of the Physicochemical Properties at Various Production Stages of Khai Hoan Fish Sauce, Vietnam	O-19
10:50-11:20	Tea break	
11:20-11:40	Reyna Mae C. Caintic Western Philippines University, Philippines Topic: Performance of Honeydew Melon (<i>Cucumis melo</i> L.) Grown on Different Nutrient Solutions under Hydroponic System	O-13
11:40-12:00	Ferdousi Begum International University of Business Agriculture and Technology, Bangladesh Topic: Influence of Humic Acid and Seaweed Extract on Soybean Growth Stages Under Saline Conditions	O-21

Technical Session 4: Food Processing and Preservation

Banyen Conference Room Level 15 Maha Vajirunhis Building
October 03, 2024 (Thursday)

Chair: Dr. Latiful Bari (University of Dhaka, Bangladesh)

Time	Program	Abstract Code
14:00-14:20	Syed M Istiak ASAP Healthy Food Ltd., Bangladesh Topic: Utilization of Fish Byproducts in the production of Functional Ready-to-eat Seafood Mix	O-03
14:20-14:40	Eliwanzita Sospeter Universiti Putra Malaysia, Malaysia Topic: Long Term Frozen Storage Affects Volatile Compound of Vacuum and Non-Vacuum Packed Musang King Durian Fruits	O-20
14:40-15:00	Syeda Nusrat Jahan University of Rajshahi, Bangladesh Topic: Development of Oven Dried Small Prawn and Compare Its Quality with Sun Dried One	O-05
15:00-15:20	Panita Ngamchuachit Chulalongkorn University, Thailand Topic: Understanding Consumer Liking of Thai Lime Juice through Aroma Modulation: Insight from Flavor Profiles and Chef Selections	-
15:20-15:40	Tea break	

Conference Overview

This conference will discuss the key food safety, and food security issues. It brings together renowned experts, entrepreneurs and government officials from different countries to discuss current and emerging food safety and food security issues, find out common problems among the countries, future direction and collaborative research plans on food safety, food security and related topics.

The plenary sessions, and concurrent symposia, will also address the challenges facing Asia to ensure food safety in the development of new food products and processing technologies, internationalization of food trade, safety of foods derived from biotechnology, microbiological risks, emergence of new and antibiotic-resistant pathogens, particularly from emerging pathogens, directing research to areas of high risk, focus intervention and establishment of target risk levels and target diseases or pathogens.

The two-days scientific and poster presentation sessions will provide multiple opportunities for experts and participants to discuss key food safety, and Food security issues. Experts from governmental organizations, international organizations, entrepreneurs and universities from different countries will be able to share their ideas, address challenges, and discuss strategies and collaborative programs to enhance the continuing global efforts to deliver safe foods for a better health and environment of the people of the developing countries.

Organizers

- Asian Food Safety and Security Association (AFSA)
- Department of Food Technology, Faculty of Science, Chulalongkorn University

Supporting Organizers:

- Asia Pacific Institute of Food Professionals (APIFP)
- International Committee on Food Microbiology and Hygiene (ICFMH)

Conference Committees

Organizing Committees

Prof. Takashi Uemura, Osaka Prefecture University, Japan
Dr. Ramesh C. Ray, Central Tuber Crops Research Institute, India
Dr. Borarin Buntong, Royal University of Agriculture, Phnom Penh, Cambodia
Dr. Antonio Acedo Jr., University of the Philippines Los Baños, Philippines
Dr. Latiful Bari, University of Dhaka, Bangladesh,
Assoc. Prof. Dr. Kitipong Assatarakul, Chulalongkorn University, Bangkok, Thailand
Assoc. Prof. Dr. Chaleeda Borompichaichartkul, Chulalongkorn University, Bangkok, Thailand
Assoc. Prof. Dam Sao Mai, Industrial University of Ho Chi Minh City, Vietnam

Local Organizing Committees (from Thailand only)

Prof. Dr. Ubonrat Siripatrawan, Chulalongkorn University, Bangkok, Thailand
Assoc. Prof. Dr. Cheunjit Prakitchaiwattana, Chulalongkorn University, Bangkok, Thailand
Assoc. Prof. Dr. Jirarat Anuntagool, Chulalongkorn University, Bangkok, Thailand
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Asst. Prof. Dr. Sarn Settachaimongkon, Chulalongkorn University, Bangkok, Thailand
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Dr. Chayapa Yiengveerachon, Chulalongkorn University, Bangkok, Thailand
Dr. Tanathep Leungtongkum, Chulalongkorn University, Bangkok, Thailand

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Dr. Latiful Bari, Univ. of Dhaka, Bangladesh
Dr. Ramesh C. Ray, Center for Food Biology & Environment Studies, India
Prof. Takashi Uemura, Osaka Prefecture University, Japan
Prof. Ryohei Kada, Research Institute for Humanity and Nature, Japan
Prof. Le Van Tan, Industrial University of Ho Chi Minh City, Vietnam
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Assoc. Prof. Baranyai László, Hungarian University of Agriculture and Life Sciences, Hungary
Assoc. Prof. Dam Sao Mai, Industrial University of Ho Chi Minh City, Vietnam
Assoc. Prof. Francesca De Filippis, University of Naples Federico II, Italy

Assoc. Prof. Malik Altaf Hussain, Western Sydney University, Australia
Assoc. Prof. Nguyen Van Cuong, Industrial University of Ho Chi Minh City, Vietnam
Assoc. Prof. Tran Nguyen Minh An, Industrial University of Ho Chi Minh City, Vietnam
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Dr. Md. Zaved H Khan, Jashore University of Science and Technology, Bangladesh
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Dr. Tofazzal Islam, Bangabandhu Sheikh Mujibur Rahman Agricultural University, Bangladesh
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Dr. Antonio Acedo Jr., University of the Philippines Los Baños, Philippines
Dr. Aljay Valida, Visayas State University, Philippines
Dr. Borarin Buntong, Royal University of Agriculture, Phnom Penh, Cambodia
Prof. Rongwei Han, Quindao Agriculture University, China
Syed Md. Ehsanur Rahman, Bangladesh Agricultural University, Bangladesh
Dr. Harvey Ho, the University of Auckland, New Zealand

Systematic Analysis of Foot-and-Mouth Disease in Bangladesh: Epidemiology, Vaccine Failure and Containment

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Abstract

Foot-and-mouth disease (FMD) is one of the most deadly illnesses of livestock animals, and its endemicity has become a major hindrance to the growth of the livestock industry in Bangladesh. It has an impact on Bangladesh's long-term growth, as its economy is heavily reliant on veterinary farming, because FMD influences the agro-economy, food security, and labor market structure. The disease's etiologic agent, FMD virus (FMDV), is classified into seven separate serotypes. The FAO and OIE developed a global 5-step FMD elimination progressive control route (PCP-FMD), but Bangladesh is falling short of its aim. As part of this effort, our team has been examining the molecular epidemiology of FMDV since 2012, and has reported three circulating FMDV serotypes, O, A, and Asia1, as well as the emergence of novel subtypes and lineages. Our findings revealed that structural heterogeneities between vaccine strains and locally prevalent FMDV strains are the leading cause of immunization failure in Bangladesh. Even when the titre is high, critical changes at the antigenic regions of the VP1 protein can assist avoid antibody produced against serotype A and Asia1. Thus, we created effective inactivated mono-/di-/tri-valent FMD vaccines including indigenous seed viruses and chimeric peptides that provide effective protection against circulating FMDVs in cattle and Guinea pigs. Overall, our systematic study suggests that immediately implementing proper immunization, a transboundary animal movement control approach, and maintaining proper cleanliness practices throughout the country could effectively combat the disease in Bangladesh.

Keywords: Foot-and-mouth disease, epidemiology, vaccine, containment, Bangladesh

Utilizing Pharmacokinetic Models to Assess Food Safety Risks from Drug Residues and Environmental Contaminants

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Abstract

Pharmacokinetic (PK) models are useful for assessing food safety hazards, particularly those provided by drug residues and environmental pollutants. These models explain the absorption, distribution, metabolism, and excretion (ADME) of chemical substances inside biological systems, offering a thorough understanding of their behavior and potential effects on human health. Integrating PK models with toxicological data allows researchers to anticipate the concentration-time profiles of contaminants in various food products and assess the possible dangers to consumers. This approach provides more accurate and dependable risk evaluations than traditional methods, which frequently rely on static assumptions and limited exposure data. In this presentation, I will present two case studies that demonstrate the principles and applications of PK models, specifically physiologically based pharmacokinetic (PBPK) models, in the context of food safety. PBPK models use differential equations to describe drug concentration profiles in virtual physiological compartments that mimic diverse animal organs and tissues. The first case study uses a simple PBPK model to mimic the depletion of doxycycline, a veterinary medication, in lamb tissues. The second case study presents a more complicated PBPK model, which incorporates the blood-milk barrier and the transporters that operate within it. This model simulates the residues of the herbicide lindane in cow milk. Both algorithms use real-world data to improve their forecasting capabilities. These case studies will emphasize the benefits, limitations, and obstacles of implementing these models. Finally, PK models help to establish more effective regulatory policies and tactics for protecting public health.

Keywords: Pharmacokinetic models, food safety risks, drug residues, environmental contaminants

Postharvest Strategies to Address Food Safety and Security Issues in Asia

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Abstract

Asia confronts enormous food safety and security concerns that are worsened by fast population expansion, urbanization, and climate change. Postharvest losses can amount to up to 30% of overall production, which has a substantial influence on food availability and safety. This talk investigates creative postharvest ways to address these concerns, with an emphasis on advanced biotechnology, enhanced storage techniques, and efficient supply chain management. Key approaches include employing biocontrol agents to decrease microbial contamination, leveraging nanotechnology for better packing, and integrating cold chain logistics to maintain food quality. Case studies from China, India, and Southeast Asia will demonstrate successful implementations and their implications for food safety and security. These measures not only cut postharvest losses, but also improve food quality and safety, assuring a steady supply for Asia's rising population. For long-term solutions, parties such as governments, researchers, and industry must work together.

Keywords: Food safety, food security, postharvest, Asia

The Challenges of Technological Innovation in Modulating Gut Microbiota and Mental Health with Fermented Functional Postbiotics

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Abstract

The modulation of gut microbiota through fermented functional postbiotics represents a novel frontier in improving mental health, leveraging the intricate communication pathways of the gut-brain axis. The gut microbiota significantly influences neurological function and behavior, implicating its role in neuropsychiatric conditions such as depression, anxiety, and cognitive disorders. Fermented functional postbiotics, defined as bioactive compounds generated from the fermentation of prebiotics by probiotics, have shown potential to alter gut microbiota composition, enhance gut barrier integrity, and modulate immune responses, all of which are crucial for maintaining mental health. Despite promising preliminary data, several scientific and technological challenges impede the clinical application of postbiotics. A primary challenge lies in the vast interindividual variability of the gut microbiome, which complicates the ability to predict and standardize therapeutic outcomes. Additionally, the precise molecular mechanisms by which postbiotics exert their effects on both gut microbiota and the central nervous system remain poorly elucidated. Understanding these mechanisms is critical for identifying specific bioactive molecules and their biological targets. Further, technological limitations in the large-scale production, stability, and targeted delivery of postbiotics pose significant barriers to their efficacy. The lack of robust regulatory frameworks and standardized methodologies for evaluating the safety and efficacy of postbiotics further complicates their integration into clinical practice. To address these challenges, advances in systems biology, including high-throughput sequencing, metabolomics, and multi-omics integration, are essential. These technologies can provide comprehensive insights into the host-microbiome interactions and postbiotic functionality. Moreover, machine learning algorithms can aid in personalizing postbiotic interventions, optimizing therapeutic outcomes. Overcoming these challenges through interdisciplinary research will pave the way for the development of targeted, effective, and personalized postbiotic therapies, offering a promising approach to modulate gut microbiota for mental health improvement.

Keywords: Functional food, postbiotics, modulation, gut microbiota, and mental health

K-05

Food Safety and Food Security Policy Landscape in Underdeveloped ASEAN Countries

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Abstract

Cambodia, Laos, Myanmar, Philippines and Vietnam (CLMPV) are ASEAN’s underdeveloped economies classified as lower middle-income countries based on the World Bank’s gross national income per capita. Of the total population in 2020-2022, food insecurity affected 51.1% (8.5 million) in Cambodia, 34.1% (2.5 million) in Laos, 29.3% (15.8 million) in Myanmar, 44.7% (50.9 million) in the Philippines, and 9% (8.7 million) in Vietnam. CLMPV’s global food security index in 2023 is ranked 78, 81, 72, 67 and 46 among 113 countries, respectively. Food security and food safety are closely linked, without one or both it is difficult to achieve many of the United Nations’ Sustainable Development Goals. Global crisis such as climate change and covid-19 add to the challenge. Policies are key drivers of all actions and to create strengthened actions and direction, policies on food safety need to be assessed. Food safety is an embedded priority in overarching national policies and strategies of CLMPV governments. CLMPV have strong legislative and regulatory frameworks (food safety laws, sub-decrees, proclamations). However, implementation involved several government agencies and different units within an agency. Multi-agency implementation is challenging due to variable food safety capacities, overlap or duplication of regulatory activities, poor enforcement and surveillance, and poor coordination. A single authority may be created for focused and comprehensive food safety strategy and actions to ensure the delivery of safe food to consumers. Recently, the food system transformation pathways for sustainable development were created in CLMPV focusing on the following action tracks: ensuring access to safe and nutritious food; shifting to healthy and sustainable consumption patterns; boosting nature-positive production at scale; advancing equitable livelihood and value distribution; building resilience to vulnerabilities, shocks, and stresses; and more inclusive food system governance.

Keywords: Food safety, food security, policy landscape, ASEAN Countries

Technological Convergence-Modern Food Safety Processing for Maximum Retention of Phytonutrients in Novel Functional Food Products

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Abstract

The food business is rapidly moving towards "technological convergence" in order to develop extremely effective processing methods for useful, safe, and shelf-stable goods. The two main focal points of industry one; clean-label technologies to improve energy expenditure, microbial inactivation, shelf stability, and retention of functional nutrients; and two, the systematic evaluation of food matrices for bioactive potential (functionality) and designing novel food matrices and products healthier than the existing formats. In this study, the effectiveness and application of several non-thermal processing (NTP) techniques (cold plasma (CP), ultra-sonication (US), high pressure (HPP), pulsed electric field (PEF), and pulsed light processing (PL) were assessed in terms of their capacity to preserve the functionality of phytonutrients and the potential for antioxidants in processed foods. The study also addresses the shortcomings in the NTP methods used and looks into possible enhancements that could be made in order to support sustainable next-generation processing technologies. Currently divergent information available on the total phenolics content (TPC) and antioxidant status of processed non-thermal foods. Of the reports that were examined, 48% indicated a rise in TPC, 21% indicated no discernible changes in TPC, and 11% indicated a fall in TPC. Every food matrix has unique components that influence the general chemical or physical reactions that the NTPs cause. HPP and US work better on specific food matrices, like on milk and milk products. During long-term storage, HPP seems to be able to retain some of the antioxidant values in white wine for 6-12 months. In fruits and fruit juices, the desired result may depend on factors such as HPP pressure, ultrasound frequency, and PEF electric field strength along with time. Nevertheless, NTPs are effective processing techniques because they inflict less harm on food matrices. Significant gaps need to be addressed before NTPs can be effectively utilized as next-generation technologies for the processing of functionally active food products. Evaluation of the effects of NTPs for the same dietary format must be made. Estimation of TPC, phenolic profile, and AOX analysis following NTP and during the storage term represent another significant gap that needs to be filled. Tomorrow's food safety processing should aim for maximum retention of phytonutrients in novel functional food products.

Keywords: Technological convergence, food safety, food processing, phytonutrients, functional food products

Food Safety and Security in Bangladesh: Enhancing Production, Minimizing Post-Harvest Loss, and Reducing Food Waste

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Abstract

Bangladesh faces significant challenges in ensuring food safety and security due to its high population density, limited arable land, and vulnerability to climate change. To address these challenges, the country needs to focus on increasing food production, minimizing post-harvest losses, and reducing food waste. Bangladesh must adopt modern agricultural practices, such as high-yield crop varieties, efficient water management, and the use of fertilizers and pesticides. The government and NGOs should work together to provide farmers with the necessary training and resources. Emphasizing sustainable agriculture is crucial to maintain soil fertility and water resources. This includes crop diversification, organic farming, and conservation agriculture. The integration of advanced technologies, such as precision farming, mechanization, and biotechnology, can significantly boost productivity. A significant portion of food is lost during storage and transportation due to inadequate infrastructure. Investing in better storage facilities, cold chains, and transportation networks is essential. Developing the food processing industry can help preserve food, extend its shelf life, and create additional income streams for farmers. Farmers and traders need training on proper handling, storage, and transportation techniques to minimize losses. Awareness campaigns can educate stakeholders on best practices. Educating consumers about the importance of reducing food waste at the household level is crucial. This can be achieved through public awareness campaigns and school programs. Establishing systems to redistribute surplus food to those in need can help reduce waste while addressing food insecurity. By focusing on these three key areas—enhancing production, minimizing post-harvest losses, and reducing food waste—Bangladesh can improve its food security and safety. Collaboration between government agencies, NGOs, the private sector, and the community is essential to achieve these goals and ensure a sustainable food system for the future.

Keywords: Food safety & security, enhancing production, minimizing post-harvest losses, reducing food waste

Potentiality of Using Salt-Tolerant Plant-Growth-Promoting Rhizobacteria as Biofertilizer for Climate-Smart Agriculture in The Coastal Areas

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Abstract

The continued spread of salt-affected land on a global scale severely inhibits crop growth and output, notably for rice. Coastal lands play an important role in agriculture and agro-based livelihoods, but they are also vulnerable to saltwater intrusion as a result of climate change. The use of salt-tolerant, plant-growth-promoting rhizobacteria (PGPR) as biofertilizers evolved as a microbiotechnology for improving salt tolerance in plants. We isolated 53 PGPRs from saline and non-saline locations in Bangladesh. Bacteria isolated from saline locations could grow in salt concentrations as high as 2.60 mol/L, in contrast to isolates taken from non-saline areas. *Bacillus aryabhatai* MS3, identified by comparing respective 16S rRNA sequences using the NCBI GenBank, produced more atmospheric nitrogen fixation, phosphate solubilization, and indoleacetic acid under 200 mmol/L salt stress. Salt stress caused osmotic, ionic, and oxidative stress in rice plants, resulting in a dose-dependent decrease in relative water content, chlorophyll content, stomatal conductance, chlorophyll fluorescence, IAA concentrations, and other growth metrics. Both types of stress produced reactive oxygen species, which impaired the antioxidant defense system and caused oxidative damage, as well as methylglyoxal (MG) toxicity, as evidenced by increased malondialdehyde levels, electrolyte leakage, and Glyoxalase I (Gly I) and Glyoxalase II (Gly II) activities. PGPR therapy mitigated these deleterious effects by improving osmotic and ionic balance, as seen by increased water balance and decreased Na⁺ content and Na⁺/K⁺ ratio. Furthermore, PGPR improved the antioxidative defense system and MG detoxification in salt-exposed rice plants by boosting ascorbate and glutathione levels, antioxidant enzymes, and glyoxalase enzymes (Gly I and Gly II). Furthermore, rice development was found to be encouraged by increased expression of at least four salt-responsive plant genes: BZ8, SOS1, GIG, and NHX1. Fertilizing rice with osmoprotectant-producing PGPR could thus serve as a climate change adaptation framework for developing climate-smart agriculture for coastal ecosystems.

Keywords: Rhizobacteria, biofertilizers, salt tolerant, coastal agriculture

Enhancing Poultry Nutrition in Bangladesh: Molecular Engineering and Cost-Effective Production of Thermostable Phytase from *Bacillus subtilis* SP11

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Abstract

Phytate in poultry feed has substantial antinutritional effects, reducing nutrient absorption. The use of phytase, an enzyme that degrades phytate, is a promising alternative; nevertheless, its high cost, due to importation and costly manufacturing procedures, limits its use in underdeveloped nations. This work focuses on enhancing phytase production utilizing low-cost agro-industrial byproducts derived from *Bacillus subtilis* SP11, a strain obtained from a broiler farm and validated via 16s rDNA sequencing. We used both statistical (Plackett-Burman Design and Response Surface Methodology) and classical (one-factor-at-a-time) approaches to optimize fermentation conditions. The results showed that a blend of mustard meal, tryptone, and yeast extract increased phytase production to 477 U/L at pH 6.5, 37°C, and 120 rpm, a fourfold increase over unoptimized conditions. The phytase-encoding gene (1200 bp) was then cloned into the pET-30a(+) vector and expressed in *E. coli* BL-21. The 45 kDa his-tagged phytase, triggered by 2mM lactose, was isolated using Ni²⁺-NTA resin and verified by SDS-PAGE and western blotting. The phytase was found to be thermostable, retaining more than 70% of its activity after one hour at 80°C, with an ideal temperature of 50°C and 96% activity at 41°C in the chicken body. Its ideal pH of 6.0 is consistent with conditions seen in the chicken's small intestine. Wheat bran was dephytinized in vitro, which increased its nutritional value by gradually releasing inorganic phosphate, reducing sugars, and soluble protein. This thermostable phytase, made locally in Bangladesh, offers a low-cost alternative for improving poultry nutrition and increasing regional food security.

Keywords: *Bacillus subtilis* SP11, thermostable phytase, and poultry nutrition

Utilization of Fish Byproducts in the Production of Functional Ready-to-eat Seafood Mix

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Abstract

The surging global demand for seafood is accelerating the value addition of raw fish. In Bangladesh, about 30-40% of fish and crustacean processing yields byproducts, locally termed ‘wastage,’ which currently have low commercial value. This study investigates the development of a ready-to-eat seafood mix as functional food, utilizing these byproducts, specifically trimmings from cuttlefish and squid, tentacles, and broken shrimp from PND shrimp production. The product development process was refined through three trials conducted in an EU and USFDA-approved processing plant. The method involved pre-treatment, cooking, cooling, and packaging, followed by quick freezing to produce Individually Quick Frozen (IQF) products. The final mix—consisting of 30% cuttlefish meat, 30% tentacles, and 40% broken shrimp—was vacuum-packed and evaluated at ten outlets across three supermarket chains. Consumer feedback indicated high acceptability, with 71% of respondents expressing strong approval. Sensory analysis confirmed the product's favorable reception, while microbiological testing showed a significant reduction in aerobic bacterial counts post-cooking ($p < 0.05$). The product offers convenience and nutritional benefits, offering 168 calories, 1.89 grams of total fat, 40 grams of lean protein, and 0.32 grams of omega-3 fatty acids per serving. This seafood mix not only enhances the value of fish byproducts but also supports sustainable marine resource management.

Keywords: Fish byproducts, RTE seafood mix, functional food, nutritional benefits, consumer acceptability

Mahua (*Madhuca latifolia* L.) – A Multipurpose Tree Serving Livelihood Security for Tribal Peoples of India

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Abstract

Mahua (*Madhuca latifolia* L., Family: *Sapotaceae*) also commonly known as mahula is a deciduous tree found in abundance in the tropical rain forests of the Asian and Australian Continent. It is an economically multipurpose tree. This tree species has been domesticated by tribal people in India for use as food (flowers), feed (leaves and flowers), wood (timber), oil (seeds), and beverages (flowers). The corolla commonly known as mahua flowers is a rich source of sugar, containing appreciable amounts of vitamins and minerals. The flowers are used to prepare various foods mixing them with cereals like rice, wheat, and ragi. The flowers are fermented with yeast to produce a distilled liquor, locally called ‘mahuli’ in India. The flowers and seeds of this tree have been very useful in the Indian Sub-Continental economy and can be employed to produce bio-ethanol (from flowers) and bio-diesel (from seeds). The oil content of mature seeds of *M. latifolia* varies from 480 g/kg to 570 g/kg, with an average of 510 g/kg. Justifiably, mahua is called a multipurpose tree as it renders livelihood security to tribal communities.

Keywords: Mahua (*Madhuca latifolia* L.), livelihood security, tribal people, India

Development of Oven Dried Small Prawn and Compare Its Quality with Sun Dried One

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Abstract

The present study was aimed to develop the oven dried small prawn and compare its nutritional and organoleptic quality with sundried small prawn during July 2023 to April, 2024. It is an effort to introduce and popularize the oven dried product to the consumer and also in the market. Small prawn is the most available, tasty and delicious food item at fresh and dried condition in Bangladesh was selected for the study. The species was collected and brought into the laboratory of Department of Fisheries, University of Rajshahi, then processed and dried under sunlight and in the oven at 55°C. Time duration was 36±0.58 hour (sun drying) and 30±0.15 (oven drying) hour. Organoleptic quality and nutritional quality test were done. The color, odour, appearance, texture and overall acceptability were 6.6±0.81, 7.2±1.15, 6.67±1.12, 6.6±1.18, 7.13±0.83 (sun dried) and 7.8±0.78, 7.5±0.5, 7.73±0.79, 7.66±0.48, 7.8±0.67 (oven dried), respectively. The lowest protein content was found 56.38 ±1.14 (oven dried) and highest was 58.29±0.43 (sun dried). The lowest lipid content was 9.3±0.50 (sun dried) and highest was found 13.22±1.25 (oven dried). The lowest ash content was found 8.88±0.072 (sun dried) and highest was 11.09±0.42 (oven dried). The lowest moisture content was found 13.61±0.20 (oven dried) and highest was 16.22±0.67 (sun dried). The lowest fibre content was found 1.17±0.04 (sundried) and highest was found 1.25±0.115 (oven dried). The lowest carbohydrate content was found 0.44±0.19 (oven dried) and highest was 4.2±0.15 (sun dried). The lowest Fe content was found 1.12±0.056 (sun dried) and highest Fe content was found 2.25±0.15 (oven dried). The lowest Ca content was 6.5±0.42 (sun dried) and highest Ca content was found 12.25±0.65 (oven dried). There was no significant difference between the sun dried and oven dried fishes for chemical composition (protein, lipid, ash, moisture, fibre and carbohydrate) and mineral content (calcium and iron).

Keywords: Oven drying, small prawn, sun dried, quality comparison

Existence of Microplastics Particles in Most Popular Bangladeshi Bottled Mineral Water and Fruit Drinks Brands and an Assessment of Human Exposure

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Abstract

Microplastics (MPs) are considered emerging contaminants and matters of global concern, which pose high risks to human health. Broadly research has been done on MPs in soils, water, the atmosphere, etc. but there is minimal data regarding MPs contamination in bottled mineral water and fruit drinks from developing nations that are packaged in plastic. Therefore, the objectives of this study were to identify and characterize the MPs in five different market-available brands of bottled mineral water and fruit drinks in Bangladesh. The study results show that MPs existed in all brands of bottled mineral water and fruit drinks, where the abundance of MPs was 35.6 ± 3.10 particles/L and 73 ± 5.15 particles/L in bottled mineral water and fruit drinks, respectively. Fibers shapes (bottled mineral water =63%, and fruit drinks =78%), and transparent color (bottled mineral water =21%, and fruit drinks =25%), were the dominating characteristics of MPs, and the MPs sizes range from 11 μ m to <5000 μ m. Attenuated Total Reflection (ATR)-Infrared Spectral Analysis (FTIR) identified seven types of polymers in the recovered MPs including Polyethylene (PE), Polystyrene (PS), Polypropylene (PP), Polyvinyl Chloride (PVC), Polyvinyltoluene (PVT), Polybutadiene (PBD) and Polyvinyl Acetate (PVA). The Estimated Annual Intake (EAI) results show that adults could be exposed to 10.17 Particles/kg/bw/year and 11.42 Particles /kg/bw/year from bottled mineral water and fruit drinks, respectively. While, children could be exposed to 44.5 Particles /kg/bw/year, and 49.96 Particles/kg/bw/year from bottled mineral water and fruit drinks, respectively. Children were found to be exposed to 4.38 times higher MPs than adults. These outcomes will assist in attaining a complete and appropriate valuation of MPs in bottled mineral water and fruit drinks in Bangladesh.

Keywords: Microplastics, bottled mineral water, fruit drinks, dietary intake, human health

Compositional Analysis, Phytochemical content, Antioxidant Capacity, and Digestibility of Bungulan (*Musa x paradisiaca*) Banana-Based Flour

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Abstract

Bungulan (*Musa x paradisiaca*) is a traditional variety of banana cultivated in the upland regions of South Cotabato, Philippines. This variety remains underutilized in the country and lacks scientific studies on its potential. Highlighting its unique biochemical properties could showcase it as a valuable food source for the agri-food sector, where it can be processed into banana flour and used as a nutritional additive and supplement to wheat flour. Therefore, this study was conducted to determine the composition, phytochemical contents, antioxidant capacity, and digestibility of Bungulan Flour (BF) compared to commercial wheat flour (WF). BF offers a more balanced proximate composition than WF, with higher potassium, total carbohydrates, and caloric content. BF had a phenolic content approximately 1.2 times higher than WF, resulting in a 10-fold higher antioxidant capacity than WF, as the Ferric Reducing Antioxidant Power Assay demonstrated. Moreover, the amylose content of BF was 26.23%, correlating with a resistant starch content of 30.66% and a relatively low digestible carbohydrate value compared to WF, offering health benefits such as better management of blood sugar levels and enhanced gut health. Hence, Bungulan flour, with its superior compositional profile compared to commercial wheat flour, holds potential as a natural fortificant or additive for developing new applications in the food industry.

Keywords: *Musa x paradisiaca*, banana flour, phytochemical content, antioxidant capacity, digestibility

Food Safety Concern in Bangladesh: Food Additives in Processed Foods, Consumption Pattern and Health Risk Assessment of Children

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Abstract

The prevalence of food additives in processed packaged foods in Bangladesh is a noteworthy concern, especially considering their potential impact on the health of children. In this context this study aims to identify the prevalence of food colors, sweeteners and preservatives in processed packaged food available in Bangladesh and to assess the health risk of primary school going children. The artificial colors, preservative, and sweetener were measured from 1114 processed foods by HPLC. For the assessment of health risk, a random survey using a structured questionnaire was conducted on 2246 individual primary school going children. To determine the significant exposure and overall potential for non-carcinogenic health effects from food additives, the target hazard quotient (THQ) was calculated using the equation: $HQ = CDI/ADI$ Where; CDI is chronic daily intake (mg/kg bw/day) and ADI is acceptable daily intake (mg/kg bw/day) set by regulatory body. Results showed that 38.82% of processed foods contained acesulfame K, 71.60% sunset yellow, and 94.54% potassium sorbate. The health risk analysis results indicated that children consumed a high percentage of artificial color sunset yellow from drinks, juices, biscuits, and cakes and exceeded the hazard quotient index 1. The average daily intake (ADI) of potassium sorbate and acesulfame K from processed foods by children were below the maximum permitted usage level as set by Codex Alimentarius and didn't exceed the hazard quotient 1. However, a few samples had a high concentration of potassium sorbate and acesulfame K, which could be a risk factor for children's health. The strict law enforcement and regular monitoring is crucial to maintain the use of additives in processed foods within regulatory limits as they were exceeded maximum permitted level in some processed foods and posed health risk for children.

Keywords: Food safety, food additives, children, health risk, HPLC

The Detection of Gamma-Aminobutyric Acid (GABA) in Water, Methanol and Water Extracts from Three Types of Black Garlic (*Allium sativum*) using TLC Followed by Spectral Analysis and Assessment of Antioxidant Properties.

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Abstract

GABA, a non-protein amino acid, is found plants, animals and microorganisms. It serves as a principle inhibitory neurotransmitter and has various health benefits such as being antihypertensive, cardioprotective, anticancer, and antidiabetic. Deficiency of GABA can lead to brain disorder and other health problems. In 2018, three types of Black Garlic (DL-BG, DS-BG and CL-BG) were developed first time in Bangladesh using the methods of Sasaki et al., (2007). GABA was identified by TLC among three compounds in water extracts of three types of Bangladeshi BG and a Japanese BG, four compounds in methanol and ethanol extracts of Bangladeshi BG and a Japanese BG, respectively by comparing with the R_f of standard GABA. Spectral analysis confirmed the presence of GABA in these extracts. However, GABA could not be identified in the methanol and ethanol extracts of Bangladeshi Black Garlic. An unknown compound with wave Length 234 nm to 235 nm was present in all three extracts of three types of Bangladeshi BG and a Japanese BG. The qualitative antioxidant test for all extracts of BG and FG (Fresh Garlic) was determined by TLC. The result indicated that all extracts of four types of BG contain high antioxidant compounds compared with four types of FG. The overall results may play an important strategy by adding these BG in our diet chart to increase our body immunity as well as to prevent different types of neurological disorders and diseases.

Keywords: Black garlic, GABA, antioxidant test

Liquid Nutrient Formulations for Three Cruciferous Vegetables Grown in Aggregate Hydroponics

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Abstract

This study was conducted to determine the macronutrient profile of ferments derived from golden snail and madre de agua, investigate the effect of liquid nutrient formulations on the yield characteristics, pigment composition, and free radical scavenging activity of three cruciferous vegetables grown in aggregate hydroponic system. The efficacy of different nutrient solutions was evaluated using broccoli, cabbage and cauliflower as test plants in randomized complete block design with the following treatments such as T1 = Commercial inorganic nutrient solution (CINS), T2 = Fermented golden snail (FGS), T3 = Fermented madre de agua (FMA), T4 = CINS + FGS (1:1 v/v ratio), and T5 = CINS + FMA (1:1 v/v ratio) in three replications. The aggregates were composed of river sand and coconut coir mixed in 3:1 ratio by volume. The pigment composition and free radical scavenging activity of the harvested commodities were done through an ultraviolet-visible spectrophotometric technique. The chemical analysis revealed that the ferments derived from golden snail and madre de agua were rich in macronutrients such as nitrogen, potassium, magnesium, and calcium but inadequate in sulfur for FGS and phosphorus for FMA. Broccoli, cabbage, and cauliflower yielded well with commercial inorganic nutrient solution. However, the application of FGS significantly promoted the yield, total chlorophyll, and carotenoids of broccoli. Meanwhile, combined application of CINS and FMA showed the highest free radical scavenging activity of broccoli. On the other hand, combined application of CINS and FGS significantly enhanced the total chlorophyll and free radical scavenging activity of cabbage. Nonetheless, the application of FGS, FMA, and CINS+FGS greatly influenced the total chlorophyll, total carotenoids, and free radical scavenging activity of cauliflower, respectively. The overall results of the study simply indicate the potential of golden snail and madre de agua ferments as valuable sources of organic fertilizer materials that can be formulated as an innovative approach for cruciferous vegetable production in an aggregate hydroponic system which can be useful in improving the quality of harvest for three cruciferous vegetables and helpful in building resilient lives for community development.

Keywords: Carotenoids, chlorophyll, cruciferous vegetables, free radical scavenging activity, golden snail, liquid nutrient formulations, madre de agua

Growth, Yield and Pod Quality of Different Pole Sitao (*Vigna Unguiculata Sesquipedalis*) Genotypes

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Abstract

Pole sitao is a climbing herbaceous crop raised primarily for its pods, although its shoots and young leaves are also edible. This crop provides good source of income, cheap substitute of animal protein, very good source of vitamin C, folate, magnesium, manganese, and may help stabilize blood glucose levels due to its antioxidant and anti-inflammatory activities. This study was conducted to assess the suitability of five pole sitao genotypes, investigate the yield characteristics of these pole sitao genotypes, and determine the pod quality of pole sitao genotypes grown at the Visayas State University in the City of Baybay, Leyte, Philippines. The experiment was laid out in randomized complete block design with five treatments as follows: T1 = FVSC Sel. #1, T2 = CPS Sel. #1, T3 = CPS Sel. #2, T4 = PS 02-8, and T5 = NSIC PS 4. These treatments were replicated three times during the conduct of the study. The results have indicated that different pole sitao genotypes significantly differed in growth, yield and fruit quality parameters. The CPS Sel #2 flowered earliest, produced most and heaviest pods and consequently obtained the highest yield, although these results were comparable to FVSC Sel #1 genotype. In addition, FVSC Sel #1 genotype obtained the highest chlorophyll a, chlorophyll b, total chlorophyll, and total carotenoid content but possessed the lowest free radical scavenging activity. Interestingly, the genotype PS-02-8 had the highest free radical scavenging activity but observed to have lower yield compared to other genotypes.

Keywords: carotenoids, chlorophyll, free radical scavenging activity, pole sitao genotypes, and yield

Enhancing Eggplant (*Solanum Melongena* L.) Productivity and Quality Through Alternative Nutrient Sources

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Abstract

The use of inorganic fertilizers had been widespread to meet the demand of the growing population. However, inorganic fertilizers to environment is known have cause pollution. This study aimed to evaluate the growth, yield, and quality of eggplant as influenced by combined application of bio-organic, inorganic fertilizer, and humic acid; determined the best combination that would provide high yield; and to assess the effects on the quality of eggplant. The study was set up in RCBD with 11 treatments replicated 3 times. The treatments used were T1- Control, T2- applied with 150-100-160 Inorganic Fertilizer (IF), T3- 12 g Arbuscular Mycorrhiza Fungi (AMF), T4- 6 g AMF, T5- 6 g AMF + 1/2 RR IF, T6- 5 g Plant Growth Promoting Bacteria (PGPB), T7- 2.5 g PGPB, T8- 2.5 g PGPB + 1/2 RRIF, T9- 5.45 g Humic Acid (HA), T10- 2.22 g HA, and T11- 2.22 g HA + 1/2 RR IF. Results revealed that the total yield, number and weight of marketable fruits was highest in T2 although was comparable to other treatments except control. Postharvest quality physical and chemical characteristics also exhibited excellent results to combined use of different nutrient sources and revealed that the use of AMF has an improved effect. All treatments were recorded to have comparable results in the growth, yield and quality of eggplant. Thus, combined application has the potential alternative to single use of inorganic fertilizer in minimizing environmental impact.

Keywords: Humic acid, Arbuscular mycorrhiza fungi, plant growth promoting bacteria, bio-organic fertilizers, pollution, inorganic fertilizers

Performance of Honeydew Melon (*Cucumis melo* L.) Grown on Different Nutrient Solutions Under Hydroponic System

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Abstract

This study was conducted from April to August at the Brgy. Princess Urduja, Narra, Palawan, to evaluate the performance of honeydew melon grown on different solutions under hydroponic system and determine which nutrient solution has the best potential to influence the growth and yield of honeydew melon grown on different nutrient solutions under an aggregate hydroponic system. All treatments were replicated three times, and there were five sample plants in each treatment. The treatments were the following: T1: commercial nutrient solution; T2: fermented malunggay; T3: fermented *Trichantera gigantea*; T4: fermented acacia; and T5: Combination of all treatments.

Results revealed that application of commercial nutrient solution (T1) obtained the highest fruit length, heaviest marketable fruit weight per plant and overall fruit yield in honeydew melons followed by the combination of all treatments (T5) under an aggregate hydroponic system. However, factors such as the days from transplanting to harvest, root weight, root length, fruit diameter, and the number of fruits per plant were not significantly affected by the different nutrient solutions. The results of the study concluded that application of Commercial solution has the potential to increase the growth and yield of honeydew melons.

Keywords: Honeydew melon, hydroponics, acacia, malunggay, *Trichantera gigantea*

Contamination Characteristics and Health Risk Assessment of Poly-And Perfluoroalkyl Substances in Animal Food from Chongqing

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Abstract

To understand the contamination level and composition characteristics of poly- and perfluoroalkyl substances (PFASs) in animal food (poultry by-products) produced in Chongqing, and to evaluate the exposure risk of local standard man consuming PFASs from animal food. Taking the six poultry by-products (chicken, chicken liver, henapple, duck, duck liver, duck egg) from five Poultry farms in main urban districts of Chongqing as the research object, the high performance liquid chromatography-tandem mass spectrometry (HPLC-MS/MS) as the detection equipment, the concentrations of 21 kinds of PFASs were determined. The exposure risk of local adult men to PFASs from food of animal origin was assessed by referring to the consumption of various kinds of food, standard human body weight and the dose value of European Food Safety Authority. The results showed that PFASs contamination was widespread in poultry by-products in Chongqing Poultry farms the detection rate was 90.7% . The concentration level and residual characteristics of PFASs in different kinds of animal foods were different. This was the concentration of Σ PFASs in poultry by-products: duck liver (21.55 ng/g)>duck egg (19.28 ng/g)>chicken liver (15.28 ng/g)> henapple (13.57 ng/g)>duck (12.66 ng/g) >chicken (9.16 ng/g). Mid-chain PFASs were the main detected compound in which PFOA was the major pollutant. It was inferred that PFASs in the animal food from Chongqing mainly came from consumer products, PTOH degradation and industrial wastewater emissions from fluorochemicals manufacturing industries based on the principal component analysis and spearman correlation analysis. It was estimated that the harm index of PFOA and PFBA in chicken liver and duck liver were greater than 1 for a local standard person, respectively. These were potentially harmful to the local population.

Productivity Enhancement and Fruit Quality of Grafted Cucumber (*Cucumis Sativus* L.) as Influenced by Various Biostimulant Substances

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Abstract

One of the popular vegetables and widely cultivated in the family of Cucurbitaceae is cucumber (*Cucumis sativus* L.). These are commonly eaten raw in some salads and pickles. They are in demand year-round, which contributes to economic sustainability. The study was conducted which aimed to evaluate the effects of various biostimulant substances on the fruit quality attributes of grafted cucumber and determine the cost and return analysis on grafted cucumber applied with various biostimulants. This was laid out in a split plot arranged in a Randomized Complete Block Design (RCBD) with three replications, with non-grafted and grafted as the main plot and various biostimulant substances as the subplot treatments. The results revealed that grafted cucumber had significantly affected the cucumber's fruit width. Combined application of SA and HA significantly increased the node bearing and fruit length of cucumber. Grafted cucumber as applied with SA and HA obtained the highest chlorophyll content of the cucumber leaves at 15 DAT, fresh and dry root weight. However, grafted cucumber applied with SA only increased the chlorophyll content of cucumber leaves at 30 DAT and herbage yield. Moreover, application of HA and SA enhanced the firmness of cucumber. In addition, the grafted cucumber applied with HA and SA improved the vitamin C of the cucumber on the first day of storage. The combination of HA and SA significantly increased net profit at PhP 62571.70.

Keywords: Cucumber, humic acid, salicylic acid, grafting

Consumer Preferences, Acceptance, Nutritional Assessment, and Willingness to Purchase: A Comprehensive Analysis of Cheesecakes

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Abstract

The growing trend of consuming healthy foods in Vietnam has led to an increased popularity of sweet pastries, which continue to hold a significant market share. Consumer spending on and selection of cheesecake products have had notable effects on economic statistics and consumer habits. This study analysed around 500 data points to examine the habits, motivations, and preferences of domestic cheesecake consumers. The findings suggest that the ongoing development and innovation in cake structures have significantly boosted consumer interest, surpassing similar product evaluations. Consumer intentions to purchase were primarily driven by perceived quality and a preference for health over price, indicating that producers should enhance product quality to capture greater economic interest. Based on consumer desires, we have also proposed the industrialization of the cheesecake production process. If implemented, this product would allow consumers to customize the flavor according to their personal preferences.

Keywords: Cheesecake, customer preferences, DIY, willing to buy, industrialization

Impact of Frontline Demonstrations on Yield of Finger millet (*Eleusine coracana*) under Rainfed Conditions in Uttarakhand, India

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Abstract

Finger millet (*Eleusine coracana* (L) commonly known as ragi is an important crop used for food, forage and industrial products. Finger millet has a wide ecological and geographical adaptability and resilience to various agro-climatic adversities hence, it is highly suited to drought condition and marginal land and requires low external input in cultivation. to know the yield gaps between improved package and practices under front line demonstration (FLD) and farmer's practice (FP) of Finger millet crop under rainfed conditions. Front line demonstrations (FLDs) were conducted on 10 farmer's fields each year to demonstrate the impact of improved agro-techniques on production and economic benefits under rainfed conditions of Uttarakhand in during kharif seasons of three consecutive years i.e. 2021, 2022 and 2023. Conducting front line demonstrations on farmer's field help to identify the constraints and potential of the finger millet in the specific area as well as it helps in improving the economic and social status of the farmers. Observation on growth and yield parameters were taken and economic analysis was done. The final seed yield was recorded at the time of harvest and the gross return in (Rs ha⁻¹) was calculated based on prevailing market prices. The results from the demonstration conclusively proved that the technologies demonstrated in FLDs recorded additional yield over farmer's practice. Under FLDs the grain yield of finger millet was increased by 34.6 per cent over FP. The extension gap, technology gap and technology index were calculated as 3.0 q/ha, 13.2 q/ha and 52.8 per cent, respectively. Adoption of improved package of practices in finger millet cultivation recorded higher B: C ratio (2.29) as compared to FP (1.75). Yield enhancement and higher net returns observed under FLDs of improved technologies in finger millet. Thus, the productivity of finger millet could be increased with the adoption of recommended improved package of practices. The study resulted to convincing the farming community for higher productivity and returns

Keywords: Economics, extension gap, FLD, technology gap, technology index, finger millet

Prevalence of AMR in Organic Produces

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Abstract

The discovery of penicillin in 1928 was a new beginning in the treatment of bacterial infection. Currently, antibiotics are used in variety of applications, with food production, including meat, egg, fish and crop production, accounting for almost 60 % of total consumption. Several types of antibiotics, including human-applicable Streptomycin, SM and Oxytetracycline, OTC are available as agricultural chemicals to crop field in Japan. As a first step to understand the effect of antibiotics-application to crop field, we focused on prevalence of antibiotic-resistant bacteria in the organic produces. We observed prevalence of antibiotic-resistant bacteria in the edible parts of lettuce and onion which were grown organically, by culture dependent methods. Population of bacteria in the edible parts of lettuce was 5 Log CFU/g on non-selective agar medium, R2A, 3 Log CFU/g on selective agar medium, R2A with SM (40mg/L), 3 Log CFU/g on R2A with OTC (40mg/L) and 5 Log CFU/g on R2A with aminobenzylpenicillin, ABPC (40mg/L) at 25-degree C. While in the edible parts of onion bacterial population was 5 Log CFU/g on R2A, 3 Log CFU/g on R2A with SM, 2 Log CFU/g on R2A with OTC and 4 Log CFU/g on R2A with ABPC at 25-degree C. There were considerable amount of resistant bacteria to three antibiotics in edible parts of lettuce and onion even without application of these antibiotics during growing period. Resistance to ABPC was higher than resistance to other antibiotics, and almost same level as total bacteria in the edible part of lettuce and onion. These results may suggest that bacterial resistance to SM, OTC or ABPC is general property in lettuce or onion. And some bacteria might have multiple resistances to antibiotics.

Keywords: AMR, organic agriculture, fresh produce

Evaluation of the Physicochemical Properties at Various Production Stages of Khai Hoan Fish Sauce, Vietnam

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Abstract

Traditional fish sauce was considered an indispensable condiment in cooking in Southeast Asian countries. In Vietnam, for instance, the market's potential for exporting fish sauce reached 5,279 tons (Innovative Hub, 2023), influencing consumer preferences. On the other hand, more than 4,200 units were engaged in producing this product. However, the physical and chemical properties and changes during the fermentation process were not adequately addressed. The study focused on salted fish as the raw material and the stages at 1, 3, 6, 9, 12, and 15 months to assess changes in protein content, salt content, and histamine limits. The results showed that most histamine levels were within commercial limits, and the total protein content in Khai Hoan fish sauce increased with longer fermentation time, exceeding 7 g/L (15 months). The color was noted as the characteristic amber, aligning with consumer preferences when the a* value reached 6 to 10, the b* value around 3, and the L* value gradually decreased, indicating positive changes in the fish sauce. This data laid the groundwork for further studies on traditional fermented products and promoted the development and preservation of Eastern culture.

Keywords: Fish sauce, fermentation, physicochemical properties, traditional fermented product

Long Term Frozen Storage Affects Volatile Compound of Vacuum and Non-Vacuum Packed Musang King Durian Fruits

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Abstract

Musang King Durian (MK) is a seasonal tropical fruit widely cultivated in Southeast Asia. It is known for its sweet, strong, and pervasive aroma. Being seasonal, preservation techniques such as vacuum packaging and frozen storage have been employed to extend its shelf life. However, the chemical reactions that occur during long-term storage impact volatile compounds (VOCs). While a limited number of studies assessed the VOCs evolution of minimally processed MK durian. This study evaluated the evolution of VOC fingerprints in a vacuum and non-vacuum-packed intact MK durian during long-term storage at -20 °C for 12 months using gas chromatography-high resolution mass spectrometry (GC-orbitrap-HRMS). Vacuum packaging and frozen storage clearly influence the VOC profile of MK durian. Partial least square discriminant analysis (PLS-DA) revealed that diethyl trisulfide, 2,2'-Dithiodiethanol, dipropyl disulfide, and ethyl isopropyl disulfide as prevalent markers in non-vacuum packed MK durian. Whereas isopropylbenzene, 2-dichlorobenzene, ethyl propanoate, and ethyl butanoate were important markers discriminating vacuum-packed durian fruits during storage. Furthermore, common influential markers for long-term storage were revealed, which included methyl butanoate, bis(ethylthio)ethane, 2-methyl heptanoic acid, and diethyl disulfide. Sulfur formation were linked to storage-induced formation processes, likely occurring non-enzymatically. While the decline of ester compounds was associated with the inhibition of enzymes responsible for the biosynthesis of ester compounds under low-temperature and vacuum condition. In conclusion, frozen storage duration influences the VOC profile of both vacuum and non-vacuum durian fruits.

Keywords: Aroma, discriminant markers, durian, packaging conditions, volatile compound profiling

Influence of Humic Acid and Seaweed Extract on Soybean Growth Stages under Saline Conditions

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Abstract

The influence of humic acid and seaweed extract on soybean growth stages under saline conditions was investigated to assess their potential to mitigate salinity stress and enhance soybean productivity. Soybean (*Glycine max*), a valuable leguminous crop, faces challenges in saline-affected regions, particularly in Bangladesh, where large tracts of land remain fallow due to salinity. In this study, various treatments were applied, including humic acid, seaweed extract, and their combinations, to evaluate their effects on soybean germination, seedling, and vegetative stages under different salinity levels (50 mM, 100 mM, 150 mM). Results indicated that humic acid treatment significantly improved soybean germination rates compared to seaweed extract application. Additionally, treatments involving humic acid (5 g/L), seaweed extract (2ml/L), or their combination showed positive effects on root length, shoot length, root weight, shoot weight, leaf number, leaf length, leaf width, and leaf area at different growth stages under saline conditions. Among the treatments, combinations of humic acid and seaweed extract demonstrated promising outcomes, with notable improvements in various growth parameters such as root length, shoot length, root weight, shoot weight, leaf number, and leaf area. Furthermore, the combined treatment showed enhanced plant height and leaf size compared to individual treatments, indicating a synergistic effect. Overall, the findings suggest that the application of humic acid and seaweed extract, either individually or in combination, holds the potential for alleviating salinity stress and enhancing soybean growth and productivity in saline-affected areas, contributing to sustainable agriculture practices and food security in regions prone to salinity.

Effectiveness of Non-Chlorine Sanitizers in Improving Safety and Quality in Dhaka city's Wet Market Poultry Facilities

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Abstract

The wet market poultry processing is a concern of spreading pathogenic microorganisms into the environment or to the products. So, this study was conducted to evaluate the microbiological contamination involved in poultry slaughtering in retail shops, i.e., slaughter and processing lines of wet market poultry shops, and the use of nonchlorine sanitizer to improve the sanitation. Swab samples from each step of poultry processing such as drum's inner surfaces, defeathering machine inner surfaces, knife surfaces and workers' hands, drum's water, feather/carcass, and debris were collected and their microbiological quality was determined. Most of the samples, which included the surfaces of the workers' hands, were heavily contaminated with coliform, fecal coliform (*Klebsiella pneumoniae*, *Enterobacter* spp.), *E. coli*, *Salmonella enterica*, yeast and mold contamination. Antibiotic sensitivity/resistivity test results revealed that all bacterial isolates resistant to 4 antibiotics, *E. coli* was resistant to 9 antibiotics, *K. pneumoniae* to 8, *S. enterica* to 5 and *Enterobacter* spp. to 4 antibiotics. Additionally, nonchlorine sanitizer (0.01% calcinated calcium from scallop or eggshell source) was shown to efficiently eliminate pathogens from the surfaces of wet market poultry slaughterhouses and processing environment as well as reduce poultry processing associated occupational hazard.

Prevalence of Microbial Hazards in Street Juice: Aloe Vera and Its Probable Risk Analysis

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Abstract

Aloe Vera juice is an integral part of the food culture in Bangladesh as this type of street juice usually prepared by instant processing before consumption. This juice is widely accepted by many people in developing countries because they are viewed as nutritious, inexpensive, convenient and attractive. This research presents a comprehensive analysis of the prevalence of microbial hazards in popular Aloe Vera juice with particular emphasis on pathogenic bacteria (*E. coli*, *Salmonella* spp., and *Vibrio* spp.), with the utensils used in serving the item. The average TABC in Aloe Vera juice samples were recorded as 6.88 ± 0.27 log CFU/ml, total coliform count was 5.47 ± 0.23 log CFU/ml, total fecal coliform count was 4.98 ± 0.46 log CFU/ml, and total yeast & mold count was recorded as 4.14 ± 0.51 log CFU/ml. The presence of *E. coli* was evident in 72 (96.0%), with an average count 2.35 ± 0.14 log CFU/ml and *Salmonella* in 16 (21.3 %), with an average count of 3.87 ± 0.40 log CFU/ml in Aloe Vera juice samples. The *Vibrio* spp. was evident in 64 (85.3%) with an average count of 4.14 ± 0.21 log CFU/ml and *Listeria* spp. was found in 7 (9.3%), with an average count of 2.80 ± 0.09 log CFU/ml, Aloe Vera juice samples. The utensils, such as glass and mugs were also contaminated with harmful pathogenic bacteria. The study also aims to assess the potential health risks associated with consuming Aloe Vera juice and provides recommendations for mitigating these risks. The probability of infection (P_{inf}) after consumption of Aloe Vera juice was analyzed (*E. coli*=0.04, *Salmonella* spp.=0.21 & *Vibrio* spp.=0.012). However, the risk analysis study found that the risk of infection from consuming Aloe Vera juice is high, and recommended that vendor's public health awareness and access to safe water is necessary to ensure the long-term safety of these types of street food.

Assessing Antibiotic Residues in Raw Cow's Milk from Local Dairy Farms in Keraniganj, Bangladesh.

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Abstract

Rapid expansion of cattle farming, particularly in nations like Bangladesh, has led to heightened reliance on antibiotics. This study aims to evaluate the presence of residual levels of commonly utilized antibiotics, including oxytetracycline (tetracycline group), ciprofloxacin, enrofloxacin, and levofloxacin (fluoroquinolones group), in milk samples. A total of raw 50 samples were collected from five different farms in Keraniganj, Dhaka. A quick, easy, and accurate approach for simultaneous detection and quantification of the antibiotic residues mentioned above in milk has been devised and validated (RP-HPLC) following International Conference on Harmonization (ICH) guidelines. The proposed method demonstrated good linearity with coefficients 0.999 to 1.0 for each antibiotic in the range of 1.25 - 15.00 µg/mL. The study found that oxytetracycline was the most commonly detected antibiotic in the majority of samples (90%), followed by levofloxacin (66%), enrofloxacin (64%), and ciprofloxacin (62%). Among the five farms, Farm 4 exhibited the highest prevalence of residual antibiotics, with oxytetracycline detected in all samples and levofloxacin, enrofloxacin, and ciprofloxacin detected in 80% of samples. About 30% of the positive samples exceeded the MRL for oxytetracycline, while none exceeded the MRL for enrofloxacin and ciprofloxacin. Evaluation of human health risks suggested that the existing concentrations of antibiotic residues in milk do not pose substantial toxicological implications on consumer health. However, the hazard quotient for children, although below one, is very close to one, suggesting potential health risks with prolonged exposure. The study identified antibiotic residues in milk samples from five local dairy farms and established a method to quantify these residues simultaneously. This method can be used in routine analysis to quantify various antibiotic residues in the food industry, pharmaceutical industries, and other fields.

Keywords: Antibiotic residues, risk analysis, dairy farms, raw milk, high-performance liquid chromatography

Challenges and Progress in Food Safety in Bangladesh

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Abstract

Food is crucial for human survival, therefore food safety is a major public health concern in Bangladesh. Foodborne infections and other food safety dangers are quite common in the country, with food adulteration being a prominent worry. Food safety issues in Bangladesh are worsened by a lack of public awareness and regulatory limits. Current major concerns include the presence of heavy metals, mycotoxins, pathogenic microorganisms, and pesticide and veterinary medicine residues in food products. However, there is good progress because many food processing firms are using certification systems to ensure the production of safe food for consumers. Despite these developments, local street food and general food shops continue to have inadequate food safety regulations and practices. Due to the low cost, a considerable section of the population consumes food from these high-risk sources. So it is critical to improve food safety standards in those areas as well. Agriculture, particularly in the vegetable sector, is an important aspect of Bangladesh's economy, providing direct income, nutrition, and food security. The varied application of agrochemicals to boost yields poses sustainability concerns. Many Bangladeshi farmers are unaware of good agricultural practices (GAP). GAP is the only alternative for producing safe food. Local agricultural institutions can help promote these practices by providing farmers with necessary resources, training, and support. The Food and Agriculture Organization (FAO) of Bangladesh is working with the government to improve food safety through technical assistance. FAO Bangladesh has recommended for proper pesticide lifecycle management and reduced antibiotic use in small-scale chicken farms. The continuing FAO Bangladesh project, in conjunction with the government, seeks to improve post-harvest technologies and increase the shelf life of fruits and vegetables by implementing modern packaging and storing procedures. Bangladesh government is hopeful about building a national safe food system. This could result in improved public health outcomes, better customer satisfaction, and economic gains by boosting the agricultural sector's reputation both domestically and abroad.

Chemical Composition, Functional Characterization, Antioxidant Capacity, Digestibility, and Thermal Properties of Philippine Purple Yam (*Dioscorea alata*)

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Abstract

This study focused on analyzing the composition and properties of the Zambal variety of purple yam from Bilar, Bohol, Philippines, examining its physicochemical properties, morphology, functional properties, digestibility, and thermal characteristics. The analysis revealed that the moisture content averaged $10.60\% \pm 0.04$, with a crude lipid percentage of 5.59 ± 0.16 . Meanwhile, the UV-VIS spectrum indicated that the sample is an amylopectin-rich starch-based product, showing a higher absorbance (ABS) at 550 nm than 620 nm. Mid-infrared spectroscopy results exhibited distinct peaks at approximately 3250, 2900, 1600, 1400, and 1000 cm^{-1} , which is associated with the carbohydrate and phenolic compounds present in the sample. The total phenolic content and antioxidant capacity showed moderate values, measured at 124.00 ± 4.58 mg GAE/100 g and 47.70 ± 1.20 mg Trolox equivalents/100 g, respectively. Morphological analysis of the starch granules revealed a homogeneous structure characterized by relatively smooth, oval granules. Energy-dispersive X-ray analysis showed that oxygen had the highest weight percentage at 57.14%, compared to 42.86% for carbon, confirming the carbohydrate abundance. Regarding digestibility, the resistant starch (RS) content was 16.59 ± 3.44 , while the total digestible carbohydrate (TDC) was 4.35 ± 0.46 . The samples demonstrated a thicker texture, akin to coagulated pastes, with a viscosity value of 2177.67 ± 1.41 cP. Gelatinization and retrogradation analyses revealed a decrease in enthalpy, with values (J/g) of 12.76 ± 2.50 , 5.02 ± 3.08 after day 1, and 4.59 ± 1.87 by day 14. The sample exhibited water and oil absorption capacity values of 1.42 ± 0.02 and 1.95, respectively. The swelling power was 2.79 ± 0.02 g/g, and solubility was measured at $13.21 \pm 0.35\%$, suggesting a negative correlation between these properties and the bulk density was determined to be 0.85 g/mL. Hence, the results of these experiments reveal the potential of Zambal flour in gluten-free baking products, thickening agents, or nutritious instant beverage powder.

Keywords: *Dioscorea alata*, purple yam, flour blends, chemical composition, functional characterization

Effects of Individual Wrapping and Waxing as Postharvest Treatment on the Quality and Shelf Life of Philippine Pummelo (*Citrus maxima*)

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Abstract

The Philippine pummelo (*Citrus maxima*) is cultivated in the southern region of the Philippines. It is considered an economic fruit in the Philippines. Pummelo growers reported 28 to 42% postharvest loss valued at P35.5 billion. The quality defects include shrinkage, weight loss and growth of microorganisms among others. Appropriate postharvest treatment is needed to boost pummelo productivity and commerce. The study aimed to determine the effects of individually wrapping and waxing as postharvest treatments on the quality and shelf life of pummelo. Pummelo fruits (cv. Magallanes) were harvested from an upland farm in Davao City, Philippines. In the first lot, samples were individually wrapped (WRAP) using a stretch film polyvinyl chloride (PVC); second lot, pummelos were waxed (WAX); and the third lot with no treatment served as the control (CONTROL). The samples were stored at 14°C and 30°C. Quality parameters weight loss, firmness, dimension, color, pH, total soluble solids (TSS), and titratable acidity (TA) were monitored periodically for 3 months. The results showed that the weight loss, color development, and size reduction (shrinkage) were significantly delayed by wrapping and waxing compared with the control samples. At 30°C, the shelf life of pomelo WRAP, WAX and CONTROL were 70, 91, and 49 days respectively. Likewise, at 14°C, WAX and WRAP pomelo has the longest shelf life of 99 days and 70 days for the CONTROL. Waxing gave the fruit a good luster and prevented excessive moisture loss. The pH and TSS followed the normal increasing trend upon ripening while TA declined. Based on the data gathered, wrapping and waxing as postharvest treatment were effective in maintaining the quality and extending the shelf life of pummelo up to 70 and 91 days respectively. With extended shelf life, there is a potential to further expand the market reach of Philippine pummelo. Further study on combining wrapping and waxing pomelo as postharvest treatment is highly recommended.

Keywords: Pummelo, postharvest technology, shelf life

Effects of the Different Packaging Materials on the Physico-Chemical Attributes of Tomato (*Solanum Lycopersicum* L.) During Storage

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Abstract

Tomato is considered as the most protective food because of its specific nutritive value, and possesses important nutrients such as beta-carotene, flavonoids, lycopene and vitamin C. At present, tomato consumption is constantly increasing worldwide. Thus, this study dealt with the effects of different packaging materials on the physico-chemical attributes to enhance shelf life of tomato during storage. It specifically aimed to evaluate the effects of the different packaging materials on the physico-chemical attributes of tomato during storage and to determine which packaging material can enhance storage life of tomato, with the following treatments: T0- Control (No Packaging), T1- Newspaper, T2- Paddy Straw, T3- Paper Bag, T4- Transparent polyethylene bag, T5- Black Polyethylene bag. Results revealed that T0 (control) obtained the highest weight loss at 28.86%, with severe deterioration whereas, T2 (Paddy Straw) and T4 (Transparent Polyethylene Bag) showed the least weight loss, reduced shrivelling, got the highest value of total soluble solid, and maintained higher VQRs throughout the 16th -day period. Moreover, T0-control (no packaging) showed more rapid color changes and disease incidence of tomato. After 6th and 8th day, the black polyethylene bag, newspaper and paper bag showed a slight increase in disease incidence while other treatments remained diseased free. The study indicates that paddy straw and transparent polyethylene bag treatments were the most effective in minimizing disease incidence in tomatoes over the 16th -day period.

Keywords: Packaging, paddy straw, tomato

Growth, Sex Expression, Yield and Physico-Chemical Properties of Grafted Muskmelon (*Cucumis Melo* L.) As Influenced by Ethrel Application

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Abstract

Muskmelon is an economically important vegetable crop worldwide which possesses unique appearance and intrinsic quality. However, muskmelon plant produces greater numbers of male flowers than female flowers. This flowering mechanism exhibited by melon is not advantageous and economical because the fruit yield usually depends on the presence of a greater number of female flowers produced by the plant (Girek et al 2013). Thus, this study was conducted to (1) evaluate the response of grafted muskmelon with the application of different Ethrel concentration; and (2) assess which Ethrel concentration applied to grafted muskmelon would give the highest yield. This study was laid out in Randomized Complete Block Design (RCBD) with 3 replications with the following treatments: T₀ – No foliar application/ Control; T₁– 50ppm Ethrel; T₂– 100ppm Ethrel, and T₃– 150ppm Ethrel. Results revealed that application of 50 to 150 ppm Ethrel on grafted muskmelon increased fresh herbage weight over the control, and increased the number of female flowers. Fifty (50) ppm Ethrel resulted to the production of the most female flowers, longer, more and heavier fruits and hence highest fruit yield with better fruit chemical composition among the Ethrel treated plants. Results of this experiment showed that cost-effective application of 50 ppm Ethrel is worth recommending for optimum muskmelon production.

Keywords: Ethrel, grafted muskmelon, growth, sex expression, and yield

Comparative Study on The Application of Waxing and Wrapping as Postharvest Treatment for Philippine Citrus

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Abstract

This study aimed to compare the shelf life of citrus fruits treated with fruit wax and wrapped individually using stretch polyvinylidene chloride (PVC) film as postharvest treatment. Satsuma variety (*Citrus unshiu Marcovitch*), which was grown in Northern part of the Philippines was considered in the study. Citrus fruits were divided into three lots and labeled as control/untreated, treated with commercial fruit wax, and individually wrapped with stretch film. Samples with different treatments were stored at 4°, 12° and 30°C for two months. The change in weight, total soluble solids (TSS), pH, change in color of the rind (L^* , a^* , b^*), change in thickness of the rind and sensory attributes were evaluated every 7 days. Based on the results, individual wrapping was found effective in suppressing weight loss in all samples stored at different temperatures. After 63 days at 4°C, weight loss for satsuma variety was 18.8%. Comparing with fruit waxing and the control, the weight loss for satsuma variety was 23.10% and 28.62%, respectively. The TSS gradually increased throughout the storage study in all treatments and storage temperatures. Wrapped samples stored at 4°C increased from 9.92% to a final TSS of 11.52% while 10.79% and 10.68% Brix for the waxed and control samples, respectively. A slight change in pH was observed on all treatments throughout the storage period. The rind color changed from green to yellow with time of storage, the change being faster with increasing storage temperature and for the untreated samples. The same trend was also observed for rind thickness. Based on the result of sensory evaluation which included the parameters rind color, odor, texture, taste and appearance, the shelf life of citrus fruits was affected by the different postharvest treatments and storage temperature. The shelf life of wrapped and waxed satsuma stored at 4°C was 63 days compared to 42 days for the control.

Keywords: Satsuma, wrapping, fruit wax, shelf life storage temperature, quality, sensory evaluation

Changes in the Phytochemical Content and Starch Properties of Germinated Philippine Adlay (*Coix Lacryma-Jobi L.*) Seed

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Abstract

Adlay (*Coix lacryma-jobi L.*) is an underutilized crop in the Philippines known for its nutritional properties, which are enhanced by germination. This study examined germination-induced changes in the apparent amylose content (AAC), lipids, phenolics, flavonoids, and antioxidant activity in both hulled and dehulled adlay sprouts. Germinated adlay flour has low amylose content (14.36 to 20.46%). Differential scanning calorimetry (DSC) determined that there was an increase in gelatinization temperatures and a decrease in enthalpy during retrogradation and amylose-lipid dissociation, indicating significant changes in thermal properties. FTIR spectra in the 1800-1600 cm⁻¹ region and principal component analysis (PCA) differentiated germinated adlay flour from ungerminated adlay. Quantification of free and bound phenolic compounds showed a 1.9-fold and 2.6-fold increase in total phenolic content in the 7-day sprouts of hulled and dehulled adlay, respectively. Total flavonoid content followed the same trend, with a 1.4-fold and 1.5-fold increase for hulled and dehulled adlay, respectively. This suggests that germination enhances the nutritional and functional properties of adlay seeds by increasing their phytochemical content, thus highlighting their potential as a valuable functional food. The antioxidant activity stabilized until day 3 and decreased at the latter part of germination, which might be due to the presence of phytochemicals that support seed growth rather than contribute to antioxidant activity during prolonged germination. This study shows the nutritional potential of germinated adlay for the development of adlay food products.

Influenced of Mycorrhiza and Different Rootstocks on the Fruit Yield and Quality of Honeydew Melon (*Cucumis Melo* Var. *Inodorus* H. Jacq.)

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Abstract

Honeydew melon (*Cucumis melo* var. *inodorus* H. Jacq.) is one of the high-value commodities in the Philippines but its yield is adversely affected by drought and soilborne pathogens. The study evaluated the yield and quality of honeydew melon as influenced by mycorrhiza and grafting with different rootstocks. The experiment was laid out in a split-plot design arranged in a Randomized Complete Block Design (RCBD) with three replications. The treatments were as follows: main plot (application of mycorrhiza) M₁ – without mycorrhiza and M₂ – with mycorrhiza and; subplot (different rootstocks) T₁ – non-grafted, T₂ – grafted with sponge gourd, T₃ – grafted with bottle gourd and T₄ – grafted with squash. Results indicated that the squash rootstocks increased the polar fruit size of honeydew melon. Sponge gourd and squash rootstocks increased the number and weight of marketable fruits, total yield and vitamin C of the fruits. In addition, squash rootstock enhanced the total soluble solids. Carotenoid content and general acceptability of honeydew melon are comparable to each other. Application of mycorrhiza increased the fruit's pH at harvest. Squash and sponge gourd rootstocks applied with mycorrhiza obtained the best quality honeydew melon.

Keywords: Bottle gourd, grafting, mycorrhiza, sponge gourd, squash

Nitrogen Use Efficiency and Yield Response of Sweet Corn (*Zea Mays* Var. *Saccharata* Sturt.) in Combined Organic and Inorganic Fertilization

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Abstract

Sweet corn (*Zea mays saccharata* Sturt) has been grown commercially and plays strategic role in national economy as multipurpose source of foods and raw material for industry. It is classified as one of the most important and promising high value horticultural crop because of its short maturity and faster economic return. Development of production technologies is needed for sweet corn to fulfill the increasing demand in the market. This research evaluated the nitrogen use efficiency and yield performance of sweet corn in combined organic and inorganic fertilization. The experiment was laid out in split plot in RCBD with three replications. Sweet corn variety was assigned in the mainplot while the combined organic and inorganic fertilization were assigned in the subplots. N use efficiency of Sweet Pearl was higher (543.2) than that of Sweet Grande (125.2) because of higher N recovery efficiency. Decrease in nitrogen use efficiency was attributed to low physiological efficiency as levels of nitrogen fertilizer increased. Sweet Grande was better than Sweet Pearl in terms of average ear height, average ear width, weighed of ear per plant with husk, weight of ear per plant without husk, yield per plot with husk, and yield per plot without husk. However, the two sweet corn varieties were comparable in terms of average ear length, stover yield and harvest index.

Keywords: Nitrogen use efficiency, plant uptake, organic and inorganic fertilization

Study on Detection Method and Influencing Factors of Iodine Content in Iodized Salt

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Abstract

This study employs ordinary iodized salt, low-sodium iodized salt, and special process iodized salt as materials, utilizing oxidation-reduction and direct titration methods to determine the iodine content in edible salt. The statistical analysis reveals that the absolute value of the t-test for iodized salt data is 1.740, below the critical value of 1.833, with a P-value of 0.116, significantly higher than the threshold of 0.05. Consequently, no statistically significant difference exists between direct titration and oxidation-reduction titration in assessing the iodine content of ordinary iodized salt and low-sodium iodized salt. However, for special process iodized salts like calcium salt, there is a significant discrepancy in the test results from the two methods, with direct titration yielding relatively lower iodine content, primarily due to the interference of reducing substances present in the calcium salt production raw materials. The addition of various flavoring agents such as ginger, sand ginger, star anise, and cardamom in special process iodized salts complicates endpoint determination, rendering both direct and oxidation-reduction titrations unsuitable for these flavored salts. The research delves into the thorough determination of iodine content in complex matrix edible salts, aiming to establish a method applicable to flavored salts where additives constitute no more than 5% of the total, for iodine content measurement. A key innovation lies in the sample pretreatment stage, employing sodium hydroxide as an iodine protector and employing carbonization and ashing steps to effectively degrade organic components in the samples. Subsequently, under acidic conditions, sodium hypochlorite is used to oxidize iodide to iodate, followed by oxalic acid to remove excess sodium hypochlorite. Iodate further oxidizes potassium iodide to release free iodine, which is then titrated against a sodium thiosulfate standard solution, using starch as an indicator, to calculate the iodine content in complex matrix edible salts. This method enhances measurement accuracy while broadening its applicability range, thereby holding significant research value for quality control in complex matrix iodized edible salts.

Shelf-Life Study of Dried *Lactiplantibacillus Plantarum* Isolated From Cambodian Fermented Fish for Starter Culture

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Abstract

This study investigates the shelf-life of dried starter culture, *Lactiplantibacillus plantarum* (*L. plantarum*), isolated from Cambodian fermented fish, a potential application in food fermentation. The primary objective is to evaluate the viability and stability of the dried bacterial culture over an extended storage period. The isolated *L. plantarum* was subjected to drying processes and stored under various conditions to monitor its survival rate. The survival rate of *L. plantarum* after freeze-drying can reach 91.5%. This rate decreased to 71% after four months of refrigeration, compared to just one month at ambient temperature. In the case of vacuum dried *L. plantarum*, the survival rate dropped to 50% after drying, and to 30% after four months of refrigerator storage. Results indicated that the freeze-dried *L. plantarum* maintained significant viability and functional properties, making it a promising candidate for enhancing the shelf-life and quality of fermented fish products. This research contributes to the development of sustainable and efficient starter cultures for the fermented fish industry and to enhance the safety and shelf-life of traditional fermented foods, promoting sustainable food preservation practices.

Keywords: Dried *Lactiplantibacillus plantarum* starter culture, Freeze-drying, Vacuum drying, Survival rate

Diversity of Bacteria in Fish Farms with Emphasis on Their Antibiotic Resistance Patterns and the Effect of Heavy Metal on Their Resistance to Antibiotics

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Abstract

Aquaculture contains a diverse range of bacterial species. Overuse and misuse of drugs, poor hygiene, contaminated feed, and contaminated water cause these bacteria to develop medication resistant. This study looked at the antibiotic resistance profiles of bacteria isolated from three fish farms and the impact of heavy metals on their resistance. This study investigated the profiles of antibiotic resistance in bacteria isolated from three fish farms and assessed the impact of heavy metals on antibiotic resistance. A total of 51 isolates were obtained and identified using culture, microscopic, and molecular techniques. There were nine genera and fifteen species discovered, with *Staphylococcus* spp. being the most common. According to the CLSI guidelines for 2022, 50.98% of the isolates were multidrug-resistant. Gram-negative isolates showed the strongest resistance to azithromycin, while gram-positive bacteria showed the highest resistance to penicillin. TetM was the most common resistance gene, accounting for 62.74% of isolates, followed by tetA (54.9%), qnrS (9.8%), and blaOXA-48 (7.8%). Approximately 85% of the isolates include class 1 Integron, and 41% contain plasmid, indicating a high risk of antibiotic resistance genes spreading among the bacteria in these fish farms. Most isolates (80.4%) were able to generate biofilms of varied intensities: strong (9.8%), medium (29.4%), and weak (43.1%). Co-exposure to antibiotics and heavy metals (chromium, zinc, and cadmium at 40 ppm) exacerbated antibiotic resistance patterns, with imipenem showing the most resistance (100% with cadmium and zinc, 83.3% with chromium). Co-exposure to antibiotics and heavy metals (chromium, zinc, and cadmium at 40 ppm) increased antibiotic resistance, with imipenem exhibiting the highest resistance (100% with cadmium and zinc, 83.3% with chromium). As the chromium content increased to 50 ppm, the majority of the isolates produced more EPS and formed biofilms. When the isolates were tested for cytotoxicity on the Hela cell line, only one (Isolate ID 2, *Aeromonas veronii* from healthy fish) shown substantial cytotoxicity. This study found that aquaculture could serve as a reservoir of multidrug-resistant bacteria that grow in the presence of heavy metals, and that consuming undercooked fish can be dangerous due to the presence of bacteria with class 1 integron and cytotoxic capabilities.

Keywords: Bacterial diversity, fish Farms, antibiotic resistance, and heavy metal

Occurrence and Characterization of Pathogenic Bacteria Producing β -lactamase in Biomedical Waste Water Samples from Hospitals in Dhaka City

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Abstract

Hospital effluents can play a significant role in the dissemination of antibiotic-resistant bacteria and genes in the environment. This study aimed to analyze the occurrence and prevalence of β -lactamase-positive Gram-negative bacteria in untreated waste discharged from various hospitals in Dhaka city, Bangladesh. Waste samples were collected from sewage disposal points of reputable hospitals in Dhaka. A total of 184 isolates were examined, of which 89 were identified as β -lactamase positive. These bacterial strains underwent antimicrobial susceptibility profiling using the VITEK-2 assay, and ESBL-producing genes were detected using molecular methods. Analysis of antimicrobial resistance among β -lactamase-positive isolates revealed high resistance to ampicillin, ceftriaxone, cefuroxime (3rd generation cephalosporin family), and meropenem (carbapenem family). The predominant taxa among the resistant isolates were as follows: *Escherichia coli* (42.7%), *Acinetobacter baumannii* (25.9%), *Pseudomonas aeruginosa* (25.9%), and *Enterobacter cloacae* (5.6%). Detection of ESBL-producing genes showed that the predominant β -lactamase genes were blaNDM-1 (100%), followed by blaOXA-1 (41.2%), blaSHV (5.9%), blaCTX-M (5.9%), and blaKPC (5.9%). Notably, none of the isolates harbored the blaTEM gene. This study highlighted the presence of a significant number of bacteria producing ESBL and carbapenemase enzymes in hospital effluents, which could contribute to the spread of bacterial resistance. Identifying ESBL-producing pathogens in untreated hospital discharges and understanding their resistance patterns provides valuable insights for developing effective pathogen management strategies. Ultimately, this knowledge could aid in minimizing the dissemination of antimicrobial resistance genes in the environment.

A Comparative Study on Probiotic Efficiencies of Yogurt and Non-yogurt Lactic Acid Bacteria

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Abstract

Lactic acid bacteria (LAB), mainly *Lactobacillus bulgaricus* and *Streptococcus thermophilus*, are widely present in yogurt. These microorganisms, which assist in digestion and promote a healthy gut microbiome, are responsible for the unique flavor and consistency of yogurt. For this quality, these bacteria are considered as probiotics. This study investigates the efficacy of LAB as probiotics, by comparing their effectiveness when derived from conventional yogurt and non-yogurt alternatives. In addition to fermenting food, LAB also affects taste, maintain food quality, and offer probiotic advantages. They also have an effect on general health, are also used in industry, and help with better nutrient absorption. In this study, total 13 bacteria samples were isolated from 8 yogurt samples and 10 isolates were sampled from 3 commercially available probiotic sources. The probiotic efficiency parameters of comparison were based on different morphological and biochemical characteristics of the isolated bacteria samples, their antimicrobial activity, susceptibility to different antibiotics and plasmid profiling. All these bacteria were Gram positive, protease negative, catalase negative and non-motile. Cell-free supernatant of 7 isolates (3 yogurt and 4 non-yogurt isolates) showed antimicrobial activity against *Streptococcus aureus* and 3 isolates (including 1 of the non-yogurt isolates) showed antimicrobial activity against *E. coli* 3 of the non-yogurt isolates showed resistance to 5 out of 8 antibiotics used, whereas 9 yogurt isolates showed resistance to maximum 4 antibiotics. Absence of plasmid in these isolated LABs indicated that plasmid-mediated transfer of their antibiotic resistance properties to gut bacteria should be limited. The isolated LAB samples from yogurt sources were also predicted by analyzing their 16S rDNA sequencing. The sequencing results indicated that almost all of the selected bacteria samples were from same genus “*Weissella*” within the family Lactobacillaceae. *Weissella* bacteria is commonly found in fermented foods all over the world and was proven as an important probiotic bacteria. Thus the current findings could enhance our comprehension of the complex interactions between probiotic bacteria and the host, providing valuable insights for making dietary choices and healthcare recommendations. This study also seeks to provide guidance to individuals, healthcare professionals, and food manufacturers on how to optimize the selection and consumption of probiotics for improved gut health and overall well-being, as the field of probiotic research progresses.

Keywords: Yogurt, Probiotics, Lactic Acid Bacteria, and non-yogurt isolates

Gamma-Irradiated Chitosan: A Novel and Biodegradable Preservative Designed to Extend the Shelf Life of Refrigerated Labeo Rohita (Hamilton)

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Abstract

Fish plays a vital role in providing animal protein in Bangladesh and is a staple food across the country. The demand for Rohu fish (*Labeo rohita*) is particularly high due to its rapid growth and popularity in the market. However, the use of formalin as a preservative for *Labeo rohita* and other fishes in Bangladesh poses significant health risks. In our study, we delved into the potential of radiation-processed chitosan as a safer alternative to formalin for extending the shelf life of Rohu fish. Our comprehensive analysis encompassed microbiological, chemical, and sensory aspects. The results showed untreated *Labeo rohita* had a refrigerated storage life of 6 days, while chitosan-treated samples at a concentration of 10 g/L showed a remarkable extension to 16 days, based on multiple spoilage parameters. Our findings uncovered that 50 kGy-irradiated chitosan, even at a concentration of 1 g/L, exhibited superior antimicrobial activity against gram-negative bacteria compared to other chitosan variants. Unlike formalin, which poses health risks and environmental hazards, chitosan is non-toxic and offers numerous health benefits. Thus, radiation-processed chitosan presents a compelling case as a safe and effective alternative to formalin in extending the shelf life of *Labeo rohita*. We are optimistic that these findings will drive wider adoption of gamma-irradiated chitosan in Bangladesh and beyond, offering a viable solution to mitigate the health risks associated with formalin.

Keywords: Chitosan, Gamma-irradiation, *labeo rohita*, preservative, shelf life

High Prevalence of Antimicrobial Resistance in *Escherichia coli* from Integrated Poultry, Dairy, and Aquaculture Farms in Bangladesh

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Abstract

Antimicrobial resistance (AMR) has become a major global concern. This study evaluates the AMR profiles of *Escherichia coli* (*E. coli*) in integrated poultry, dairy, and aquaculture farms in Bangladesh. Samples were collected from litter, water, farm soil, cloacal swab, worker hand swab, feed, cow dung, milk, pond water, sediment, and fish (scale with skin, gill, gut) across two farms in Noakhali and Cumilla districts in Bangladesh. A total of 55 *E. coli* strains were isolated for drug resistance analysis and AMR gene detection. The findings revealed high resistance rates to ampicillin, tetracycline, and chloramphenicol (over 50%), with ciprofloxacin resistance reaching over 83%. Among the isolated 55 strains of *E. coli*, all of them except isolates from fish sediment were resistant to more than three antimicrobial drugs, with 31 strains resistant to seven different drugs and the most resistant strain showing resistance to five antimicrobial agents. *E. coli* isolated from poultry litter and pond water showed resistant to all the antimicrobial group type, where we used total eight (8) types of antimicrobial drugs. In AMR gene analysis high prevalence of *tetA*, *qnrS*, and *sul-2* were detected (≥90%) where highest AMR gene detected was *tetA* (>94%). The *blaTEM* and *blaCtxm-15* genes were present in over 45% of the strains and the detection rates for *dfrA-17* and *sul-1* were below 17%, with *blaOXA-48* being the least common (5.45%). In summary, among 55 strains 46 strains of *E. coli* exhibited multi-drug resistance and carried various antimicrobial resistance genes. Thus, it is essential to strengthen the rational use of antimicrobial drugs, especially the fluoroquinolone drugs and control the antimicrobials resistance in the livestock industry of Bangladesh.

Keywords: Antimicrobial resistance, *Escherichia coli*, Integrated farm, Bangladesh

Development of A RT-qPCR Assay for The Detection of Avian Influenza A Virus Subtype H5 in Poultry

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Abstract

Avian influenza poses a huge threat to the poultry industry and public health. With rapid transmission and high mortality characterizing this disease, the successful detection and containment of avian influenza can have a huge impact to the agricultural economy and food security. However, access to accurate and reliable testing becomes difficult due to the high cost and delay of procurement of foreign diagnostic kits, as well as the prioritization of countries with locally developed kits during times of high demand as in global outbreaks. The development of this highly sensitive, specific, precise, and robust assay that can be made low-cost and easily accessible for local testing is seen to greatly improve early and efficient detection of the virus in poultry. In this study, the assay was developed by testing a combination of reagent concentration gradients, as well as temperatures and time allotments for the cycling profile, where three main characteristics were considered—sensitivity, specificity, and overall cost of the assay. It was shown that the developed assay can detect up to 1 target copy/μL with a PCR efficiency of 106.6% while remaining specific to avian influenza A subtype H5 viruses. Evidence was also provided for its repeatability and reproducibility, showing no significant difference between each replicate and run performed in the laboratory. Robustness experiments showed that the assay can be performed reproducibly on different PCR detection systems and can be deployed to laboratories nationwide without significant effect from possible deviations in performance, for as long as biosafety requirements are followed. Therefore, this assay provides a good opportunity to increase accessibility to testing and surveillance locally, with the possibility of early detection and containment of future avian influenza outbreaks.

Keywords: Avian influenza, H5, poultry, RT-qPCR, detection, diagnosis

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