PROCEEDINGS

Abstracts

4th INTERNATIONAL SYMPOSIUM ON AGRICULTURE

INNOVATIVE APPROACHES TO MODERNIZE AGRICULTURE FOR FOOD SECURITY

06 March 2025

FACULTY OF AGRICULTURE
EASTERN UNIVERSITY, SRI LANKA

ISA 2025

Proceedings of the

4th International Symposium on Agriculture

(4th ISA 2025)

"Innovative Approaches to Modernize Agriculture for Food Security."

6th March 2025

Faculty of Agriculture
Eastern University, Sri Lanka
Palachcholai
Kaluwankerny

PROCEEDINGS OF THE

4TH INTERNATIONAL SYMPOSIUM ON AGRICULTURE - 2025

"Innovative Approaches to Modernize Agriculture for Food Security."

Compiled by:

Dr. T.M.S.A. Tennakoon

Mr. G. Niroash

Published by:

Faculty of Agriculture,

Eastern University, Sri Lanka,

Palachcholai,

Kaluwankerny, 30372

Telephone: +94 (0) 6531 21750 Website: https://isa2025.fag.esn.ac.lk/

ISBN 978-624-5731-51-0

MEMBERS OF THE ORGANIZING COMMITTEE OF THE ISA 2025

Chair

Prof. T. Prabaharan
Acting Vice Chancellor
Eastern University, Sri Lanka

Co-chair

Prof. (Mrs.) P. Premanandarajah
Dean
Faculty of Agriculture
Eastern University, Sri Lanka

Coordinator

Dr. T.M.S.A. Tennakoon

Secretary

Mr. G. Niroash

Members of the Editorial Committee

Prof. M. Pagthinathan (Editor-in-Chief)

Snr. Prof. (Mrs.) T. Mahendran

Snr. Prof. (Mrs.) T.H. Seran

Prof. S. Sutharsan

Prof. (Mrs.) P. Premanandarajah

Prof. (Mrs.) R.F. Niranjana

Prof. M. Sugirtharan

Dr. (Mrs.) T. Krishnal

Prof. (Mrs.) Jeyapraba Suresh

Dr. M. Koneswaran

Inaugaration and Registration Committee

Dr. K. Prasannath (Person-in-Charge)

Technical Committee

Mr. G. Niroash (Person-in-Charge)

Logistic Committee

Mr. R. Thivyatharsan (Person-in-Charge)

Sponsor Management and Outreach Committee

Dr. T.M.S.A Tennakoon (Person-in-Charge)

Ms. R. Krishnananthy (Person-in-Charge)

Technical Session Committee

Mrs. T. Kirupananthan (Person-in-Charge)

REVIEWERS OF THE ISA 2025

Name of the Reviewer	Affiliation
Emeritus Prof. Ben Basnayake	University of Peradeniya, Sri Lanka
Snr. Prof. K.K.I.U. Aruna Kumara	University of Ruhuna, Sri Lanka
Snr. Prof. M.M.M. Najim	University of Kelaniya, Sri Lanka
Snr. Prof. M. Esham	Sabaragamuwa University of Sri Lanka
Snr. Prof. (Mrs.) T.H. Seran	Eastern University, Sri Lanka
Snr. Prof. (Mrs.) Vajira. P. Bulugahapitiya	University of Ruhuna, Sri Lanka
Prof. (Mrs.) Jeyaprabha Suresh	Eastern University, Sri Lanka
Prof. (Mrs.) M.R.J.C. Chandrakantha Mahendranathan	Eastern University, Sri Lanka
Prof. (Mrs.) R.F. Niranjana	Eastern University, Sri Lanka
Prof. (Ms.) W.M.A.P. Halmillawewa	University of Kelaniya, Sri Lanka
Prof. A. L. Ranawake	University of Ruhuna, Sri Lanka
Prof. G.C. Samaraweera	University of Ruhuna, Sri Lanka
Prof. Hongjing Dong	Shandong Analysis and Test Centre, Jinan, China
Prof. K. Rajendram	Eastern University, Sri Lanka
Prof. K.G.C. Senarathna	Uva Wellassa University of Sri Lanka
Prof. K.H.M.A. Deepananda	University of Ruhuna, Sri Lanka
Prof. K.R. Koswattage	Sabaragamuwa University of Sri Lanka
Prof. M. Pagthinathan	Eastern University, Sri Lanka
Prof. M. Sugirtharan	Eastern University, Sri Lanka
Prof. M.I.M. Mowjood	University of Peradeniya, Sri Lanka
Prof. Nadeeka Kumari	Rajarata University of Sri Lanka
Prof. Nalin Wijayawardene	Qujing Normal Univeristy, China
Prof. Nilantha Liyanage	University of Ruhuna, Sri Lanka
Prof. (Mrs.) P. Premanandarajah	Eastern University, Sri Lanka
Prof. (Mrs.) S. Rajika Amarasinghe	University of Ruhuna, Sri Lanka
Prof. R.G.U. Jayalal	Sabaragamuwa University of Sri Lanka
Prof. Ruvini K. Mutucumarana	Sabaragamuwa University of Sri Lanka
Prof. S. Arasaretnam	Eastern University, Sri Lanka
Prof. S. Sutharsan	Eastern University, Sri Lanka
Prof. S. Wijetunga	University of Ruhuna, Sri Lanka
Prof. T. Bhavan	Eastern University, Sri Lanka
Prof. T. Mathiventhan	Eastern University, Sri Lanka
Prof. W.A.D. Nayananjalie	Rajarata University of Sri Lanka
Prof. W. Nilantha De Silva	University of Ruhuna, Sri Lanka
Dr. (Mrs.) Dulangana Menike Hunupolagama	Eastern University, Sri Lanka
Dr. (Mrs.) J.A.A.C Wijesinghe	Wayamba University of Sri Lanka

Dr. (Mrs.) K.N. Nadeeshani Silva	University of Ruhuna, Sri Lanka
Dr. (Mrs.) Krishnal Thirumarpan	Eastern University, Sri Lanka
Dr. (Mrs.) S. Suthamathy	Eastern University, Sri Lanka
Dr. (Mrs.) Thivahary Geretharan	Eastern University, Sri Lanka
Dr. (Ms.) Kalya Subasinghe	University of Kelaniya, Sri Lanka
Dr. (Ms.) T.U.S. Peiris	Wayamba University of Sri Lanka
Dr. A. Narmilan	University of Wollongong, Australia
Dr. A.A.M. Subodinee	University of Ruhuna, Sri Lanka
Dr. A.C.P. Priyankara	University of Ruhuna, Sri Lanka
Dr. A.D.N.T. Kumara	South Eastern University of Sri Lanka
Dr. A.J.M. Harris	Eastern University, Sri Lanka
Dr. A.L.M. Rifky	Eastern University, Sri Lanka
Dr. A.M.K.A. Bandara	University of Ruhuna, Sri Lanka
Dr. A.N.M. Mubarak	South Eastern University of Sri Lanka
Dr. A.R.M.H.A Rathnayake	Rajarata University of Sri Lanka
Dr. A.S. Mahaliyana	Uva Wellassa University of Sri Lanka
Dr. Achala Rathnayaka	Mae Fah Luang University, Thailand
Dr. Anusha H. Ekanayaka	University of Sri Jayewardenepura, Sri Lanka
Dr. Anushka Upamali Rajapaksha	University of Sri Jayewardenepura, Sri Lanka
Dr. Aseni Ediriweera	Kunming Institute of Botany, China
Dr. B.L. Sanjaya Thilakarathne	University of Colombo, Sri Lanka
Dr. B.S.W. Karunarathna	Eastern University, Sri Lanka
Dr. Champika Ellawala Kankanamge	University of Ruhuna, Sri Lanka
Dr. Chathuranga Bharathee Ranaweera	General Sir John Kotelawala Defence University, Sri Lanka
Dr. D.J. Jayasanka	University of Sri Jayewardenepura, Sri Lanka
Dr. D.L.C. Kumari Fonseka	University of Ruhuna, Sri Lanka
Dr. D.M.S. Duminda	Rajarata University of Sri Lanka
Dr. D.M.S. Saumali Daundasekara	University of Peradeniya, Sri Lanka
Dr. D.W.M.M.M. Kumari	University of Sri Jayewardenepura, Sri Lanka
Dr. Dananjali Gamage	University of Ruhuna, Sri Lanka
Dr. Devanmini Halwatura	University of Colombo, Sri Lanka
Dr. Dilanthi Nadeeka Koralagama	University of Ruhuna, Sri Lanka
Dr. Dushan Kumarathunge	University of Ruhuna, Sri Lanka
Dr. Duwini Padukkage	Sri Lanka Institute of Biotechnology
Dr. E.A.C. Priyankara	Eastern University, Sri Lanka
Dr. G. Abhiram	Uva Wellassa University of Sri Lanka
Dr. G. Sumali Nivanthi Fernando	University of Ruhuna, Sri Lanka
Dr. G.E.M. Wimalasiri	Sabaragamuwa University of Sri Lanka
Dr. G.G. Bandula	Hector Kobbekaduwa Agrarian Research and Training Institute, Sri Lanka

Dr. H.D.A. Wimalarathne	Sabaragamuwa University of Sri Lanka
Dr. H.K. Priyanga P. Kariyawasam	University of Colombo, Sri Lanka
Dr. H.L.K. Sanjaya	University of Ruhuna, Sri Lanka
Dr. Himasha Rathnapriya	National Research Council, Sri Lanka
Dr. J.M.S.N. Rathnapala	University of Ruhuna, Sri Lanka
Dr. Jayani J. Wewalwela	University of Colombo, Sri Lanka
Dr. K. Prasannath	Eastern University, Sri Lanka
Dr. K. Premakumar	Eastern University, Sri Lanka
Dr. K. Sooriyakumar	University of Jaffna, Sri Lanka
Dr. K.K. Ranaweera	Tea Research Institute, Sri Lanka
Dr. K.K.L.B. Adikaram	University of Ruhuna, Sri Lanka
Dr. K.M.W. Rajawaththa	University of Ruhuna, Sri Lanka
Dr. Kaushalya Nadeeshani Wijayasekara	University of Ruhuna, Sri Lanka.
Dr. K.M.T.S. Bandara	University of Ruhuna, Sri Lanka
Dr. M.A.P. De P. Wickramarathne	University of Ruhuna, Sri Lanka
Dr. M.A.R.A. Mandanayake	Department of Agriculture, Sri Lanka
Dr. M.G. Mohamed Thariq	South Eastern University of Sri Lanka
Dr. M.G.G. Awanthi	University of Ruhuna, Sri Lanka
Dr. M.K.S.L.D. Amarathunga	Uva Wellassa University of Sri Lanka
Dr. M.P.M. Arachchi	Uva Wellassa University of Sri Lanka
Dr. M.S. Mohamed Nafees	Eastern University, Sri Lanka
Dr. M.S.V.H. Priyashadi	University of Ruhuna, Sri Lanka
Dr. M.W.A.C.S. Wijetunga	Uva Wellassa University of Sri Lanka
Dr. Madhubhashini Makehelwala	China Sri Lanka Joint Research and Demonstration Centre for Water Technology, Peradeniya, Sri Lanka
Dr. N. Varnakulendran	Eastern University, Sri Lanka
Dr. I.M. Neelaka Molagoda	Lund University, Sweden
Dr. Niluka Nakandalage	University of Ruhuna, Sri Lanka
Dr. Niranjan Kannangara	University of Ruhuna, Sri Lanka
Dr. Nisansala Vidanapathirana	University of Colombo, Sri Lanka
Dr. P.A.B.N. Perumpuli	University of Ruhuna, Sri Lanka
Dr. P.C.D. Perera	University of Ruhuna, Sri Lanka
Dr. Pilana Vithana Sajith Harshana	Griffith University, Australia
Dr. Piumi De A. Abeysundara	University of Jayewardenepura
Dr. Pranith Piyumal Ruwanpathirana	University of Ruhuna, Sri Lanka
Dr. Pubudu Darshana Kahandage	Rajarata University of Sri Lanka
Dr. R. Eeswaran	University of Jaffna, Sri Lanka
Dr. R.M.T.B. Ranathunge	Eastern University, Sri Lanka
Dr. Renuka Ariyawansha	SLTC Research University, Sri Lanka
Dr. S. Kokilananthan	The Open University of Sri Lanka
Dr. S. Ushakanthan	Eastern University, Sri Lanka

Dr. Sampath Dharmadasa	Uva Wellassa University of Sri Lanka
Dr. Sugandima Vidanagamachchi	University of Ruhuna, Sri Lanka
Dr. T. Geretharan	Eastern University, Sri Lanka
Dr. T.M.S.A. Tennakoon	Eastern University, Sri Lanka
Dr. Thanuja D.P. Liyanage	University of Ruhuna, Sri Lanka
Dr. Thilanka Ariyawansha	University of Colombo, Sri Lanka
Dr. U. Ishara Priyadarshani Perera	Department of Agriculture, Sri Lanka
Dr. U.D. Prabuddha Manjula	Uva Wellassa University of Sri Lanka
Dr. U.G.A.I. Sirisena	Rajarata University of Sri Lanka
Dr. U.G.A.T. Premathilake	Uva Wellassa University of Sri Lanka
Dr. Udari Uvindhya Rathnathunga	University of Sri Jayewardenepura, Sri Lanka
Dr. (Mrs.) Vanitha Prasannath	Eastern University, Sri Lanka
Dr. W.B.M.A.C. Bandara	University of Ruhuna, Sri Lanka
Dr. W.M. Chamila J. Wijekoon	University of Ruhuna, Sri Lanka
Dr. W.P. Kaushalya M. Abeysekera	University of Sri Jayewardenepura, Sri Lanka
Dr. W.S. Weerakkody	University of Ruhuna, Sri Lanka
Dr. Wajira Balasooriya	Wayamba University of Sri Lanka
Dr. Wishwajith Kandegama	Wayamba University of Sri Lanka
Mr. U.W. Lahiru Madhushanka Kumarasiri	Sugarcane Research Institute, Sri Lanka
Mr. B.K.A. Bellanthudawa	Chinese Academy of Sciences, Beijing, China
Mr. N.Y. Jayanath	University of Peradeniya, Sri Lanka
Mr. P.C. Arampath	University of Peradeniya, Sri Lanka
Mr. R. Kiruparajah	Eastern University, Sri Lanka
Mr. R. Thivyatharsan	Eastern University, Sri Lanka
Mr. S. Sotheeswaran	Eastern University, Sri Lanka
Mr. S. Srikrishnah	Eastern University, Sri Lanka
Mr. S.Thuvaragan	University of Jaffna, Sri Lanka
Mr. Susantha Udagedara	Blue Resources Trust, Sri Lanka
Mrs. Amuthinie Sugirtharan	Eastern University, Sri Lanka
Mrs. C.P. Rupasinghe	University of Ruhuna, Sri Lanka
Mrs. D.A.B. Nimalshanthi Gunarathna	University of Ruhuna, Sri Lanka
Mrs. E.D.J. Prince	Eastern University, Sri Lanka
Mrs. Umaramani Mathiventhan	Eastern University, Sri Lanka
Mrs. Ranahansi Bandara	Coconut Research Institute, Sri Lanka.

MESSAGE FROM THE VICE CHANCELLOR

Eastern University, Sri Lanka

It is with great pleasure that I extend my warmest congratulations to the organizing committee of the 4th International Symposium on Agriculture (ISA 2025) for bringing researchers, academics, and industry experts together to discuss *"Innovative Approaches to Modernize Agriculture for Food Security."*

Agriculture has always been the backbone of human civilization, and in today's rapidly changing world, the need for modern, sustainable, and technology-driven agricultural practices has never been more critical. The increasing challenges of climate change, resource limitations, and food security demand innovative solutions that integrate scientific advancements, digital technologies, and sustainable practices.

The ISA 2025 symposium provides a vital platform for global knowledge exchange, fostering collaborations that transcend geographical boundaries. The participation of researchers from diverse countries—including China, Pakistan, India, Thailand, Saudi Arabia, Italy, the USA, Japan, and Korea—highlights the international significance of this event. With 165 research papers submitted across various sub-tracks, this symposium is set to contribute immensely to the discourse on agricultural innovation, environmental sustainability, and food security.

As the Acting Vice-Chancellor of Eastern University, Sri Lanka, I take great pride in supporting this initiative. I commend the Faculty of Agriculture for their dedication to advancing knowledge in this field. I am confident that the insights and discussions at ISA 2025 will lead to impactful solutions that empower farmers, enhance productivity, and ensure food security for future generations.

I extend my best wishes to all participants and organizers for a successful and productive symposium. May this event serve as a catalyst for transformative advancements in global agriculture.

Prof. T Prabaharan
Acting Vice-Chancellor
Eastern University, Sri Lanka

MESSAGE FROM THE DEAN

Faculty of Agriculture, Eastern University, Sri Lanka

It is a great pleasure to give this message as the Dean, Faculty of Agriculture, for the 4th International Symposium 2025. This conference brings academics, researchers, practitioners and research students together from national and international levels to discuss how technology can contribute to sustainable solutions in the Agricultural sector under the theme "Innovative approaches to modernize Agriculture for food security" by having 8 important session tracts.

This year, we are honoured to have distinguished chief Guest Ms Azusa Kubota, Resident Representative, UNDP, Sri Lanka, and two eminent keynote speakers: Dr. Yuguang Zhou, Associate Professor, Department of Agricultural Engineering, China Agricultural University, China and Dr. Anurudda Kumara Karunarathna, Senior Lecturer, Department of Agricultural Engineering, University of Peradeniya, Sri Lanka. I extend our sincere gratitude for gracing us with their presence and invaluable contribution to setting the tone for meaningful insight.

This symposium is a calendar event of the faculty in March and provides a platform for undergraduates, and researchers to showcase their research findings each year. Dissemination of knowledge is a part of our responsibility as academics, and Symposia like this will help to fulfil that responsibility. The symposium has attracted researchers nationally and internationally, which is evidenced by the submission of over 160 abstracts, out of which 141 have been selected for oral and poster presentation. This platform offers a unique opportunity to engage in discussions that inspire new methodologies, innovative ideas, and impactful collaborations to address pressing global issues on sustainability. Apart from that, I believe this kind of event helps young researchers to learn and develop communication skills, presentation skills and teamwork other than academic work, and I hope the presenters will get a memorable experience. The existing challenges create more demands on the higher education system to be more adaptable and resilient, and focusing on developing employability skills through research is becoming crucial.

I take this opportunity to thank the Chief guest, keynote speakers, Editorial Board, reviewers, panel chairs and panel members for their intellectual contribution to making this symposium a success. I would also like to thank the sponsors for their support in conducting this symposium in a grand manner. As we all know organizing this kind of event on annual basis is not an easy task. I wish to congratulate the symposium Coordinator, Secretory and all the committee members for their commitment and handwork in organizing this international symposium in a fruitful manner.

Finally, I take this opportunity to wish all presenters and the participants for all success and wish a very pleasant and rewarding experience at the 4th ISA 2025, Faculty of Agriculture, Eastern University, Sri Lanka.

Prof. (Mrs.) P. Premanandarajah
Dean/Faculty of Agriculture, Eastern University, Sri Lanka

MESSAGE FROM THE COORDINATOR

4th International Symposium on Agriculture 2025

It is an honor to share this message for the 4th International Symposium on Agriculture (ISA 2025), organized by the Faculty of Agriculture, Eastern University, Sri Lanka. Providing an essential space for scholarly engagement, this symposium facilitates advancing knowledge, critical dialogue, and transformative agricultural solutions.

As food security, climate change, and resource scarcity escalate, groundbreaking research and innovation are more crucial than ever. Addressing these complexities requires interdisciplinary collaboration, technological advancements, and sustainable strategies to enhance agricultural resilience.

This symposium brings scholars, practitioners, and industry leaders together to foster knowledge exchange and drive progress in modern agriculture. The insights shared here will contribute to policy development, technological adaptation, and strengthening sustainable food systems at regional and global levels.

The success of this symposium is a testament to the unwavering efforts of the organizing committee, esteemed keynote speakers, diligent reviewers, and dedicated contributors, for which I am truly grateful. I am confident that ISA 2025 will inspire meaningful discussions and impactful solutions that will shape the future of agriculture.

Dr. T.M.S.A Tennakoon
Coordinator/ISA 2025

MESSAGE FROM THE SECRETARY

4th International Symposium on Agriculture 2025

The 4th International Symposium on Agriculture (ISA 2025), organized by the Faculty of Agriculture, Eastern University, Sri Lanka, serves as a significant platform for researchers, academics, professionals, and students to explore advancements in agricultural sciences.

Agriculture is undergoing a profound transformation, driven by technological advancements, precision agriculture, automation, and data-driven decision-making. The integration of electronics, sensors, IoT, robotics, AI, process automation, smart irrigation, environmental monitoring, and real-time data analytics plays a crucial role in enhancing agricultural productivity, sustainability, and resilience against climate change.

With the theme "Innovative Approaches to Modernize Agriculture for Food Security," ISA 2025 emphasizes the importance of integrating advanced technologies and sustainable practices to ensure efficient and resilient food production systems. The symposium covers a diverse range of topics, including digital and climate-smart agriculture, soil-water- environment interactions, post-harvest technologies, and sustainable livestock management. These focus areas are essential for addressing global challenges such as climate change, resource scarcity, and food security while promoting sustainable agricultural practices.

The success of ISA 2025 is the result of the collective effort of the organizing committee, faculty members, reviewers, technical staff, students, and sponsors. Their dedication and hard work have been instrumental in bringing together experts and stakeholders to facilitate meaningful discussions and collaborations. Through knowledge exchange and collaboration, ISA 2025 aims to contribute to the advancement of modern agriculture, ensuring a more sustainable and food-secure future.

Mr. G. Niroash
Secretary/ISA 2025

ADDRESS FROM THE CHIEF GUEST

4th International Symposium on Agriculture

I would like to congratulate the Eastern University, Sri Lanka for convening the 4th International Symposium on Agriculture, a vital platform for knowledge exchange at a time when global challenges are becoming increasingly interconnected, and food security is a critical concern. This year's theme, "*Innovative Approaches to Modernize Agriculture for Food Security,"* is both timely and essential in shaping the future of sustainable food systems.

The world faces unprecedented challenges. From climate change and population growth to resource depletion, these inter-connected challenges together threaten our ability to feed future generations. Innovation will be key in overcoming these barriers and building climate resilient, resource-efficient agricultural systems that ensure food security for everyone, everywhere

At UNDP, we are committed to fostering innovative approaches that not only increase agricultural productivity but also prioritize environmental sustainability, climate resilience, and social inclusivity. Through ongoing community-based agriculture and sustainable energy projects, UNDP together with its partners are working to mainstream climate-smart agriculture. We are introducing nature-based solutions, regenerative farming techniques, and digital climate advisory services that empower farmers with real-time data for climate-resilient decision-making. Additionally, we are promoting renewable energy integration in agriculture, such as solar-powered irrigation systems and energy-efficient post-harvest technologies, to reduce costs and enhance productivity. These on the ground initiatives directly support our work with the government on policies and target setting exercise to operationalize the country's global commitments, such as the Paris Agreement.

While technological advancements offer great promise, they must be accompanied by a strong commitment to equity and inclusivity. It is crucial that the benefits of agricultural modernization reach smallholder farmers, women, and vulnerable communities who are often marginalized in this transformation. Gender- responsive climate action is a key pillar of UNDP's projects including the Government of Japan funded Climate Promise initiative. We are working to bridge gender disparities in agriculture by promoting women's access to climate-smart technologies, finance, and decision-making platforms. Strengthening linkages between agriculture, gender equality, and social protection is fundamental to ensuring a just and inclusive transition for all.

As students and researchers, you play an essential role in driving this transformation. Your innovations, research and ideas form the foundation for the next generation of agricultural solutions. I encourage you to embrace interdisciplinary approaches, leverage emerging technologies, and champion solutions that are not only innovative but also inclusive and environmentally sustainable. UNDP is committed to bridging research with policies and practices at all levels to ensure evidence-based actions for greater results and impact for the farmers and the long-lasting food security for everyone.

This symposium is a testament to the power of collaborative knowledge exchange in shaping a more sustainable agricultural future. I look forward to the insightful discussions and tangible solutions that will emerge from this symposium. I also acknowledge the unwavering financial support provided by the Government and People of Japan to make our contributions a possibility to this important symposium.

Together, we can drive the agricultural sector transformation that is needed to enhance food security, strengthen rural livelihoods, and protect our planet.

Azusa Kubota
Resident Representative
UNDP in Sri Lanka

KEYNOTE ADDRESS

Overview of Straw Molding Fuel Development and Clean Heat Supply in Rural China

Dear All, I'm Dr.Yuguang Zhou from China Agricultural University. Today, let's talk about the development of straw molding fuel and the status of clean heat supply in rural areas of China. In northern rural areas of China, residents rely heavily on coal for heating. The direct combustion of bulk coal not only causes severe air pollution but also has low energy efficiency. To address this, China is vigorously promoting the clean heating revolution.

Straw molding fuel and biomass - based clean heating technologies play crucial roles. Straw molding fuel, processed through biomass compression molding technology, has many advantages. It has a relatively high density and calorific value, similar to medium - quality bituminous coal. It burns well, is easy to ignite, produces less smoke, and has low pollutant emissions, making it an environmentally - friendly fuel option.

The production of biomass pellet fuel involves a series of processes such as drying, pulverization, humidity adjustment, granulation, and cooling. These processes ensure the quality of the fuel. Biomass pyrolysis technology also offers new ways to utilize biomass resources. Under oxygen - poor or limited - oxygen conditions, biomass pyrolysis can produce valuable products, contributing to the energy field.

Biomass boilers, which use biomass as fuel, have lower emissions compared to coal - fired boilers. In rural clean heating, different energy sources and heating equipment have different thermal efficiencies. Clean energy sources like biomass pellets show significant advantages in this aspect.

China's clean heating revolution has achieved remarkable results. A large - scale civil energy transformation project has been completed, a large amount of bulk coal use has been controlled, and the clean heating rate has increased significantly. Biomass - based clean heating technologies are becoming increasingly important in rural areas due to their low heating costs, small environmental impact, and the potential for carbon - trading - based additional income.

In conclusion, the development of straw molding fuel and clean heat supply in rural China is of great significance for environmental protection, energy conservation, and rural development. We should continue to promote the research, development, and application of these technologies to build a more sustainable future for rural areas.

Thank you!

Dr. Yuguang Zhou
Associate Professor,
Department of Agricultural Engineering
Chinese Agricultural University
China

KEYNOTE ADDRESS

Biochar: Technological innovations to enhance agricultural productivity and environmental health

Biochar, a material characterized by its high carbon content and generated through the pyrolysis of biomass, has emerged as a multifaceted and sustainable solution addressing a variety of environmental, agricultural, and energy-related issues. Recent progress in biochar research has revealed pioneering methodologies aimed at augmenting its properties and broadening its applications. This paper investigates these groundbreaking advancements, with particular emphasis on production techniques, functionalization, nanotechnology, environmental remediation, energy applications, and agricultural implementations.

Pyrolysis represents the predominant technique for biochar production, defined as a thermochemical process capable of concurrently converting solid biomass into a liquid known as bio-oil, a solid termed biochar, and a gas identified as syngas. This process entails the thermal treatment of organic materials at temperatures exceeding 300°C in an environment devoid of or with restricted oxygen. Advancing beyond traditional biochar manufacturing methods, contemporary innovative production techniques have markedly enhanced the efficiency and applicability of biochar. Sophisticated methodologies, such as microwave pyrolysis, advanced recirculatory reactors, fluidized bed reactors, and down draft double chamber pyrolysers, for instance, provide a sustainable approach for generating high-quality biochar from organic waste materials, including agricultural, industrial, and municipal residues. Such methodologies not only present an environmentally benign solution for waste management but also yield biochar exhibiting elevated adsorption capacities, thereby enhancing its efficacy in the treatment of wastewater and contaminants. Furthermore, cost- effective, user-friendly, and efficient low-budget techniques, such as drum and pit kilns, have undergone improvements, thereby increasing the accessibility of biochar for economically disadvantaged farmers.

Biochar contributes to the enhancement of soil health by augmenting organic matter content, refining soil structure, and improving nutrient retention capabilities. It functions as a soil conditioner, enhancing cation exchange capacity and water retention capacity, which are essential components for sustainable agricultural practices. Additionally, biochar enhances plant resilience against biotic and abiotic stresses, including drought and salinity, through improved efficiency in water utilization and nutrient uptake. Moreover, biochar fosters the proliferation of beneficial soil microorganisms, such as arbuscular mycorrhizae, which further enhances nutrient absorption and boost plant disease resistance. The incorporation of biochar within integrated nutrient management frameworks diminishes the reliance on synthetic fertilizers, thereby reducing the financial burdens on agricultural producers. Furthermore, it augments agricultural output and enhances the quality of produce, thereby facilitating increased profitability. Agricultural inputs derived from biochar,

including liquid fertilizers, slow-release fertilizers, and organic amendments, present supplementary avenues for revenue generation for both farmers and associated industries. Thus, biochar effectively mitigates food security challenges by bolstering agricultural productivity, particularly in areas characterized by soil degradation. It empowers smallholder farmers by offering an economically viable and sustainable resolution to challenges concerning soil fertility and climate change. Additionally, biochar promotes rural development by generating employment opportunities within the spheres of biochar production and its application.

Biochar serves as a mechanism for carbon sequestration within soils, thereby mitigating climate change effects by diminishing net atmospheric CO_2 concentrations. Its stable configuration enables it to persist in the soil for centuries, rendering it a valuable instrument for long-term carbon storage. This process of carbon sequestration concurrently enhances soil fertility and structural integrity, thereby creating a mutually beneficial scenario for both agricultural and environmental outcomes. Additionally, the production of biochar from organic waste diminishes reliance on fossil fuels, thereby contributing to the establishment of a circular economy.

Biochar has emerged as a fundamental element in environmental remediation, particularly in the realms of water and air purification. Biochar-aided advanced oxidation and anaerobic digestion processes have demonstrated efficacy in the degradation of refractory contaminants. Engineered biochar composites have also been effectively utilized in the removal of heavy metals and organic pollutants from aquatic environments, highlighting their versatility in environmental remediation initiatives. Furthermore, biochar reduces the bioavailability of heavy metals and contaminants in soils, thereby enhancing environmental safety.

The prohibitive costs associated with the production and application of biochar represent a formidable obstacle to its broader implementation. It is imperative to enhance production scales and diminish costs through industrialization and technological innovation to render biochar accessible to smallholder farmers. Moreover, the absence of standardized protocols governing biochar production and application undermines its consistent efficacy across diverse geographical locales. The establishment of comprehensive guidelines for the production, characterization, and application of biochar is vital to ensure its effectiveness and safety.

Notwithstanding its potential, significant knowledge deficits exist concerning the long-term impacts of biochar on soil health and ecosystem dynamics. Additional research is essential to elucidate its behavior within freshwater ecosystems and its relationship with black carbon emissions. Furthermore, the mechanistic underpinnings of biochar's interactions with soil microbiota and plant systems warrant further investigation. The advent of nanobiochar has inaugurated novel prospects for sustainable agricultural practices and environmental remediation. However, despite its promise, research into nanobiochar remains nascent, necessitating further inquiry into its toxicity and

environmental ramifications. Expanding biochar production through industrial means and developing biochar-based products can facilitate its broader acceptance and accessibility. Establishing markets for biochar and its derivative products is critical for ensuring its commercial viability and sustainability.

In the context of Sri Lanka, it is essential to formulate supportive policies and regulatory frameworks to foster the adoption of biochar and guarantee its safe and effective utilization. Stakeholders, including governmental bodies, universities, and research institutions, should prioritize investment in research, development, and extension services to aid in the integration of biochar into agricultural methodologies. In summary, biochar presents innovative strategies to modernize agricultural practices and bolster food security. Its capacity to enhance soil health, sequester carbon, and promote sustainable agricultural practices renders it an invaluable asset in addressing global challenges. However, the realization of its full potential necessitates the resolution of issues related to production costs, standardization, and existing knowledge deficiencies. By incorporating biochar into agricultural practices and amplifying its production and application, we can unlock its advantages for a sustainable and food-secure future.

Dr. Anurudda Kumara Karunarathna
Department of Agricultural Engineering
Faculty of Agriculture
University of Peradeniya
anujica@agri.pdn.ac.lk

CONTENTS

ORAL PRESENTATIONS

AGRICULTURAL ECONOMICS AND EXTENSION

CROP PRODUCTION AND BIODIVERSITY CONSERVATION

CROP PROTECTION TECHNOLOGY AND BIOTECHNOLOGY

DIGITAL AND CLIMATE SMART AGRICULTURE

SUSTAINABLE LIVESTOCK AND AQUACULTURE MANAGEMENT

SOIL, WATER, ENERGY, AND ENVIRONMENT

FOOD AND NUTRITION

MEDICINAL PLANTS AND PHYTOCHEMICALS

POSTER PRESENTATIONS

AGRICULTURAL ECONOMICS AND EXTENSION

CROP PRODUCTION AND BIODIVERSITY CONSERVATION

CROP PROTECTION AND BIOTECHNOLOGY

DIGITAL AND CLIMATE SMART AGRICULTURE

SOIL, WATER, ENERGY AND ENVIRONMENT

FOOD AND NUTRITION

MEDICINAL PLANTS AND PHYTOCHEMICALS

ORAL PRESENTATIONS

AGRICULTURAL ECONOMICS AND EXTENSION

MILK POWDER CONSUMPTION PATTERN BEFORE AND AFTER THE MILK POWDER SHORTAGE: A STUDY IN THE WESTERN PROVINCE, SRI LANKA

A.M. Amarasinghe[1*], M.G.A. Subhashini[1], R.A.S. Lakmali[1] and U.B.E. Sasanka[1]

[1]*Department of Agribusiness Management, Faculty of Agricultural Sciences, Sabaragamuwa University of Sri Lanka*

Abstract

In Sri Lanka, milk powder has traditionally been the most common method of milk consumption, unlike fresh milk in other countries and this trend was continuing for nearly four decades. However, the recent economic crisis led to a shortage of milk powder within the country since late 2019, impacting its availability & usage. This issue might lead to changes in consumption patterns, where still lack of scientific research evidence. This study examined the impact of the milk powder shortage on milk consumption patterns in the Western Province of Sri Lanka. Data were collected from 198 households contacted conveniently using a structured questionnaire focusing on changes in consumption behaviours, influencing factors, and adaptive strategies. The majority of the sample was participants aged 41–60 years (70%) and female respondents (60.1%). The results revealed a significant reduction in milk powder consumption, with an average monthly decrease of 0.63 kilograms per household ($p < 0.05$). The shortage prompted consumers to rely more on locally produced milk powder while reducing consumption of imported brands, marking a substantial shift in consumer behaviour toward local products. To adapt, households diversified their milk consumption patterns by turning to fresh milk (64.6%), malted drinks (43.9%), and plant-based alternatives (10.6%). Further, 14.1% of participants ceased milk consumption entirely. Multiple linear regression (Adjusted $R^2 = 0.75$) confirmed that price, availability, health consciousness, and substitutes were the most significant determinants of consumption patterns ($p<0.05$). This study underscores the behavioural adjustments made in response to economic and market challenges, highlighting the necessity for improved supply chain resilience, enhanced consumer education, and supportive government policies sustaining local dairy production and diversifying milk powder sources within the country. The findings offer valuable insights on consumer adaptability during commodity shortages, providing practical implications for policymakers, industry stakeholders focused on food security and supply chain management.

Keywords: Consumption adjustments, Consumption pattern, Milk powder, Milk powder Shortage, Sri Lanka

**Corresponding author: amarasingheayesha381@gmail.com*

STAKEHOLDER PARTICIPATION AND CONTRIBUTION IN AGRICULTURAL WATER RESOURCE MANAGEMENT IN WEERAYADI ANICUT COMMAND AREA

M.N. Izzathul Nuha[1*] and M. Sugirtharan[1]

[1]*Department of Agricultural Engineering, Faculty of Agriculture, Eastern University, Sri Lanka*

Abstract

Agricultural Water Resource Management (AWRM) is a fundamental aspect of agricultural systems worldwide. Anicut based agricultural systems are crucial for improving food security and livelihood in rural Sri Lanka. The collaborative management of agricultural water (AW) requires the active participation of various stakeholders. However, several factors influence stakeholders' participation in AWRM. This study, conducted from July to November 2024, aimed to assess stakeholders' participation in water resource management in the Weerayadi anicut command area of Ampara district Sri Lanka. Primary data was collected from 100 stakeholders using a stratified random sampling method, and analyzed through SPSS [Statistical Package for Social Sciences] version 20, employing Descriptive statistics, and Chi-square analysis to determine the associations between variables. Findings revealed that there is a significant disparity exists, as only 35% of stakeholders participate in the water committee activities. Socio-economic factors such as education level, income level, family size, and household head have significantly influenced participatory approaches in AWRM. And, Socio-cultural factors such as cultural norms and traditions negatively impacted participation particularly gender roles lead to marginalization of women. Additionally, process-related factors within water user associations, such as lack of accountability, inclusivity, and transparency further hindered their participation. The key challenges identified include limited understanding of water management techniques, lack of education and knowledge on water resource management strategies, lack of interest, time and venues are not conductive, lack of trust, spread of untrue information, and gender imbalance and marginalization of women. Despite these challenges, legal, policy, and institutional reform, promoting awareness programs, implementing education and training programs, promoting gender equality, support from divisional and district level officials' approaches could increase the stakeholder's participation in AWRM in this study area.

Keywords: Anicut irrigation scheme, Challenges, Stakeholder participation, Sustainability, Water resource management

**Corresponding author: nuhanafar@gmail.com*

CONSUMER PREFERENCE FOR STREET FOODS IN COLOMBO DS DIVISION, SRI LANKA

H.G.V. Shandhi[1*], A.L.S. Wijesinghe[1], W.M.C.D. Wijesinghe[1] and S.H.P. Malkanthi[1]

[1]*Department of Agribusiness Management, Faculty of Agricultural Sciences, Sabaragamuwa University of Sri Lanka*

Abstract

This study aims to assess the street food preferences of consumers in the Colombo DS division in Colombo District. Currently, urban food culture heavily relies on street food because it provides tasty, convenient, and reasonably priced options. The purpose of this study was to examine the behaviours of frequent street food consumers, their willingness to pay more for improved quality or hygiene, and the importance of factors like taste, price, convenience, cleanliness, and variety in their selection process. The research was carried out in the Colombo DS division in Colombo District. We used an online survey from October to November 2024 using a - snowball sampling method, up to a total sample of 150 participants. Statistical tools, namely regression analysis, reliability tests, and descriptive statistics, were used to analyse the data using SPSS software. The findings, revealed that the frequency of street food consumption is significantly influenced by demographic factors like occupation and income level. Consumers show a moderate willingness to pay more for street food made with better ingredients or with more stringent hygienic guidelines. The taste was found to be the most important factor influencing consumer decisions among the evaluated attributes, while cost and convenience came as the second and the third factors respectively. The results emphasize that the rest of the consumers seek factors among taste, affordability, convenience, and hygiene when choosing street food. In order to receive better prices for street foods, vendors should place a high priority on food safety, hygiene, and high-quality ingredients. They can improve consumers' loyalty and satisfy the changing tastes by serving a variety of foods, providing wholesome options, and leveraging social media engagement.

Keywords: Colombo district, Consumer behaviour, Consumer preferences, Quality perception, Street food

**Corresponding author: vidyagamage1999@gmail.com*

KEY DRIVERS AND IMPACTS OF PART-TIME EMPLOYMENT AMONG UNIVERSITY UNDERGRADUATES IN SRI LANKA

Y.G.R.N.M. Jayaweera[1*], D.M.D.I. Prabodhanie[1] and L.G.S.M. Sathsarani[1]

[1]*Department of Agribusiness Management, Faculty of Agricultural Sciences, Sabaragamuwa University of Sri Lanka*

Abstract

This study explores the willingness of Sri Lankan university undergraduates to engage in part-time employment alongside their academic pursuits. With increasing financial demands and the growing need for practical experience during undergraduate studies, understanding this phenomenon is crucial. The research aims to identify key motivations, benefits, challenges, and their impacts on students' academic performance and overall well-being. Data were collected through a structured questionnaire administered to 250 undergraduates from public universities in Sri Lanka, utilizing a convenience sampling method. A quantitative approach was adopted, employing statistical analyses such as descriptive statistics and inferential tests. The sample encompassed students from diverse academic disciplines, providing a comprehensive perspective on trends in part-time employment among undergraduates. The findings reveal that financial necessity is the primary driver of part-time employment, followed by the desire to gain work experience and develop practical skills. Notably, 72.8% of respondents reported improved time management skills as a result of part-time work, while 61.2% indicated positive effects on their academic performance. Nonetheless, significant challenges were identified, including difficulties in balancing academic and work responsibilities, time constraints, and increased stress levels. Despite these obstacles, 77.1% of students expressed a willingness to engage in part-time work in the future, highlighting the perceived benefits of career preparation and financial independence. The study provides the importance of institutional and employer support in enabling students to effectively balance work and academics. Recommendations include the adoption of flexible academic policies, the provision of career-oriented job opportunities, and training in time management. Employers are also encouraged to offer flexible work schedules, particularly during exam periods, to accommodate students' academic commitments. Future research should investigate the long-term career implications of part-time work and identify specific job types that offer the greatest benefits for employability.

Keywords: Academic performance, Financial need, Part-time employment, Time management, University undergraduates

**Corresponding author: ruwanijw99@gmail.com*

EXPLORING THE DEMAND FOR HOME-COOKED MEAL DELIVERY SERVICES IN URBAN SRI LANKA: INSIGHTS FROM THE KADUWELA DS DIVISION

H.P.T. Perera[1*], R.D.C. Prabuddhika[1] and M.G.I. Sewwandi[1]

[1]*Department of Agribusiness Management, Faculty of Agricultural Sciences, Sabaragamuwa University of Sri Lanka*

Abstract

After the Covid-19 pandemic, online food ordering experienced rapid growth in Sri Lanka, driven by increasingly busy lifestyles. However, this shift in eating habits has also led to health concerns and growing dissatisfaction among consumers. To address these issues, this research explores the demand for home-cooked meal delivery services in the Kaduwela DS division of Sri Lanka. The study examines factors influencing the demand for online food delivery services, as well as usage patterns, customer satisfaction levels, and areas for improvement in home-cooked meal delivery offerings. Data for the study were collected from 150 respondents in the Kaduwela DS division using a structured online questionnaire distributed via convenience sampling. A quantitative approach was applied, with data analyzed through SPSS software using descriptive statistics and multiple linear regression. The findings revealed that 85% of respondents used online food delivery services, though 49.3% reported negative experiences. Notably, only 43% of respondents used home-cooked meal delivery services. The multiple linear regression (Adjusted $R^2 = 0.60$) revealed that demand for online food delivery is influenced by healthy food options, nutritional value, delivery time, price, and packaging quality ($p < 0.05$). The study identified young adults, particularly women aged 20-30, as the primary consumer segment. Dinner was the most frequently ordered meal, with traditional Sri Lankan dishes like rice and curry being the top choice. Uber Eats emerged as the most popular platform for placing orders. Customers expressed satisfaction with home-cooked meal delivery services, particularly regarding taste (91%) and healthiness (75%), and 83% indicated they would recommend the service to others. Customers preferred improvements like customizable meal plans, nutritional transparency, loyalty programs, flexible portion sizes, eco-friendly packaging, and app-based ordering. These insights can help service providers enhance customer satisfaction, tailor offerings to market needs, and contribute to the development of Sri Lanka's food delivery industry.

Keywords: Busy lifestyles, Customer satisfaction, Food delivery industry, Home-cooked meal delivery services, Kaduwela DS Division

**Corresponding author: teranapiyumi@gmail.com*

MARKET POTENTIAL FOR TARO-BASED COOKIES IN KURUNEGALA DISTRICT

M.N.U. Gunathilaka[1*], I.F. Nifasa[1], P. Saranya[1], S.H.P. Malkanthi[1] and U.V.E. Sasanka[1]

[1]*Department of Agribusiness Management, Faculty of Agricultural Sciences, Sabaragamuwa University of Sri Lanka*

Abstract

This study evaluates the market feasibility of taro-based cookies in Sri Lanka's snack industry, focusing on the Kurunegala district. While various snacks are available, taro-based options remain largely unexplored, presenting an opportunity for market expansion. Taro is a nutrient-rich root crop with a high starch, fiber, and mineral content, making it a viable alternative ingredient for cookies. The study assessed consumer awareness, perceptions, and market potential for taro cookies. Data was collected from 135 respondents using taste-test interviews through a convenience sampling technique from May to December 2024. Data were analyzed using descriptive statistics. Findings indicate that taste, nutritional value, and price are the most influential factors in consumer preferences. Most (59%) preferred crunchy cookies, while 68% favored chocolate flavor. Additionally, 67.4% had never seen taro-based products in stores, highlighting distribution and awareness gaps. The study identifies significant market potential, as 59.3% of respondents expressed willingness to purchase taro cookies at a reasonable price range of Rs. 201–250 for a 100g packet. The target market is predominantly young (87.4% aged 19-35 years) and female (80.4%), with significant purchasing power. Awareness campaigns are essential, as 77.8% were unfamiliar with value-added taro products. Expanding distribution networks is also crucial, as 42.2% of respondents stated that taro-based cookies were unavailable in their area. Further recommendations include offering eco-friendly packaging and introducing additional flavors to cater to consumer preferences. This research provides a foundation for developing strategies to promote taro cookies as a nutritious and appealing snack in Sri Lanka.

Keywords: Consumer preferences, Kurunegala district, Product attributes, Purchase intention, Taro-based cookies

**Corresponding author: mnugunathilaka@std.agri.sab.ac.lk*

CONSUMER AWARENESS ON FOOD QUALITY STANDARDS OF PACKAGED FOOD PRODUCTS: A COMPARATIVE STUDY AMONG X, Y, AND Z GENERATIONS IN SABARAGAMUWA PROVINCE, SRI LANKA.

G.H.M.N.D. Karunarathna[1*], M.S.R. Samarakoon[1] and V. Aravinth[1]

[1]*Department of Agribusiness Management, Faculty of Agricultural Sciences, Sabaragamuwa University of Sri Lanka*

Abstract

In today's fast-paced world, packaged food products have become a staple in many individual's diets of across different age groups. With the increasing reliance on these convenient food options, it is crucial to ensure that consumers know the quality standards governing these products. This research studied consumer awareness on the food quality standards of packaged foods, focusing on the generational differences of Generations X, Y, and Z in the Sabaragamuwa Province of Sri Lanka. Convenient sampling was used, and 334 respondents were analyzed to identify variations in awareness and the factors that influence it. Data analysis involved descriptive statistics, correlation, and multiple regression. Findings indicate that Generation Z demonstrated the highest awareness (mean score: 3.64), attributed to their extensive use of digital platforms, while Generation X showed the lowest awareness (mean score: 2.42), relying primarily on traditional sources. It was found that knowledge, trust quality, attitudes, exposure to information, and cultural factors were significant determinants. However, the influence of media and past experiences showed some negative impacts. Only 4.8% of respondents have a high level of awareness about the quality standards. Whereas 38.3% have a neutral level of awareness. The study has highlighted a significant knowledge gap in food quality indicators, such as certification and nutrition labels, and calls for consumer education strategies tailored to specific needs. Most of the generation X and Y consumers were not considered about the quality indicators and they have lower level of awareness rather than generation Z consumers. This includes recommendations for using digital platforms for younger generations and traditional communication for older generations, simplified labeling, and targeted outreach in rural areas. In this way, the research hopes to contribute to improved public health outcomes and informed consumer choices about the safety and quality of their food.

Keywords: Consumer awareness, Food quality standards, Generational differences, Packaged food products, X, Y and Z generations

**Corresponding author: nadunidhanushka@gmail.com*

IMPACT OF SPRINKLER IRRIGATION ON YIELD AND CULTIVATION COSTS IN GROUNDNUT AND JUMBO PEANUT FARMING IN KILINOCHCHI DISTRICT

T. Lathusha[1*], K. Sooriyakumar[1], S. Sivashankar[1] and S. Sarujan[1]

[1]*Department of Agricultural Economics, Faculty of Agriculture, University of Jaffna, Sri Lanka*

Abstract

The adoption of climate-smart agricultural practices has become essential for mitigating the challenges posed by climate change in dry-zone agriculture. However, the effectiveness of these practices remains uncertain due to low awareness and poor adoption rate of such technologies, especially among small-scale farmers. Therefore, this study focuses on the adoption of a climate-smart practice- sprinkler irrigation- by small-scale groundnut and jumbo peanut producers in northern Sri Lanka and evaluates its effectiveness of sprinkler irrigation adoption on farm outcomes such as yield and cultivation cost. Primary data for this study were collected using stratified random sampling technique from 257 small-scale farmers engaged in ground nut and Jumbo peanut cultivation in the Kilinochchi district in northern Sri Lanka. The dataset includes farm output measures, adoption status, and socio-demographic characteristics of farm households. Among jumbo peanut farmers, 124 are adopters of sprinkler irrigation practices, and 50 have not. Among the groundnut farmers, 31 are adopters, and 52 are non-adopters. The impact of sprinkler adoption was estimated using propensity score matching technique. The results indicate that sprinkler adopters experience a yield increase of 178 kg per acre for groundnuts and 30 kg per acre for jumbo peanuts compared to non-adopters. Additionally, the results show that sprinkler adopters experience a reduction in cultivation cost by Rs. 45,040 per acre in groundnut cultivation and by Rs. 59,399 per acre in jumbo peanut cultivation compared to their counterparts. These findings highlight the importance of adopting of sprinkler irrigation as a viable strategy to mitigate the climate challenges faced by small-scale groundnut and jumbo peanut producers.

Keywords: Climate smart agriculture, Groundnut, Jumbo peanut, Propensity score matching, Sprinkler irrigation.

**Corresponding author: thavarajah3lathu@gmail.com*

CONSUMER AWARENESS AND WILLINGNESS TO PAY MORE FOR ECO-FRIENDLY PACKAGING: A STUDY IN WESTERN PROVINCE, SRI LANKA

A.P.G.Y. Dias[1*], A.E.P. Veenavi [1], P.G.A.S. Nawarathna[1] and U.B.E. Sasanka[1]

[1]*Department of Agribusiness Management, Faculty of Agricultural Sciences, Sabaragamuwa University of Sri Lanka*

Abstract

Consumer behavior is being shifted significantly towards eco-friendly packaging today, due to heightened concern of environmental sustainability on the global scale. Although this concern is prevalent in worldwide, there is a significant lack of empirical research in Sri Lankan context. This study explored consumer awareness and perceptions on eco-friendly packaging, willingness to pay a premium for such packaging, and the factors influencing this willingness. The research was conducted in the Western Province of Sri Lanka where high variety of consumers presents. Due to the unavailability of an accepted sampling frame, a sample of 204 conveniently selected participants were asked to respond to an online questionnaire, and the data collected were analyzed using descriptive statistics and ordinal logistic regression. The findings revealed that 70.6% of respondents were aware of eco-friendly packaging, and 74.5% agreed that it is essential for environmental protection. However, 56.9% occasionally purchase eco-friendly packaged products and only 11.3% do so frequently, indicates a gap between awareness and actual behavior. Regarding the willingness to pay, though 54.4% are willing to pay up to 5% more, 14.2% are unwilling to pay any premium. Key factors influencing willingness included product quality (67.6%), personal environmental concerns (61.3%) and price considerations (35.8%). Ordinal logistic regression highlighted that financial considerations and consumer preferences as significant predictors of willingness to pay more for eco-friendly packages ($p<0.05$). The study underscores the importance of bridging the gap between awareness and action through public education, cost-reduction strategies, and enhanced packaging quality. Financial support for producers and government-led initiatives are recommended to encourage adoption and promote sustainable consumer behavior.

Keywords: Consumer behavior, Consumer preferences, Eco-friendly packaging, Environmental sustainability, Willingness to pay

**Corresponding author: yadeepa.d@gmail.com*

EXPLORING SRI LANKAN CONSUMERS' LEVEL OF AWARENESS AND WILLINGNESS TO PAY FOR CULTURED MEAT: A STUDY IN WESTERN PROVINCE, SRI LANKA

W.M.M.G.S.N. Rajapaksha[1], D.S.S. Jayasooriya[1], R.S.W.B.M.T. Gamage[1] and U.B.E. Sasanka[1]

[1]*Department of Agribusiness Management, Faculty of Agricultural Sciences, Sabaragamuwa University of Sri Lanka*

Abstract

Cultured meat is manufactured by cultivating animal cells in a controlled environment, offering a sustainable alternative to traditional meat production. Cultured meat reduces resource use, minimizes environmental impacts, enhances animal welfare, mitigates zoonotic disease risks, and strengthens food security, while addressing population's protein needs amidst rising global meat demand. However, there is a lack of research evidence regarding consumer preference for cultured meat in Sri Lanka context. This study explored Sri Lankan consumers' level of awareness and willingness to pay for cultured meat in the Western Province. The study aimed to assess current level of awareness, factors associated with willingness to pay, and consumer attitudes, preferences, benefits, and barriers towards cultured meat compared to traditional meat. A structured online questionnaire was used to collect data from 225 consumers belonging to different demographic chores. There were 25 close-ended questions. The data were analyzed using descriptive statistics and chi-square tests. Findings show that 50.2% were somewhat familiar with cultured meat, 2.7% very familiar, and 47.1% unfamiliar, indicating its novelty in Sri Lanka and 49% of consumers showed willingness where 31% showed neutrality to purchase cultured meat if the price and taste the same as traditional meat. Being sensitive to price, 32% expressed a willingness to pay 10% more for cultured meat. Chi-square analysis revealed nutritional value (χ^2 =45.653, p=0.001), health benefits (χ^2 = 28.402, p=0.028), taste (χ^2 = 36.753, p=0.002), texture (χ^2 = 37.456, p=0.002), safety (χ^2 = 31.789, p=0.046), and demographic factors like dietary preferences (χ^2 = 16.511, P=0.036) and monthly household income (χ^2 = 32.745, P=0.036) were significantly associated with willingness to pay ($p < 0.05$). Price (χ^2 = 13.850, p= 0.310), appearance (χ^2 = 22.122, p=0.139), environmental friendliness (χ^2 = 24.196, p=0.085), ethical concerns (χ^2 = 23.479, p=0.492), recommendations (χ^2 = 30.321, p = 0.065), cost (χ^2 = 30.138, p = 0.180) and other demographics such as age, gender, residence, education, occupation were not significantly associated with willingness to purchase cultured meat ($p > 0.05$). Meat consumers and people with higher incomes were more willing to pay for cultured meat. Cultured meat was perceived as environmentally friendly, safe, and nutritious rather than traditional meat. Nonetheless, perceived barriers such as limited availability, lack of trust, insufficient information, artificial production, and concerns taste & texture remained. Policymakers should promote consumer education, establish safety regulations, support affordability, and incentivize local production to enhance cultured meat adoption in Sri Lanka.

Keywords: Consumer attitudes, Consumer awareness, Cultured meat, Sustainable food, Willingness to pay

**Corresponding author: sandurajapaksha00@gmail.com*

KNOWLEDGE, ATTITUDE, AND PRACTICES ON DISPOSAL OF USED SHARP WASTE IN HOME SETTINGS AMONG INSULIN SELF-INJECTING DIABETIC PATIENTS ATTENDING THE CLINICS AT TEACHING HOSPITAL BATTICALOA, SRI LANKA.

W.P.A. Karunarathna[1], M.S.M. Anas[1], B.M.C.N. Basnayaka[1*] and S. Shanmukanathan[1]

[1]*Department of Supplementary Health Sciences, Faculty of Health Care Sciences, Eastern University, Sri Lanka.*

Abstract

Patients with diabetes mellitus must successfully manage their illness at home because it is a worldwide health concern. However, there are serious health and environmental dangers associated with incorrect disposal of used sharp waste. This study examines the knowledge, attitudes, and practices of 110 diabetic patients at Teaching Hospital Batticaloa who self- inject insulin with relation to disposing of sharp waste. Data was gathered using a validated questionnaire, and SPSS 26 was used for analysis. The findings highlight the need for educational efforts by pointing to a lack of awareness and inappropriate disposal methods. Recommendations for policy and community education are proposed.

Keywords: Attitude, Diabetes Mellitus, Knowledge, Needles, Sharp waste disposal

***Corresponding author: *chamodi97nisansala@gmail.com*

THE ROLE OF RURAL HOME GARDEN FOR HOUSEHOLD FOOD SECURITY: A STUDY OF DRY ZONE IN SRI LANKA

E.I.E. Sulochana[1*], W.M.G.D. Wijesundara[1] and D.C. Chandrasekara[1]

[1]*Climate Resilience Integrated Water Management Project, United Nation Development Program – Sri Lanka*

Abstract

Home gardens have been recognized globally as a multifunctional strategy to enhance food security. They play a crucial role, particularly in the context of climate change and natural resource degradation. They contribute significantly to food security by providing direct access to fresh produce at the household level, strengthening community resilience and local food distribution networks at the village level, and supporting national food supply chains and agricultural sustainability. This paper discusses the role of home gardens in addressing household food security and identifies the factors that influence food security in the dry zone of Sri Lanka. The study was conducted across seven districts in the dry zone, with a randomly selected sample of 1,968 home gardens. Data were collected using a pre-tested questionnaire through interviews with respondents and direct observations by trained enumerators. The findings reveal that the majority of home gardens were located in Anuradhapura, with 52% categorized as small-scale across all districts. Approximately 64% of households were Samurdhi beneficiaries, and 67% of home gardens were primarily practiced at a subsistence level, while 33% were operated commercially. Year-round home gardening was a considerable factor in food security, with 55% of home gardens being maintained throughout the year. Vegetable was the majority of products, although their availability was relatively high across all districts. Excess produce was often sold, generating additional income for households. In addition to other staple foods, playing a vital role in household food security. This study highlights the potential of systematic home gardening in the rural dry zones of Sri Lanka as a sustainable strategy for enhancing household food security. The diverse food items produced, including staple food, vegetables, fruits, cereals, and animal products, provide a critical source of food security and income for households.

Keywords: Home garden, Dry zone, Food Security, climate change, household

**Corresponding author: ishanerandika93@gmail.com*

ASSESSMENT OF CROPPING SYSTEMS AND THEIR CHALLENGES IN THE DRY ZONE: A CASE STUDY FROM KINNIYA, TRINCOMALEE DISTRICT, SRI LANKA

M.S.M. Issath[1], K. Jeyavanan[2*] and T. Sivananthawerl[2]

[1] *Department of Agronomy, Faculty of Agriculture, University of Jaffna, Sri Lanka*
[2] *Department of Crop Science, Faculty of Agriculture, University of Peradeniya, Sri Lanka*

Abstract

Farmers in the dry zone of Sri Lanka, particularly in the Kinniya area of the Trincomalee District, adopt various cropping systems, but present conditions and their challenges have not been studied. This study aims to assess the current state of cropping systems in the region. A total of 40 farmers were randomly selected from different villages and interviewed using a pre-tested structured questionnaire. The study explored land use, cropping systems, agronomic practices, and economic aspects of farming. The average landholding size was 0.97 acres, with cultivated land averaging 0.93 acres. Farmers managed land under three ownership types: own land, government land, and partner land, with government land having the largest average (1.64 acres). Soil fertility (95%) and proximity to water sources (75%) were the main factors influencing land selection. Major cropping systems were intercropping (47.5%) and monocropping (45%) and limited to mixed cropping. Vegetables like okra, brinjal, and tomato were primarily intercropped, while field crops such as maize, cassava, and paddy were grown in monocropping systems. Most farmers (62.5%) cultivated during both the *Yala* and *Maha* seasons. Common agronomic practices included land preparation, watering, and weeding, with less adoption of trellising and mulching. Inorganic fertilizers and agrochemicals were widely used, while organic fertilizers were adopted by 75% of farmers. Major challenges included lack of rural credit (60%) and land availability (52.5%). The study highlights the need for improved agronomic practices, credit access, and infrastructure to boost productivity and profitability.

Keywords: Cropping systems, Eastern province, Present status, Sri Lanka

**Corresponding author: kjvanan@univ.jfn.ac.lk*

ASSESSING THE PRACTICAL APPLICATION OF AGRICULTURAL EXTENSION KNOWLEDGE BY AGRICULTURAL UNDERGRADUATES AT SABARAGAMUWA UNIVERSITY OF SRI LANKA

N.W.J.V. Hansika[1*], K.M.K. Madusani[1], R.M.K.D. Rathnayake[1] and N.M.H.I. Nayakarathne[1]

[1]*Department of Export Agriculture, Faculty of Agricultural Sciences, Sabaragamuwa University of Sri Lanka, Belihuloya*

Abstract

Agricultural extension plays a crucial role in bridging the gap between farmers and up-to-date agricultural knowledge. This study evaluated the agricultural extension knowledge and practical skills of agricultural undergraduates at Sabaragamuwa University of Sri Lanka, identifying factors limiting knowledge application and exploring career motivations. A self-administered questionnaire was distributed to 150 randomly selected undergraduates, with data analyzed using descriptive and inferential statistics. The majority of respondents were female (81.33%), aged 24-26 (71.33%), and resided in semi-urban areas. Findings revealed that 48.4% of undergraduates had moderate awareness of agricultural extension, with average comprehension of core concepts. Over half (50%) had engaged in extension services through workshops (48.3%), farm visits (48.3%), and training (46%). A substantial 60% were unaware of extension career roles, and only 17.3% expressed interest in pursuing such a career. Limited opportunities (66.7%), resources (71.3%), low salaries, and limited career advancement (73%) were identified as major deterrents. Despite these challenges, respondents recognized the rewards of agricultural extension, with 63% citing farmer empowerment and 54% highlighting contributions to food security. A significant association ($p = 0.034$) emerged between prior participation in extension activities and interest in becoming an extension officer. Individuals with prior experience were more likely to express a desire for such a career. Encouragingly, 90.7% of respondents were interested in pursuing this field and sought professional certification courses. Over 75% were willing to enhance their skills through enhanced technical opportunities. This study reveals a gap in agricultural extension education, as undergraduates are eager to engage in this area, viewing it as a promising career. University-level programs and opportunities, in collaboration with government and private sectors, can address this knowledge gap. These findings are presented based on the responses of agricultural undergraduates of Sabaragamuwa University of Sri Lanka and can be further expanded upon to gain a broader understanding of this area. Effective agricultural extension services can contribute to agricultural sustainability and food security by enhancing agricultural productivity.

Keywords: Agricultural extension, Career aspirations, Extension service, Knowledge application

**Corresponding author: nwjvhansika@std.agri.sab.ac.lk*

DEVELOPMENT AND QUALITY EVALUATION OF NUTRIONALLY ENRICHED JAM INCORPORATING HIBISCUS FLOWER -*Hibiscus rosa-sinensis* (HFJ)

T. Jansan[1*], J.A.N. Gimhani[1] and S. Kartika[2]

[1]*Department of Food Technology, Institute for Agro-technology and Rural Sciences, University of Colombo, Sri Lanka*
[2]*Sri Lanka German Training Institute, Kilinochchi, Sri Lanka*

Abstract

This study investigates the development of a hibiscus flower-based jam aimed at providing a plant-based alternative with desirable sensory and physicochemical properties. The research involved optimizing the jam's composition through various formulations, including blending, boiling, and oven drying of hibiscus flowers. Three distinct ratios of hibiscus flower to added sugar, pectin and citric acid (100:250, 100:250, 100:250) were tested to determine the most effective formulation. Sensory evaluation assessed attributes such as appearance, taste, texture, aroma, color, and overall acceptability, while physicochemical analysis measured titratable acidity, pH, ash content, moisture content, Brix content, protein content, fat content, sugar content, salt content, and energy content. Among the formulations, the T1 (Hibiscus flower boiled) sample was acceptable as the most favorable based on sensory attributes. The T1 sample had a pH value of 3.55 ± 0.07 , titratable acidity of 0.72±0.02 g/100ml, moisture content of 1.48±0.06 , ash content of 1.48±0.06 g/100g, total Brix content of 73.0±0.00, total protein content of 0.16±0.00 g/100g, total sugar content of 69.24±0.02 g/100g, total fat content of 0.09±0.00 g/100g, total salt content of 0.80±0.00 g/100g, and total energy content of 467.66±0.16 g/100g.The findings indicate that hibiscus flower jam is both palatable and nutritious, with a pleasant flavor profile, appealing pink color, and texture similar to traditional jams. The optimized formulation offers a balanced nutritional profile, including essential proteins and healthy fats. Sensory evaluations showed high consumer acceptability, suggesting commercial potential for this plant-based product. This research supports the development of sustainable, plant-based food alternatives and highlights the feasibility of hibiscus flower jam as a viable option for consumers seeking nutritious and flavorful products.

Keywords: Hibiscus flower jam, sensory evaluation, nutritional analysis, formulations processing techniques.

**Corresponding author: ttjansan@gmail.com*

CROP PRODUCTION AND BIODIVERSITY CONSERVATION

EVALUATING THE POTENTIAL OF ORGANIC FOLIAR SPRAYS ON GROWTH AND YIELD OF BRINJAL (*Solanum melongena* L.) UNDER INTEGRATED PLANT NUTRIENT MANAGEMENT

K. Kajeevan[1*], A.F. Imthath Ahamed[1], N. Gnanavelrajah[1], A. Amirthalojanan[2] and S. Sivanesan[2]

[1]*Department of Agricultural Chemistry Faculty of Agriculture, University of Jaffna, Sri Lanka*
[2]*Regional Agriculture Research and Development Centre, Kilinochchi, Sri Lanka*

Abstract

The current agricultural system relies heavily on chemical fertilizers, yet excessive use leads to significant environmental and health issues. While a complete shift to organic fertilizers isn't entirely feasible, Integrated Plant Nutrient Management (IPNM) provides a balanced and sustainable alternative to reduce reliance on inorganic fertilizers while maintaining productivity. In this background, this research study examined the combined effect of two organic foliar sprays namely, Azolla and Banana pseudo-stem formulations with reduced inorganic or organic fertilizers levels on brinjal (*Solanum melongena* L.) growth and yield. The research was conducted at the Regional Agricultural Research and Development Centre, Kilinochchi. Brinjal growth and yield were assessed with four replicates and six treatments namely; T1-100% inorganic fertilizer (Department Recommendation – DR), T2-100% organic (cattle manure – CM), T3-50% DR + Azolla formulation (AF), T4-50% DR + Banana pseudo-stem formulation (BF), T5-50% CM + AF, and T6-50% CM + BF in Randomized Complete Block Design (RCBD). AF and BF were applied as foliar sprays at 650 L/ha, with all other practices following Department of Agriculture (DOA) guidelines. Plant height, leaf length, and width to estimate leaf area index (LAI), and yield were recorded and analyzed using ANOVA, with mean separation by Duncan's Multiple Range Test (DMRT). Results showed that T1 (100% DR) had the highest plant height, though T3 (50% DR + AF) was not significantly different. T3 had the highest LAI however there was no significant difference between T1. With regards to yield, T1 (100% DR) recorded the highest yield across four pickings, while T6 (50% CM + BF) had the lowest yield. However, yield differences between T1 and T3 were not significant. T3 (50% DR + AF) performed comparably to T1 (100% DR) in all parameters. These findings indicate that the Azolla formulation can be a viable organic fertilizer alternative, potentially reducing reliance on chemical fertilizers without compromising crop yield.

Keywords: Azolla formulation, Banana pseudo-stem, Integrated Plant Nutrient Management (IPNM), Organic foliar sprays, Sustainable agriculture

**Corresponding author: jkasthuri@univ.jfn.ac.lk*

NOSTOC GROWN IN PARBOILED EFFLUENT AS A BIOFERTILIZER IN COMBINATION WITH INORGANIC FERTILIZERS FOR PADDY CULTIVATION IN THE DRY ZONE OF SRI LANKA

A.M.C. Jayawardhana[1*], N. Gnanavelrajah[1], S. Sivaneson[2] and A. Ponnegipprenthiraraja[2]

[1]*Department of Agriculture Chemistry, Faculty of Agriculture, University of Jaffna, Sri Lanka*
[2]*Rice Research Station, Department of Agriculture, Paranthan, Sri Lanka*

Abstract

Rice is the staple food of Sri Lanka. Fertilizer application is one of the avenues in improving paddy yield. Cyanobacteria biofertilizers contain both micronutrients and macronutrients which can be used to reduce the usage of inorganic fertilizers and ensure environmental sustainability. However, the cultivation of cyanobacteria demands a nutrient medium. As rice parboiled water is rich in nutrients, it could be used as a low-cost growing medium for *Nostoc*. *Nostoc* is a genus cyanobacteria and fix atmospheric nitrogen into plant available form. The mass culture of *Nostoc* was done in 460 L parboiled water for 28 days with 2000 lux light intensity and 200 rpm shaking provided by aerators. A field trial was conducted at the rice research station in Paranthan to study the effectiveness of *Nostoc* with urea inorganic fertilizer combination on growth performance and yield of paddy variety Bw 312. The experiment design was RCBD with four treatments with four replicates. Treatments were T1 - control, T2 – 100 % urea + P and K fertilizers, T3 – 75 % urea + 100 % P and K fertilizers, T4 – 75 % urea+ 100 % P and K fertilizers + *Nostoc* foliar application. Plant height, leaf length, number of leaves, and number of tillers were measured as vegetative parameters. The final grain yield was measured as the reproductive parameter. Data analysis was done by using a Statistical analytical system with LSD mean separation at P=0.05. Considering all parameters, T4 was recorded as significantly higher or equal results than T2 in both vegetative and reproductive parameters. From the study results, it can be concluded that using parboiled water as a medium for *Nostoc* cultivation provides an eco-friendly alternative to partially substitute synthetic nitrogen fertilizers for paddy cultivation.

Keywords: *Nostoc*, Bio-fertilizer, Paddy cultivation

**Corresponding author: mewanche1999@gmail.com*

SELECTION OF THE OPTIMAL STEM CUTTING TYPE FOR PRODUCING HIGH QUALITY PLANTING MATERIAL IN BETEL (*Piper betle* L.)

R.M.M.L. Rathnayake[1,2*], H.M.P.A. Subasinghe[2], R.M. Fonseka[1] and T. Sivananthawerl[1,3]

[1]*Postgraduate Institute of Agriculture, University of Peradeniya, Sri Lanka*
[2]*Department of Export Agriculture, Peradeniya, Sri Lanka*
[3]*Faculty of Agriculture, University of Peradeniya, Sri Lanka*

Abstract

Betel is an economically and medicinally important cash crop that belongs to the family Piperaceae, often known as the "green gold". It is an important export agricultural crop in Sri Lanka and is grown for the domestic and export markets majorly in Gampaha and Kurunegala districts. The most used variety is "*Narammali*". It is propagated through stem cuttings and the availability of high-quality planting material is a limiting factor for expanding the crop. Even though the variety is popular, studies on the production of quality planting material by this variety is scanty. Therefore, this experiment was carried out with the variety "*Narammali*" in naturally ventilated net house at Intercropping and Betel Research Station, Narammala to select high yielding and high-quality planting material of betel for field establishment using three types of stem cuttings; T1- Three nodal stem cutting (control), T2- Four nodal stem cutting, T3- Five nodal stem cutting. The experiment was laid out in a Complete Randomized Design with three treatments and four replicates. Data were collected two weeks intervals. Significantly ($P< 0.05$) high root fresh weight (1.33±0.23 g), root dry weight (0.17±0.03 g) and total root length (88.44±7.69 cm) were observed from three nodal stem cutting (T1) which is more related to field establishment. The highest survival rate was observed in four nodal stem cutting (T2). However, the highest shoot parameters including shoot length (12.84± 1.83 cm), and shoot fresh weight (4.22± 0.42 cm) were recorded in T3; five nodal stem cutting. With the promising results on root parameters, T1 showed the lowest number of days for 50% shoot initiation (17.5). The results indicated that selection of T1 is better in ensuring better field establishment and smaller size cuttings facilitate the production of more number of plants.

Keywords: Root fresh weight, Stem cutting, Shoot length, Shoot parameters, Survival rate

**Corresponding author: madhavilrathnayake@gmail.com*

EFFECT OF CYANOBACTERIA BIOFERTILIZER ON GROWTH AND YIELD OF HYDROPONICS LETTUCE

R. Rushanthi[1*], N. Gnanavelrajah[1] and R. Ratnayake[2]

[1] *Department of Agricultural Chemistry, Soil Science, Faculty of Agriculture, University of Jaffna, Sri Lanka*
[2] *Microbiology and Soil Ecosystem, National Institute of Fundamental Studies, Kandy, Sri Lanka*

Abstract

Hydroponics offers a sustainable alternative solution for land degradation. However, due to the high cost of production and limited availability of Albert solution, farmers are unable to sustain with this soilless medium. This has led to seeking alternate source of nutrients for hydroponics. *Nostoc* is a biofertilizer which is an excellent source of essential plant nutrients, however, it also demands a growing medium. Therefore, this study was conducted to assess the growth of *Nostoc* in dairy effluent medium and to assess the potential of *Nostoc* either alone or in combination with albert solution on growth and yield of hydroponics lettuce (Grand rapid F1 variety). The lettuce seedlings were transplanted after 14 days to the small containers. The nitrogen percentage of biofertilizer adjusted according to the albert solution. The experimental design was CRD with eight treatments and five replicates. Treatments were, T1-100% Albert, T2-75% Albert + 25% Nostoc, T3-50% Albert + 50% Nostoc, T4-25% Albert + 75% Nostoc, T5-100% Nostoc, T6-75% Nostoc + 25% Nostoc foliar, T7-150% Nostoc, T8-200% Nostoc. Vegetative parameters and biochemical properties of lettuce were measured. ANOVA and Duncan Multiple Range Test at P = 0.05 were performed using Statistical Analytical System (University version). The plant height (31.16 cm), fresh weight of root (3.44 g) and shoot (10.89 g), chlorophyll a (1.44 mg/ml), carotene (5.45 mg/ml) and total phosphate content (2.29%) were the highest for T4. The highest FRAP value (4.23 ppm) was recorded in T1. There was a significant different with all other treatments. Highest nitrate content (16.57 ppm) was recorded in T3 and there was a significant difference with other treatments. The highest chlorophyll-b content (7.4017 mg/ml) was recorded in T6. As the marketable quality of lettuce depends on fresh weight, T4 is suggested as an alternative media instead of T1.

Keywords: Hydroponics, *Nostoc*, Plant height, Fresh weight of root and shoot

**Corresponding author: ramanrusha@gmail.com*

ASSESSING GROWTH PERFORMANCE OF WATERMELON (*Citrullus lanatus*) AGAINST BIOFERTILIZER ENRICHED WITH AZOLLA AS AN ENHANCER OF NITROGEN CONTENT

B.L.D. Deepali[1*] and M.I.S. Safeena[1]

[1]*Department of Biosystems Technology, Faculty of Technology, Eastern University, Sri Lanka*

Abstract

The challenge of nitrogen depletion in municipal solid waste (MSW) compost limits its efficacy as a nutrient source for plants. To address this, dry Azolla was incorporated into Municipal solid waste compost to enhance its nitrogen content. The objective of this study was to increase the nitrogen content of Municipal solid compost to 5% and evaluate its impact on watermelon growth and yield. The study was conducted at the Fruit Research and Development Institute (FRDI), Kananwila, Horana, Sri Lanka, using a Randomized Complete Block Design (RCBD) with six treatments and three replicates per treatment across 90 pots. Treatments included: T1 (Control: 16 kg topsoil + 0 compost), T2 (16 kg topsoil + 101.47 g MSW compost), T3 (16 kg topsoil + 34.5 g nitrogen-rich fertilizer), T4 (16 kg topsoil + chemical fertilizers: Urea, TSP, MOP), T5 (16 kg topsoil + 50% chemical fertilizer + 50% Municipal solid compost), and T6 (16 kg topsoil + 50% chemical fertilizer + 50% Azolla-enhanced N fertilizer). Dry Azolla successfully enhanced the nitrogen content of Municipal solid waste compost increasing from 1.7% to 5%, while also phosphorus (0.85%) and potassium (6.1 ppm). Data was analyzed using the Minitab 19 statistical software (version 2021). And ANOVA was performed to determine statistical significance ($p<0.05$). The findings indicated that there is no significant among the treatments T4, T6, and T5 and they showed similar effects on vine length, vine weight, and chlorophyll content ($P > 0.05$). Specifically, after 2 weeks of planting, T4 had a vine length of 5.95 ± 0.33 cm and 6.00 ± 0.50 cm after 4 weeks, with chlorophyll content of 45.3 ± 9.38 at 6 weeks. T6 demonstrated root weight (0.643 ± 0.214 g) and leaf weight (41.5 ± 15.8 g) compared to the other treatments. Regarding vine fresh weight, T6 recorded 98.8 ± 40.1 g with leaves, and T4 showed 62.6 ± 30.2 g without leaves. In reference to fruit quality, T4 achieved the highest fruit weight (2927 ± 556 g) and fruit circumference (39.417 ± 0.712 cm), while T6 showed the highest Brix value (10.217 ± 0.289) and pH (5.893 ± 0.027), suggesting superior sweetness and overall fruit quality. Additionally, T6 had the highest edible matter content (889 ± 185 g). Although multiple treatments showed comparable vegetative growth, the combination of 50% chemical fertilizer and 50% Azolla-enhanced fertilizer (T6) showed promising results in promoting watermelon growth and improving fruit quality, making it a potential alternative to conventional fertilization methods for the salable character of the fruit.

Keywords: Azolla, Biofertilizer, Growth response, Municipal solid waste compost, Watermelon.

**Corresponding author*: *bldevinideepali@gmail.com*

IMPACT OF DIFFERENT POTTING MEDIA ON GROWTH, YIELD AND QUALITY PERFORMANCE OF LUFFA (*Luffa acutangula*) UNDER SHADE NET CONDITION

S. Ladsika[1], L. Pradheeban[1*] and K. Thanusan[1]

[1] *Department of Agronomy, Faculty of Agriculture, University of Jaffna, Sri Lanka*

Abstract

Utilizing organic waste in agriculture can lessen the demand for chemical fertilizers and make up for the soil's lack of organic carbon. Demand for luffa in Asia is increasing due to its multiple uses. An experiment was conducted to evaluate the effect of different potting media on growth, yield and quality responses of luffa (*Luffa acutangula*) under shade net conditions at the crop farm, faculty of Agriculture, Ariviyal Nagar, Kilinochchi from April to June in 2022. The pot experiment was carried out in Completely Randomized design (CRD) with six replicates. Potting materials were Topsoil, compost, dried *Azolla*, *Gliricidia* leaves, *Moringa* leaves, peanut shell, and mesquite leaves. Six treatments were provided with different potting media. Treatment 1 used as control (topsoil: compost at ratio (v/v) of 1:2) (T1), Treatment 2 (topsoil: compost: dried *Gliricidia* leaves at ratio of 1:1:1) (T2), Treatment 3 (topsoil: compost: dried *Moringa* leaves, 1:1:1) (T3), Treatment 4 (topsoil: compost: peanuts shell, 1:1:1) (T4), Treatment 5 (topsoil: compost: dried mesquite leaves,1:1:1) (T5), Treatment 6 (topsoil: compost: dried *Azolla*, 1:1:1) (T6) for ridge gourd (NAGA F1). Seedlings were planted in each pot, and other agronomic practices were done based on the recommendation of the Department of Agriculture. Growth parameters number of leaves and branches per plant were recorded at a weekly interval. At the time of flowering, number of male and female flowers were recorded regularly. At the time of harvesting, the number of fruits per plant, fruits circumference, length, weight of fruits, and yield per plant were measured. Data were analyzed to determine the difference between treatments by using SAS 9.1 for Anova and Mean separation was done by using the Duncan method at p value of 0.05 to identify the best treatment. The results indicated that potting materials have a significant ($p<0.05$) effect on luffa growth, yield and quality under shade net condition. The highest number of leaves, branches, and average weight of fruit (455g) of luffa plant were obtained in treatment 4 (peanuts shell). The maximum number of male (172) and female (12) flowers, fruit length (46 cm) was recorded in treatment 5 (mesquite leaf). The highest number of fruits per plant, the highest fruit circumference (14.7 cm), weight (340 g) and yield (1 Kg) were received in treatment 6 (T6) among the tested media grown under shade net condition. It can be concluded that usage of dried *Azolla* potting material with topsoil and compost (T6) is the suitable medium to improve the growth, yield and quality performances of luffa grown in pots under shade-net conditions.

Keywords: *Azolla*, Luffa, Potting media, Shade net, Treatment

**Corresponding author: lohap@univ.jfn.ac.lk*

EXPLORING THE HIDDEN DIVERSITY OF FRESHWATER HYPHOMYCETES IN LENTIC FRESHWATER HABITATS IN ANURADHAPURA DISTRICT, SRI LANKA

S.D.M.K. Wimalasena[1,2], N.N. Wijayawardene[2,3,4*], T.C. Bamunuarachchige[2], T.N. Withana[2], R.G. Udeni Jayalal[5], D.J. Bhat[6], T.M. Dawoud[6], H.K.S. de Zoysa[2] and Dong-Qin Dai[3]

[1]*Faculty of Graduate Studies, Sabaragamuwa University of Sri Lanka, Belihuloya 70140, Sri Lanka*
[2]*Department of Bioprocess Technology, Faculty of Technology, Rajarata University of Sri Lanka, Mihintale 50300, Sri Lanka*
[3]*Center for Yunnan Plateau Biological Resources Protection and Utilization, Qujing Normal University, Qujing, Yunnan Province 655011, P.R. China*
[4]*Tropical Microbiology Research Foundation, 96/N/10, Meemanagoda Road, Pannipitiya 10230, Sri Lanka*
[5]*Department of Natural Resources, Faculty of Applied Sciences, Sabaragamuwa University of Sri Lanka, Belihuloya 70140, Sri Lanka*
[6]*Department of Botany and Microbiology, College of Science, King Saud University, P.O. Box 2455, Riyadh 11451, Saudi Arabia*

Abstract

The distribution of freshwater habitats associated with irrigation schemes in the Anuradhapura district of Sri Lanka covers approximately 102,200 acres and exhibit remarkable biodiversity including freshwater fungi. However, knowledge of conventional aquatic fungal groups, particularly freshwater hyphomycetes, in Sri Lanka is poor and needs to be completed. This study represents a preliminary effort to identify the freshwater hyphomycetes in foam samples collected from freshwater habitats in the Anuradhapura district. Accordingly, foam samples were systematically collected from five lentic freshwater habitats, *viz*. Mahakanadara, Abhaya, Nuwara, Rajanganaya, and Tissa tanks and one lotic freshwater stream, the Malwathu Oya. Microscopic examination revealed the presence of freshwater hyphomycetes in the foam of three of the lentic habitats (Mahakanadara, Nuwara, and Rajanganaya tanks). Foam samples from the other locations predominantly comprised plant detritus, algal cells, and insect fragments. The fungal taxa identified based on micro-morphological characteristics included *Alternaria* spp., *Curvularia* spp., *Corynespora* spp., *Drechslera* spp., and *Exosporium* spp. These identifications were made by examining the conidial morphology and further comparing them to established descriptions in the literature. Efforts to isolate and culture these taxa were not successful. Given the limitations of traditional culture-based methods, this study proposes a shift towards culture-independent techniques, such as metagenomic sequencing, as a more reliable approach for identifying freshwater hyphomycetes.

Keywords: Culture-independent method, Foam sampling, Metagenomic, Micro-morphological characteristics.

**Corresponding author: nalinwijayawardene@yahoo.com*

HIGH-DENSITY PLANTING IN COTTON: NANO NUTRIENTS FOR MAXIMUM GROWTH AND YIELD

E. Mahachandramuki[1*], K. Thirukumaran[1] and P. Parasuraman[1]

[1]*Department of Agronomy, Tamil Nadu Agricultural University, Coimbatore 641003, India*

Abstract

A field experiment was conducted from February to July 2023 at Tamil Nadu Agricultural University, Coimbatore, to assess assessed the impact of foliar nutrition with new formulations IFFCO Nano Fertilizers like Nano urea Plus and Nano DAP on rice fallow cotton in a high-density planting system. The study aimed to evaluate the effects on growth, physiological attributes and yield components under zero tillage. Treatments included control with potassium only, Recommended Dose of Fertilizer (RDF) and various combinations of nitrogen and phosphorus (RDN&P) with conventional urea, Nano Urea Plus (NUP), and nano DAP at 25, 45, and 65 days after sowing (DAS). Results showed that foliar nutrition of 1% NUP and 0.5% nano DAP at 25 and 45 DAS, along with 50% RDN&P (T_{10}), significantly improved plant height and leaf area index. Physiological parameters like chlorophyll content, nitrate reductase activity, and soluble protein were high under application of (T_7) 50% RDN&P with 1005 K along with foliar application of 0.5% NUP and 0.5% Nano DAP. Yield attribute such as boll count/plant were was enhanced, while fiber quality remained unaffected. The highest seed cotton yield (kg ha^{-1}) and net returns (Rs ha^{-1}) were achieved with foliar application of 0.5% NUP and 0.5% Nano DAP at 25 and 45 DAS along with 50% RDN&P and 100% potassium (T_7) demonstrating the economic benefits of nano formulations over conventional urea and RDF.

Keywords: Foliar nutrition, High density planting system, IFFCO nano fertilizers.

**Corresponding author: emaha1999@gmail.com*

ORGANIC COTTON PRODUCTION: ANALYZING THE IMPACT OF ORGANIC MANURES ON GROWTH, YIELD AND PROFITABILITY

K. Thirukumaran[1*], E. Mahachandramuki[1], K. Nagarajan[1], V. Saitheja[1], R. Karthikeyan[2] and P. Parasuraman[1]

[1]*Department of Agronomy, Tamil Nadu Agricultural University, Coimbatore 641003, India.*
[2] *Directorate of Crop Management, Tamil Nadu Agricultural University, Coimbatore 641003, India.*

Abstract

This experiment Project on Cotton focuses on evaluating various organic and inorganic treatments to enhance the growth and yield of organic cotton (*G. hirsutum* variety). This project included eleven treatments: T_1 (absolute control with no organic or inorganic inputs), T_2 (control with recommended dose of nitrogen through inorganic means), and T_3 (recommended dose of nutrients through organic sources based on phosphorus equivalent basis). Additional treatments involved seed treatment and soil application of recommended biofertilizers along with foliar application of Pink Pigmented Facultative Methylotrophs (PPFM) (T_4), application of neem cake at 250 kg/ha (T_5), and incorporation of sun hemp or fodder cowpea between rows before flowering (T6). Other treatments examined the effects of intercropping with legumes such as green gram, black gram, groundnut, or soybean (T_7), as well as combinations of these approaches (T_8: $T_4 + T_5$, T_9: $T_4 + T_6$, T_{10}: $T_4 + T_5 + T_6$, and T_{11}: $T_4 + T_5 + T_7$). Through this comprehensive study, the project aims to determine the most effective methods for improving the sustainability and productivity of organic cotton cultivation.

Keywords: *Organic manures, Cotton, PPFM.*

**Corresponding author: thirukumaran.tnau.ac.in*

MITIGATING TRANSPLANTING SHOCK IN RICE (*Oryza sativa*): EVALUATING ORGANIC COMPOST MEDIA IN MODIFIED DAPOG NURSERIES

M.G. Pathirana[1] and H.M.A.S.B. Jayasinghe[2*]

[1] *Faculty of Agriculture, University of Peradeniya, Peradeniya, Sri Lanka*
[2] *Graduate School of Agriculture, Kagawa University, Kagawa, Japan*

Abstract

Rice, the primary food crop for over half of the global population, faces challenges in increasing production to meet the rising demand driven by population growth. Transplanting, with advancements in agricultural machinery, offers multiple benefits over direct seeding, including solutions to labor shortages, improved planting efficiency, reduced uneven emergence, and facilitated weed management. However, transplanting often delays rice development due to the abiotic stress known as transplanting shock. This study aimed to evaluate the potential of different organic compost materials in mitigating transplanting shock and promoting early growth in transplanted rice using the modified dapog nursery method. Four compost media: kitchen waste compost, soybean residue compost, alfalfa (*Medicago sativa*) compost, and ordinary commercial compost were used to prepare dapog nurseries, with direct seeding and wet-bed nurseries serving as controls. The pot experiment was conducted under controlled environmental conditions using a completely randomized design. There were fifteen replicates, with each replicate consisting of a single plant. Significant differences among treatments were observed in root length, plant height, SPAD value, and H_2O_2 concentration during four days and eight days after transplant. Results showed that alfalfa compost significantly enhanced plant height, green leaf count, root development, and SPAD values while reducing H_2O_2 concentration compared to other tested compost amendments and wet-bed nursery, indicating lower oxidative stress. Plants treated with alfalfa compost exhibited the best recovery from transplanting shock, likely due to the presence of triacontanol, a plant growth-promoting compound. In contrast, direct-seeded plants and those from wet bed nurseries demonstrated lower growth and higher H_2O_2 levels. The study concludes that alfalfa compost effectively alleviates transplanting shock, promotes early seedling growth, and supports sustainable rice production, highlighting its potential to enhance rice yield and quality.

Keywords: Modified dapog nursery, Organic compost, *Oryza sativa*, Transplanting shock, Triacontanol

**Corresponding Author: arunasanjayaagri@gmail.com*

EFFECT OF CAPITULA HARVEST TIME ON SEED QUALITY OF THREE ZINNIA (*Zinnia elegans* Jacq.) CULTIVARS

A.H.A.I. Upamali[1] and S. Sivachandiran[1*]

[1]*Department of Agronomy, Faculty of Agriculture, University of Jaffna, Sri Lanka*

Abstract

Zinnias are one of the easiest flowering plants to grow and bloom heavily in dry zone. Their flowers could be effectively used in landscaping and decorations. Obtaining high-quality seeds is the biggest limiting factor in zinnia cultivation. Considering its commercial potential as a cut flower, a field trial was conducted to find out the proper harvesting time of flower capitula to obtain high quality seeds for three common cultivars of zinnia (single petal plants, semi double petals plants and fully double petals plants). Three capitula harvesting periods (25-35 days after flowering (DAF), 36-45 DAF and 46-50 DAF were tested. The experiment was carried out in a two-factor factorial design with three replicates in complete randomized design from April to August 2023 at Integrated Farm of the Faculty of Agriculture, University of Jaffna. Germination percentages and the seeds were planted and their growth and flowering parameters were recorded to ensure the flower quality. All the analysis was performed using SAS 9.1 software package at $p < 0.05$. Germination rates are significantly high in the seeds harvested between 46 -50 DAF in all three cultivars. Growth parameters and flower traits are also shown significantly higher performance in the plants propagated from the seeds harvested from 46-50 DAF in the fully doubled petal plants except the number of flowers which remained the same across all three cultivars. Seeds harvested 25-35 DAF showed a poor germination rate and not recommended for propagation. From this study, it could be recommended that the Zinnia seeds harvested at 46-50 DAF could be used for commercial seed production which has high germination percentage.

Keywords: Capitula harvest time, Floral characteristics, Germination percentage, Seed quality

**Corresponding author: ssivamathy@univ.jfn.ac.lk*

THE IMPACT OF ADVERSE WEATHER CONDITIONS ON TEA YIELD IN THE LOW COUNTRY WET ZONE OF SRI LANKA.

I.L.G. Rathnayake[1*], S.M.W. Senevirathna[2] and D.V.D. Hemalika[3]

[1] *Centre for Environmental Science and Sustainable Development, The Open University of Sri Lanka.*
[2]*Department of Zoology, Faculty of Natural Sciences, The Open University of Sri Lanka.*
[3]*Department of Chemistry, Faculty of Natural Sciences, The Open University of Sri Lanka.*

Abstract

Sri Lanka, a small island nation famous for its weight in the global tea industry, provides ideal climatic conditions for cultivating a wide range of tea *(Camellia sinensis (L.) O. Kuntze)* varieties. In this study**,** the impact of adverse weather conditions on tea yield in the low country wet zone of Sri Lanka was investigated to identify optimal climatic conditions for tea growth while investigating the influence of climatic variables on tea productivity and determining adverse weather conditions, effect on tea yield employing a quantitative method. Average temperature, rainfall, relative humidity, tea yield, and fertilizer application information were collected over 8 months. Correlation analysis was used to assess the relationship between climatic variables and tea yield. Average temperature (27.2 °C - 29.6 °C) from September to November of 2023 led to a higher tea yield of 149 kg per week in an acre. Higher temperatures (29.6 ^{0}C – 34.3 ^{o}C) reduced tea yield from mid-January to March end of 2024 with a weak negative linear relationship between average temperature and tea yield in 2023. High rainfall (above 71.8 mm) and low rainfall (below 39 mm) negatively impact tea yield. There was a period (from the 28th of January to the 10th of February 2024) of no rainfall-related low tea yield, and the 25th of February in 2024 resulted in zero tea yield, indicating a strong positive correlation between average rainfall and tea yield. The relative humidity range (70-85 %) is associated with a wide range of tea yield from 0 to 148 Kg. The lowest relative humidity recorded was 69%, with a corresponding yield of 63 kg in February of 2024. The correlation between relative humidity and tea yield is not strictly linear. Warmer temperatures (27.2°C - 29.6°C), adequate rainfall (39mm to 71.8mm), and a 70-85% relative humidity range provide the optimal climatic conditions crucial for optimal tea yield.

Keywords: Humidity, Optimal, Rainfall, Tea yield, Temperature.

**Corresponding author*: *ishsanju6@gmail.com*

ASSESSMENT OF CORAL RECRUITMENT PATTERNS AND BENTHIC DIVERSITY CHANGE BETWEEN FORE REEF AND BACK REEF: A STUDY ON *PASSIKUDAH* BAY, BATTICALOA DISTRICT IN SRI LANKA

H.G.C.R. Sooriyabandara[1]* and H.A.C.C. Perera[1]

[1] *Department of Zoology and Environmental Management, Faculty of Science, University of Kelaniya, Sri Lanka*

Abstract

Coral reefs in *Passikudah* bay form a foundational ecosystem, sustaining a vast range of ecological and economic benefits. Coral recruitment can be useful determining the state of the reef by helping to identify priority conservation areas. This study focuses on assessing the coral recruitment patterns in the fore reef and back reef zones clearly demarcated by the reef crest of *Passikudah* bay. Sampling was carried out at four sites representing both zones – two sites per zone. 30 photoquadrats of 0.25 m² were obtained along five 25 m transect lines laid perpendicular to the shoreline for the substrate at each site. Benthic diversities and coral recruitment with length measurements (1 cm < Coral recruits < 10 cm) were collected in each quadrat. Data analysis was done using R Studio. A significant difference in recruitment densities ($P < 0.001$) was observed between the fore reef (23.86 ± 2.14 recruits/m^2) and back reef (7.78 ± 0.66 recruits/m^2). Shannon-Weiner diversity index (H') demonstrated no significant differences in benthic diversity between reef zones. Recruitment density and benthic diversity had no significant correlation (Spearman's rho = -0.061, p = 0.545). Therefore, the coral recruitment dynamics of the *Passikudah* reef configuration may be much affected by zone-specific environmental factors rather than benthic diversity. The anthropogenic stress level due to unregulated tourism poses potential threats to the reef, particularly the fore reef area where sensitive *Acropora spp.* recruitments thrive. Back reef coral recruitments are dominated by sediment-tolerant coral species such as *Porites spp.* and *Favites spp.* that thrive in sheltered conditions which are primarily facilitated by healthy fore reef and reef crest succession. In this context, a marine spatial management plan that addresses and brings solutions for unsustainable anthropogenic stressors is timely needed for safeguarding the conditions of the *Passikudah* Bay coral reef ecosystem.

Keywords: Benthic diversity, Coral recruitment, Marine spatial planning, Reef zonation, Spatial patterns

**Corresponding author: chanakasooriyabandara000@gmail.com*

SELECT THE BEST PERFORMANCE OF STRAWBERRY VARIETY (*Fragaria ananassa)* UNDER AEROPONIC CULTIVATION SYSTEM OF SEETHA ELIYA, SRI LANKA

D.G.D.S.P. Dilrukshi[1], P.D. Abeythilakarathna[2], S. Thanusan[1], S. Nishanthan[1] and S. Vinujan[1*]

[1]*Department of Biosystems Technology, Faculty of Technology, University of Jaffna, Ariviyal Nagar, Kilinochchi, Sri Lanka*
[2]*Agriculture Research Station, Seethaeliya, Nuwaraeliya, Sri Lanka*

Abstract

Strawberries are traditionally grown in soil-based open-field systems. High cost of fertilizer, seasonality, water demand, environmental pollution, urban expansion and food security issues have replaced open-field systems with modern plant production systems. Soilless culture is a modern plant production technology that makes far more efficient use of available resources. This study aims to determine the best-performing strawberry variety (*Fragaria ananassa*), under an aeroponic cultivation system. The experiment was conducted to assess various growth parameters and yield characteristics of each variety grown using aeroponic techniques. The experiment was designed as Randomized Complete Block Design. The aeroponic system as the main factor and 04 treatment combinations such as Sweet Charlie, Festival, Chandler, and Camarosa and 5 replications. Data on plant height, number of leaves, chlorophyll content, root length, fresh weight, date of flower and fruit initiation and number of flowers and fruits production, were collected and analyzed by using Farm stat. In this study the Festival strawberry (treatment 02) variety resulted in a significantly higher average root length than Chandler (treatment 03) and Camarosa strawberry varieties (treatment 04). Additionally, in terms of shoot growth, the sweet Charlie (treatment 01) and Chandler (treatment 03) treatment yielded significantly greater fresh weight than the Chandler (treatment 03). And Sweet Charlie (treatment 01), Camarosa (treatment 04) and Festival varieties (treatment 02) have resulted in a significantly higher yield performance than the Chandler strawberry variety (treatment 03). These findings highlight the potential benefits of the Festival (treatment 02) in terms of root development and the sweet Charlie (treatment 01).

Keywords: Aeroponic system, Growth parameters, Nutrient solution, Strawberry, Yield parameters

**Corresponding author: svinujan@univ.jfn.ac.lk*

EFFECT OF DIFFERENT ORGANIC FERTILIZERS ON GROWTH AND YIELD OF POTTED *Cucumis anguria* L. (var. Chandani)

P. Mathurangani[1]*, S. Sutharsan[1], S. Srikrishnah[1] and M.M.S.F.T. Begum[1]

[1]*Department of Crop Science, Faculty of Agriculture, Eastern University, Sri Lanka*

Abstract

The extensive application of chemical fertilizers has raised serious concerns regarding their impact on agricultural sustainability. In response, organic fertilizers have gained importance as a sustainable alternative, enhancing soil health, boosting crop productivity, and promoting environmentally friendly agricultural practices. This study investigates the effect of various organic fertilizers on the growth and yield of *Cucumis anguria* L. (var. Chandani) in a pot experiment conducted at the Faculty of Agriculture, Eastern University, Sri Lanka, from July to September 2024. The experiment was laid out in Completely Randomized Design (CRD) with twelve treatments and five replicates which were, T1 (Amirthakaraisal), T2 (Jeewamrutha), T3 (Modified Panchagavya), T4 (Fish Tonic), T5 (Kunapajala), T6 (Sasyagavya), T7 (Compost), T8 (Discovery), T9 (Vegi Super), T10 (Cocoly), T11 (Maxicrop), and T12 (Control). Growth and yield parameters were regularly measured, and the data were analyzed statistically using one-way ANOVA in Minitab 17. The results revealed significant ($p < 0.05$) improvements in plants treated with T10, which exhibited significantly higher performance in leaf area (84.31%), shoot dry weight (67.87%), number of pods per vine (73.74%) and total yield (69.63%) compared to T12 (Control). Based on these findings, the use of Cocoly fertilizer is highly promising, as it significantly enhances the growth and yield of pot-grown *Cucumis anguria* L., fostering sustainable and environmentally friendly cultivation in the dry zone of Sri Lanka.

Keywords: Cocoly, *Cucumis anguria*, Gherkin, Growth parameters, Yield parameters

**Corresponding author: pmathura1997@gmail.com*

EFFECT OF DIFFERENT ORGANIC FERTILIZERS ON GROWTH AND YIELD OF FIELD GROWN *Cucumis anguria* L.

A.H.F. Aashika[1*], S. Sutharsan[1] and M.M.S.F.T. Begum[1]

[1] *Department of Crop Science, Faculty of Agriculture, Eastern University, Sri Lanka*

Abstract

The overuse of chemical fertilizers in conventional agriculture has negatively impacted soil and plant health, necessitating sustainable alternatives like organic farming. This study evaluated the effects of organic fertilizers on the growth and yield of *Cucumis anguria* L. (Var. Chandani), commonly known as gherkin, from July to September 2024 at the Faculty of Agriculture, Eastern University, Sri Lanka. The experiment employed a randomized complete block design with eight treatments and five replicates: Amirthakaraisal (T1), Jeewamirtha (T2), Modified Panchagavya (T3), Fish Tonic (T4), Vegi Super (a commercial organic product) (T5), Discovery 2010 (a commercial organic product) (T6), Compost (T7), and a control (T8). Growth and yield parameters were assessed along with the cost benefit analysis. Discovery 2010 showed the most significant improvements, with the leaf area and the shoot dry weight increasing by 249.8% and 306% respectively, compared to the control treatment. It also boosted the total number of fruits and total yield by 100.4% and 84.3% compared to the control. Although treatments T6, T5, T4, T3, and T1 exhibited no statistically significant differences in yield ($p > 0.05$), T6 generated the highest net profit of Rs. 979,140 per hectare, surpassing all other treatments. T5 and T1 also provided competitive growth, yield, and economic benefits, while T3 and T4 were less profitable due to higher input costs. In conclusion, Discovery 2010 (T6) is the most effective organic fertilizer for enhancing gherkin growth and yield (23.35 tons/ha) while ensuring optimal economic returns.

Keywords: Discovery 2010, Gherkin, Growth parameters, Organic fertilizers, Sustainable agriculture and Yield parameters

**Corresponding author: aashikahakeem99@gmail.com*

CROP PROTECTION TECHNOLOGY AND BIOTECHNOLOGY

NANO-BASED FORMULATION OF *Acorus calamus* RHIZOME EXTRACT AND ITS *IN VITRO* EFFICACY ON CONTROL OF *Fusarium* FUNGUS

A. Fathima Aska[1*] and K. Prasannath[1]

[1]*Department of Agricultural Biology, Faculty of Agriculture, Eastern University, Sri Lanka*

Abstract

The growing demand for environmentally friendly agricultural practices necessitates innovative strategies to produce high-quality, healthy food while minimizing reliance on synthetic chemicals. Integrating nanotechnology with natural plant resources offers a robust, environmentally conscious strategy for managing fungal diseases and advancing sustainable agriculture. This study presents a sustainable approach to controlling *Fusarium* fungus, a destructive plant pathogen responsible for significant crop losses, by developing a nano-based formulation derived from *Acorus calamus* rhizome aqueous extract. Silver nanoparticles (AgNPs) synthesized from *A. calamus* were evaluated for their antifungal efficacy at concentrations of 0.005 g, 0.01 g, and 0.02 g. They were compared with 0.1 M $AgNO_3$, 10% *A. calamus* aqueous extract, a positive control (Topsin fungicide), and a negative control (untreated). *Fusarium* fungus was isolated from a carrot dry rot sample. The study was conducted *in vitro* using the food poisoning technique and arranged in a Completely Randomized Design with seven treatments and three replicates. Mycelial inhibition percentages were recorded at 10 days post-inoculation. Results demonstrated a dose-dependent antifungal effect, with AgNPs achieving the highest inhibition rate of 53.3% at 0.02 g concentration. Lower concentrations also showed notable antifungal activities, highlighting a greater efficacy of AgNPs compared to the aqueous extract alone. These findings underscore the potential of *A. calamus* in the form of nanomaterials for managing crop diseases caused by the *Fusarium* pathogen. Further studies are required to enhance the efficacy of *A. calamus* AgNPs by increasing the concentration of *A. calamus* and extracting the antifungal compounds from the rhizome using organic solvents.

Keywords: *Acorus calamus*, Eco-friendly disease management, *Fusarium* diseases, Nano-formulated botanical extracts, Silver nanoparticles

**Corresponding author: askaameerdeen98@gmail.com*

EVALUATION OF BLENDED ATTRACTANTS COMBINED WITH CUE LURE FOR SUPPRESSING MELON FLIES, (*Zeugodacus cucurbitae:* DIPTERA: TEPHRITIDAE) IN CUCURBITS.

P.V.J.S. Wijethilake[1], P.H. Ranaweera[2*], M.I. Sriwardana[2] and R.F. Niranjana[1]

[1]*Department of Agricultural Biology, Faculty of Agriculture, Eastern University*
[2]*Horticultural Crop Research and Development Institute, Gannoruwa, Peradeniya, Sri Lanka*

Abstract

Melon fruit fly (*Zeugodacus cucurbitae*: Diptera: Tephritidae) infestation represents the most destructive pest complex for cucurbits crops, resulting in significant yield losses of 30%-100% and quality losses that make the produce inappropriate for local and export markets in Sri Lanka. Male Annihilation Technique (MAT) is a widely recognized and effective method for monitoring and controlling the tephritid fruit fly population. Methyl Eugenol (ME) (4-allyl-1, 2-dimethoxybenzene-carboxylate) and Cue Lure (CL) (4(p-methoxyphenyl)-2-butanone) are the major male attractants. This study evaluated the effectiveness of blended attractants incorporating CL and ME for enhancing male melon fruit fly attraction by using a single trap with a blend of both attractants. The experiment was conducted at the snake gourd field in the Horticultural Crops Research and Development Institute, Gannoruwa, Peradeniya, Sri Lanka, using a Randomized Complete Block Design (RCBD) with five treatments and four replicates. Treatments include combinations of CL and ME in different proportions, individual applications of CL and ME, and a commercially available clear trap (Containing CL) as a control trap. Data collection involved weekly monitoring of the traps over 8 weeks. The count data from each treatment and replicate were recorded. The number of *Z. cucurbitae* attracted to the blend of CL and ME traps was significantly similar ($P>0.05$) to commercially available clear traps. However, the mixture of 0.5 ml CL and 0.5 ml ME was the most effective; trapping 33 more melon flies than commercial trap. This study confirms that a combination of CL with ME could enhance the attraction to a certain extent and offer a cost-effective alternative to commercial traps. These findings underscored the potential of using this blend to strengthen the area-wide management of *Z. cucurbitae* populations in cucurbit cultivation in Sri Lanka.

Keywords: Blends, Clear trap, Male annihilation technique, Male attractants, Methyl Eugenol

**Corresponding author: ranaweerapra@gmail.com*

EFFECT OF METHYL JASMONATE ON AGARWOOD PRODUCTION FROM SHOOT CULTURE OF *Gyrinops walla*

A.M.D.C. Aththanayake[1*], J.P. Eeswara[2] and G. Thirukkumaran[1]

[1]*Department of Agricultural Biology, Faculty of Agriculture University of Jaffna, Sri Lanka*
[2]*Department of Crop Science, Faculty of Agriculture, University of Peradeniya, Sri Lanka*

Abstract

Gyrinops walla, known as "*WallaPatta*", produces a resinous compound Agarwood, and is an endemic plant to Sri Lanka. The production of agarwood occurred as a response to external damage. In-vitro propagation of *G. walla* has been identified as a better alternative for sustainable harvesting and agarwood production due to the high price and rare presence of natural agarwood .The present study was carried out to identify the effect of different concentrations of Methyl Jasmonate as an elicitor on the growth and the agarwood production of *G.walla* under solid cultures and identify the correct harvesting stage after application of MJ for maximum product synthesis from shoot cultures of *G.walla* under in-vitro conditions. *G. walla* shoots were grown on full-strength MS medium supplemented with 1 mg/L of BAP and 0.1 mg/L of IBA. Approximately 0.5g of *G. walla* shoots were cultured in one unit for 12 weeks. At the end of the 12th week, all treated and control 10 samples were harvested and freeze-dried. According to thin-layer chromatography (TLC) results, most of the compounds produced at 1 µmol MJ treatment had thicker bands than all other treatments. Moreover, 0.5g of *G.walla* shoots were cultured in 1 µmol MJ applied MS medium, and growth measurements were obtained at weekly intervals until 6 weeks. TLC results and SAS, Kruskal Wallis test revealed that the samples harvested in the 5th and 6th week weeks had a higher number of chemicals than in other weeks. Furthermore, similar compounds representing bands at similar retention times were present in 6th week treatments and agarwood extract than in other weeks. TLC fingerprint profile proved the presence of similar phytochemicals in shoot cultures and agarwood extracts. Therefore, these results revealed that the effective concentration of MJ is 1µmol and most effective harvesting stages are 5th and 6th week period.

Keywords: Agarwood, Methyl Jasmonate, Solid culture, Thin layer chromatography

**Corresponding author: attanayakedinith@gmail.com*

BIOPLASTIC DEVELOPMENT FROM WATER HYACINTH AND CANNA: A CONSERVATION AND RESOURCE STRATEGY

I.C. Jayasinghe[1*], M.M.N.C. Marasinghe[1], T.H.S. Lakmali[1] and M.J. Chiranga[1]

[1]*Department of Environmental Technology, Faculty of Technology, University of Colombo, Sri Lanka*

Abstract

Water hyacinth (*Eichhornia crassipes*) is an invasive plant that is widespread in many reservoirs, including Beira Lake, Colombo, Sri Lanka and contains high amounts of cellulose. Canna (*Canna indica*) is grown in floating wetlands and used for water purification in many reservoirs, including Beira Lake. After purification, the plant is discarded as waste, contributing to plant biomass accumulation. This study explored the production of bioplastics using these plant wastes. Water hyacinth and canna plants were collected, washed, and cut into 2 cm pieces. Instead of extracting isolated fibers, whole plant pieces were used to utilize their complete polymeric composition, which includes cellulose, hemicellulose, and lignin, contributing to improved bioplastic properties. The fibers were blended, filtered, washed, and oven-dried at 40 °C for 24 hours before being incorporated into the bioplastic formulation. The final bioplastic underwent solubility, biodegradability, and tensile strength analyses to evaluate its properties. Chemical solubility was tested using an immersion and weight-loss measurement method. Results showed 28.32% solubility in sulfuric acid, 85.34% in acetone, and 65.67% in glacial acetic acid, with negligible solubility in ethyl alcohol. These tests were conducted to determine the chemical resistance of bioplastics for potential industrial applications. Biodegradability analysis showed a 54% weight loss in compost and 30% in natural outdoor garden soil, indicating its capability to degrade in different environments. The tensile strength analysis revealed a tensile strength of 1 MPa and elongation of 66.67%, which was compared with conventional petroleum-based plastics and starch-based biodegradable materials to assess its performance. These results highlight the bioplastic's potential for industrial applications requiring specific chemical resistance. The study provides a sustainable and practical solution for waste management and environmental conservation while contributing to the circular economy by converting invasive species into valuable resources.

Keywords: Bioplastics, Environmental Conservation, Invasive species, Waste management, Water hyacinth

**Corresponding author: isindujayasinghe2000@gmail.com*

EFFECT OF DIFFERENT CROP ESTABLISHMENT METHODS ON THE ABUNDANCE OF RICE THRIPS, RICE LEAF FOLDER, AND RICE BROWN PLANTHOPPER IN THE Bg 352 RICE VARIETY

M.P.H.K. Jayaweera[1*], S.R. Sarathchandra[1], K.S. Hemachandra[2], K.S. Sandadevani[1] and L.B.T. Dilanka[1]

[1]*Rice Research and Development Institute, Batalagoda, Sri Lanka*
[2]*Faculty of Agriculture, University of Peradeniya, Sri Lanka*

Abstract

Rice is the staple food and one of the main cultivated crops in Sri Lanka. Insect pest infestations in rice have been identified as one of the constraints in rice production; hence, exploration of new pest management strategies, which are cost-effective and environmentally friendly is important to promote rice cultivation. This study was conducted to find out the effect of different crop establishment methods on the abundance of rice thrips (*Stenchaetothrips biformis*), rice leaf folder (*Cnaphalocrocis medinalis*), and rice brown planthopper (*Nilaparvata lugens*) in the Bg 352 rice variety during the 2021/22 *Maha* season in Polonnaruwa, Kurunegala and Kegalle districts representing the dry, intermediate and wet zone in Sri Lanka, respectively. The experiment was laid out as a Randomized Complete Block Design with three replicates. Six establishment methods: Broadcasting (T1), Row seeding (T2), Manual transplanting (T3), Machine transplanting (T4), Parachute method (T5) and Farmer practice (T6) were used as treatments. The Abundance of rice thrips were counted from 25 randomly selected plants from each replicate, rice leaf folders were counted from 25 damaged leaves per replicate, and brown planthoppers were counted from 10 plants per replicate and data were analyzed separately using SAS software. The results revealed that significantly lower populations of all three pests in parachute (4±0.9, 21±3.8, 9±1.4), machine (9±1.2, 33±2.9, 12±2) and manual transplanting (8±1.5, 34±2, 10±1.7) methods compared to row seeding (24±1.2, 50±3.1, 19±2.8), broadcasting (26±3.8, 48±4.5, 21±1.7) and farmer practice (28±2.8, 55±4.1, 25±1.8) methods showed higher pest infestations in Kegalle district; this trend was consistent across all districts. Hence, the parachute, machine, and manual transplanting methods can be used as good crop establishment methods which can also help to diminish pest infestations that have high productivity.

Keywords: Crop establishment methods, Pest abundance, Pest management, Rice, Sustainable agriculture

**Corresponding author: jayaweerahashani@gmail.com*

INDEXED-BASED APPROACH ON MARINE DEBRIS POLLUTION IN FOUR MAIN COASTAL REGIONS OF SRI LANKA

H.P.A. Rupasinghe[1], I.J.J.U.N. Perera[2,3], R.D.C. Sandaruwan[4*], H.P.S. Jayapala[5], B.K.A. Bellanthudawa[2,6] and T.M.S.A. Tennakoon[7]

[1]*Department of Biosystems Technology, Faculty of Technology, Eastern University, Sri Lanka*
[2]*University of Chinese Academy of Sciences, Beijing, 100049, China*
[3]*South China Sea Institute of Oceanology, Chinese Academy of Sciences, Guangzhou, 510301, China*
[4] *Faculty of Graduate Studies, University of Kelaniya, Kelaniya,*
[5]*Department of Coastal Resources Management, Faculty of Engineering and Management, Ocean University of Sri Lanka*
[6]*Research Center for Eco-Environmental Sciences, Chinese Academy of Sciences, Beijing, 100085, China*
[7]*Department of Agricultural Biology, Faculty of Agriculture, Eastern University, Sri Lanka*

Abstract

Marine debris has emerged as a significant issue along Sri Lanka's coastal regions, endangering marine resources, disrupting tourism industries, and impacting other economic activities, while also undermining the overall health and quality of the ecosystem. The study aims to evaluate the abundance, density, and pollution status of marine debris across four coastal regions of Sri Lanka. Four major coastal beaches in Sri Lanka (Kallady, Negombo, Kandakuliya, and Balapitiya) were selected based on their status as popular tourist destinations, the vulnerability of their coastal habitats. At each location, three transects were established to collect marine debris using a purposive sampling technique. Pollution status was assessed using the Clean Coast Index (CCI), Plastic Abundance Index (PAI), Hazardous Item Index (HII), and Environmental Status Index (ESI). The study recorded a total of 10,873 items, representing 13 types of marine debris and various subtypes, with average litter densities ranging from 0.7 to 1.2 items/m²; Kallady Beach was classified as "extremely dirty" by the CCI while other sites were "dirty," all four beaches fell under category IV (4-6.7) based on the HII, were rated as having a "moderate level of plastic contamination" (PAI values 2-3.9), and were classified as "bad" status according to the ESI. The debris composition revealed that most marine debris originated from land-based sources, driven by unsustainable fishing practices, inadequate solid waste management, and harmful recreational activities. This highlights the urgent need for marine and coastal management frameworks, particularly for Kallady Beach, which has an 'extremely dirty' status. Although awareness campaigns, education, and beach cleanup initiatives have been undertaken, it is recommended that efforts focus on enhancing waste management infrastructure, strengthening regulations, promoting corporate responsibility, and advancing research and development as essential measures to conserve Sri Lanka's coastal ecosystems.

Keywords: Coastal Clean-up Index (CCI), Coastal management, Environmental Status Index (ESI), Hazardous and non-hazardous debris, Plastic Abundance Index (PAI)

**Corresponding author: charukasadanruwan@gmail.com*

MOLECULAR IDENTIFICATION OF *RHINACANTHUS* SPECIES USING COMBINED CHLOROPLAST DNA MARKERS

M. Siyama[1], R.W.W.K.A.D. Rajapaksha[2], N.U. Jayawardana[2] and Y. Somaratne[2*]

[1]*Postgraduate Institute of Agriculture, University of Peradeniya, Sri Lanka*
[2] *Department of Agricultural Biology, Faculty of Agriculture, University of Peradeniya, Sri Lanka*

Abstract

Rhinacanthus, a genus within the family Acanthaceae, comprises approximately 30 species worldwide. In Sri Lanka, three species are found: *Rhinacanthus polonnaruwensis* and *Rhinacanthus flavovirens*, which are endemic, and *Rhinacanthus nasutus*, which is widely distributed across Southeast Asia and China. Traditionally, *Rhinacanthus* species known for its medicinal value in Ayurvedic medicine. Notably, *R. polonnaruwensis* is listed as an endangered species in the IUCN Red List 2020. Morphologically, *R. polonnaruwensis* can be distinguished from the other two species by its linear leaf shape. However, *R. nasutus* and *R. flavovirens* exhibit a high degree of morphological similarity, complicating species-level identification and taxonomic classification. To address this limitation, DNA barcoding was employed to facilitate accurate species identification and support conservation efforts. This study aims to employ DNA barcoding to resolve taxonomic ambiguities and determine phylogenetic relationships among these species. 24 DNA samples were extracted from all three species and quantified using NanoDrop spectrophotometer. High quality DNA was then used to amplify the chloroplast regions rbcL (*rbcL-bf* and *rbcL-724r*) and trnH-psbA (*trnH- psbA* F5 and t*rnH- psbA R5*). The amplified fragments were sequenced using Sanger sequencing. Pairwise distance calculated under Jukes Cantor model. The trnH-psbA region exhibited greater nucleotide variation (16.3%) compared to rbcL (5.35%). Phylogenetic analysis using a Maximum Likelihood tree of the combined rbcL and trnH-psbA regions revealed that *R. nasutus* and *R. flavovirens* clustered together, while *R. polonnaruwensis* formed a distinct clade. With respect to these markers, our findings suggest that the combined rbcL and trnH-psbA regions are effective for discriminating *Rhinacanthus* species in Sri Lanka, contributing to their accurate identification and conservation.

Keywords: DNA barcoding, Phylogeny, rbcL, *Rhinacanthus*, trnH-psbA

**Corresponding author: yamunas@agri.pdn.ac.lk*

PLANT-EXTRACT DERIVED NANOEMULSIONS AS POTENTIAL BIO-FUNGICIDES FOR STRAWBERRY GRAY MOLD PATHOGEN UNDER IN-VITRO CONDITION

R.M.I.K. Rathnayake[1*], A.D.N.T. Kumara[1] and C. Ranasinghe[2]

[1]*Department of Biosystems Technology, Faculty of Technology, South Eastern University of Sri Lanka*
[2]*Agriculture Research Station, Seethaeliya, Sri Lanka*

Abstract

Strawberry gray mold disease, caused by *Botrytis cinerea (Necrotrophic fungus)*, poses a significant threat to strawberry and other fruit crop cultivation in Nuwara Eliya, Sri Lanka and worldwide, where it is traditionally controlled with chemical fungicides that have detrimental effects on the consumers and environment. To date, no significant efforts have been made in Sri Lanka to explore the use of plant extracts as bio-fungicides to combat this disease. This study aimed to identify the pathogen of strawberry gray mold and evaluate the potential of Nano emulsion formulations of plant extracts with antifungal properties. The pathogen *Botrytis spp.* was isolated and confirmed by morphological analysis, including pathogenicity testing. Nano emulsion formulations containing plant extracts such as clove (*Syzygium aromaticum*), nutmeg (*Myristica fragrans*) and a combination of clove and jasmine (*Jasminum* spp.) were tested under in vitro conditions using food poisoning technique. Antifungal efficacy was assessed by measuring inhibition zones under PDA growth media. The results showed that the clove-jasmine combination and clove-only formulations demonstrated significant inhibition of pathogen growth at all tested concentrations (25 µl, 50 µl, 75 µl, and 100 µl per 10ml of solidified PDA), with notable efficacy at lower concentrations (25–50 µl/10 ml). This indicated that there is a potential to use those plant extracts as bio-fungicides. However, further field-level evaluations of these formulations are essential to determine their efficacy under natural growing conditions and to develop a sustainable solution for managing strawberry gray mold disease.

Keywords: Bio fungicides, *Bothritis cinera*, Eco-friendly solutions, Plant extracts, strawberry grey mold disease

**Corresponding author: ireshakumari483@gmail.com*

INFLUENCE OF LIGHT COLOR ON THE GROWTH OF *IN-VITRO* PROPAGATED BANANA (*Musa* spp.) PLANTLETS

K.A.H.N. Kuruwita[1*], D.M.C.C. Gunathilake[1], H. Rohanadeera[1] and D.M.H.C. Dissanayake[1]

[1]*Institute for Agro-Technology and Rural Sciences, University of Colombo, Weligatta, Hambantota, Sri Lanka*

Abstract

Banana (*Musa spp*.) is one of the major fruit crops cultivated in Sri Lanka. *In-vitro* (tissue culture) propagation is one of the best propagation methods to produce disease free high yield banana plants. Numerous studies have revealed that the light spectrum significantly influences plant growth, with blue and red wavelengths being particularly effective in enhancing photosynthesis. Generally, in tissue culture laboratories, light (fluorescent tube light) and plant nutrients medium are provided artificially to the in-vitro propagated plantlets for their growth. This study was conducted to evaluate the effect of blue light (frequency 750THz, wavelength = 400-500nm) and red light (frequency 430THz and wavelength 600-700nm) with white light (wavelength 400-700nm) for plant growth in comparison to providing white light alone. Red, blue and white light (frequency, wavelength) were provided for 6 weeks using Light Emitted Diode (LED). The experiment was set up using Complete Randomized Design (CRD) by General Liner Model (GLM) procedure. Treatment means were separated by Duncan Multiple Range Test and each treatment was replicated three times. Results showed that the 100% red light significantly enhanced ($p < 0.05$) plantlet growth. The treatment combinations of 20% blue with 80% white light and 60% red with 40% white light also showed notable improvements in plantlet growth. In contrast, 100% blue light did not produce significant growth improvements compared to white light. These findings suggest that red light, within the specified frequency and wavelength range, is more effective than blue or white light for promoting the growth of in vitro-propagated banana plantlets.

Keywords: Banana, Red light, Blue light, White light, Wavelength, Frequency

**Corresponding author: hirukuruwita@gmail.com*

DIGITAL AND CLIMATE SMART AGRICULTURE

SPATIAL DISTRIBUTION OF SOIL MICROBIAL BIOMASS CARBON IN *CHENA* CULTIVATION SYSTEMS IN MIHINTALE, SRI LANKA

M. Rammiya[1], W.D.U. Premarathna[2], G.A.D. Perera[3] and R.R. Ratnayake[2*]

[1]*Department of Agricultural Engineering and Environmental Technology, Faculty of Agriculture, University of Ruhuna, Sri Lanka*
[2]*National Institute of Fundamental Studies, Hantana Road, Kandy, Sri Lanka*
[3]*Department of Botany, Faculty of Science, University of Peradeniya, Sri Lanka*

Abstract

Soil microbial biomass carbon (MBC) plays a crucial role in maintaining soil health and productivity by influencing nutrient cycling and organic matter decomposition. Chena cultivation, one of the oldest agricultural practices in Sri Lanka, is a traditional shifting cultivation method commonly found in the dry zone. It involves clearing natural vegetation for farming, which often contributes to the degradation of native plant species. This study aims to assess the MBC in soils from Chena cultivation systems and develop a GIS-based digital map to illustrate the spatial distribution of soil MBC within the Mihintale division in Anuradhapura, Sri Lanka. A total of 16 composited soil samples were collected from predetermined sites, employing a stratified random sampling technique, with samples taken from a depth of 0–15 cm across the 16 Chena cultivation lands. Soil samples were analysed for soil MBC, soil pH, and electrical conductivity (EC) using standard protocols. Derived data were used to create GIS-based digital maps illustrating the spatial distribution of soil microbial biomass carbon, pH, and EC using Arc GIS 10.8 software and for further analyzed using descriptive statistical methods in Minitab software to evaluate MBC and associated soil properties. MBC values varied from 0.037% to 0.859%, with a mean value of 0.1699%, EC ranged between 10.68 µS/cm and 47.90 µS/cm, with a mean of 32.1 µS/cm, and pH varied from 5.59 to 8.76, with a mean of 6.851, reflecting notable differences in microbial activity across sampling sites. Variability in MBC across different chena cultivation sites could be due to the crop type and land use practices. Descriptive analysis showed that the coefficient of variation for MBC was 111.92, while EC and pH were 127.43 and 9.86, indicating a higher variability in MBC and EC among the sites. Similarly, previous studies reported that MBC in paddy soil ranged between 0.001% and 0.17%, while in forest soil, it ranged from 0.045% to 0.823%. This spatial distribution can provide valuable insights for effective land management practices by underscoring the importance of understanding spatial patterns of soil MBC to enhance sustainable land management in Chena cultivation systems.

Keywords: *Chena* lands, GIS, Microbial biomass carbon, Soil health, Spatial mapping

**Corresponding author: renuka.ra@nifs.ac.lk*

SPATIAL DISTRIBUTION OF SOIL MICROBIAL BIOMASS CARBON AND SOIL AVAILABLE MACRONUTRIENTS IN *KATUPOTHA* DRY ZONE FOREST SYSTEMS, MIHINTALE, SRI LANKA

M. Kiruciga[1], W.D.U. Premarathna[2], G.A.D. Perera[3] and R.R. Ratnayake[2*]

[1]*Department of Agricultural Engineering and Environmental Technology, Faculty of Agriculture, University of Ruhuna, Sri Lanka*
[2]*National Institute of Fundamental Studies, Hantana Road, Kandy, Sri Lanka*

[3]*Department of Botany, Faculty of Science, University of Peradeniya, Sri Lanka*

Abstract

Tropical dry forests provide critical ecosystem services, including biodiversity conservation, carbon sequestration, and nutrient cycling. The Katupotha Forest, characterised by its diverse vegetation and distinct ecological dynamics, illustrates the intricate interactions between anthropogenic activities and natural ecosystems within the dry zone of Sri Lanka. Soil Microbial Biomass Carbon (MBC) is a key indicator of soil health, reflecting microbial activity in organic matter decomposition and nutrient availability. Soil available macronutrients play a vital role in plant metabolic processes throughout the lifecycle of plants. Several researches have been done on MBC and soil available macronutrients in the wet zone forests and other ecosystems of Sri Lanka, but research on the dry zone forests remains relatively limited. Therefore, this study aimed to assess the current status of soil MBC and soil available macronutrients (phosphate, nitrate, and ammonium) in the Katupotha tropical dry zone forest, Mihintale, Sri Lanka, and to study the spatial variation of these soil parameters throughout the forest. Soil samples were collected from 30 random locations at a depth of 0-15 cm and analysed using standard protocols. The 0-15 cm soil layer was selected for measurement due to its high microbial activity compared to the sub soil layer. GIS-based digital maps illustrating the spatial distribution of soil microbial biomass carbon, pH, and EC were generated using Arc GIS 10.8 software. The results showed that MBC varied from 0.045% to 0.283%, with a mean of 0.1695%. Soil available phosphate varied from 0.244 to 5.166 µg/g soil, with a mean of 1.791 µg/g soil, the nitrate varied from 0.781 to 16.629 µg/g, with a mean of 7.432 µg/g, while the ammonium ranged from 4.122 to 51.047 µg/g soil, with a mean of 14.230 µg/g soil. Spatial analysis indicated that higher concentrations of MBC and macronutrients were found in the northern part of the forest, particularly around the peak of the Katupotha mountainous forest. In similar studies done on the Knuckles Forest range, of wet zone, Sub Montane Forests showed an MBC of 0.053%, Montane Forests had 0.035%, and Open Sparse Forests with MBC of 0.048%. These findings of the study underscore the importance of MBC and available macronutrients as key indicators of soil health and functioning, particularly in dry zone where such levels may be lower compared to other regions. Hence, further research on dry zone forests is crucial to guiding conservation and strengthening ecosystem resilience.

Keywords: Ecosystem services, Katupotha, Microbial Biomass Carbon, Soil health, Spatial variations, Tropical dry zone forest system

** Corresponding author: renuka.ra@nifs.ac.lk*

DEVELOPMENT OF A SOLAR-POWERED SMART IRRIGATION SYSTEM

H.M.S.D. Herath[1], N.A.S.I. Neththasinghe[1*] and P.J. Ranasinghe[1]

[1]Skills College of Technology, Nugegoda, Sri Lanka

Abstract

Modern agriculture includes areas of focusing on concerns such as food scarcity, sustainable resource consumption, robotics, and efficient smart monitoring technologies. For this particular study, the implementation of the system is to synthesize and install an efficient solar irrigation system for a one-half hectare cornfield. The system includes the photovoltaic panels, a centrifugal pump, soil moisture sensor thresholds, power consumptions sensors and flow sensor. The moisture and flow sensors communicate with a microcontroller-based unit, enabling precise control of the irrigation process. By integrating these components, the system effectively manages irrigation based on real-time soil moisture levels and optimizes energy consumption. This approach not only reduces waste but also ensures that irrigation is applied at the appropriate times and in an environmentally conscious manner, ultimately improving both water and energy efficiency. The outcomes show that the use of the system has reduced the use of water by 40% and has boosted the production of crops by 10% more than the conventional approaches. Soil moisture content was therefore kept within the range of 60 – 75% of VWC. Those of the off-grid system produced 2.5 kW daily with the potential of cutting greenhouse gas emissions by 30% (equivalent to 1.2 tons CO_2 per year). Business case benefits consist of a three-year break-even, reduction of costs in operation and total eradication of the use of fossil fuel. Limitations was an expensive system, requirements for calibration of the sensors, and an obvious dependency on the meteorological conditions. Facilitating solutions include hybrid energy system, smart sensors auto-calibration, and architecture scalability improvements. This system offers an excellent opportunity for off-grid and resource-limited regions to integrate into existing structures. The future growth in developing the system that utilizes artificial intelligence for predictive irrigation control, enlarges the applicability to other crops and field areas. This study forms the basis for using higher precise instruments and technologies that will enhance sustainability and robustness of the agricultural sector amidst global challenges.

Keywords: Automation, Microcontrollers, Renewable Energy, Sustainable Agricultural, Solar-Powered Irrigation.

**Corresponding author: sewminiishara5@gmail.com*

OPTIMIZING CROP SELECTION USING XGBOOST: A DATA DRIVEN APPROACH FOR CROP RECOMMENDATION

M.S.H. Peiris[1*] and W.M.H.G.T.C.K. Weerakoon[1]

[1]*Department of Computer Science, Faculty of Science, University of Ruhuna, Matara, Sri Lanka*

Abstract

Accurate forecasting of crop identification for given environmental conditions is crucial for best agricultural practices, as it allows the farmers to anticipate rapid changes in growing conditions and crop patterns to ensure long-term food security. The fully automated data extracted from sensors should be recognized through patterns to identify environmental conditions over a considerable period. Due to frequent climate changes, it is challenging for farmers to figure out the ideal crops to be planted under these environmental conditions. This study suggests a gradient boosting algorithm (XGBoost) model, which helps to identify and evaluate the best-yielding crops for cultivation under some given environmental conditions. Additionally, this model provides data-driven insights to optimize crop selection for improved agricultural productivity. The dataset used in here was taken from the widely recognized Kaggle repository, which contained 22 crop types under four specific environmental conditions: temperature, humidity, rainfall and pH value of the soil. Training and validation accuracy, precision, recall and F1-score were obtained for this data-driven approach. The proposed XGBoost model produced a significant testing accuracy of 100% and a training accuracy of 99% for the particular crop identification. The minor drop suggests that while the model generalizes well, there might be a few challenges in distinguishing crops with similar soil and climatic requirements. Further enhancements can be carried out to improve its ability to generalize the crop identification by expanding the dataset. Overall, this approach exhibits promising performance and reliability in crop recommendation under a set of given environmental conditions to optimize agricultural decision-making.

Keywords: Climate changes, Data-driven approaches, Hidden patterns, XGBoost

**Corresponding author: peirismsh@dcs.ruh.ac.lk*

EFFECTS OF HARVEST MATURITY ON PHYSICOCHEMICAL QUALITY OF *Piper nigrum* AND EXTRACTION TECHNIQUES ON YIELD AND QUALITY OF OLEORESINS EXTRACTS

R.P.D.D.D. Ranaweera[1*] and H.D. Weeratunge[2]

[1]*Department of Food Science and Technology, Faculty of Applied Science, University of Sri Jayewardenepura, Sri Lanka*
[2] *Herbal Department, Industrial Technological Institute, Malabe, Sri Lanka*

Abstract

Piper nigrum has occupied a premium place in the global market due to its superior quality and bioactive properties. This study investigated the impact of peppercorn maturity stages—medium berry and mature berry—on physicochemical properties, including moisture content, essential oil content, bioactive composition, oleoresin yield, and piperine content of dried black pepper. Additionally, the efficiency of Soxhlet and reflux (6:1 solvent-to-sample) extraction techniques for oleoresin production was evaluated. Moisture content was determined using the Dean-Stark method. Essential oils were extracted via Clevenger-type hydro distillation, and their bioactive profiles were analyzed using GC-MS analysis. Oleoresins were extracted with Soxhlet and refluxing techniques, while piperine contents of oleoresins were quantified using HPLC. The moisture contents were recorded as 11.1±0.11% and 10.6±0.13% for medium and mature berry, respectively. The highest value for essential oil content (3.3±0.07%) was recorded from medium-berry and the lowest value has been recorded from mature-berry (2.2±0.07%). GC-MS analysis identified major bioactive compounds in pepper essential oils such as D-limonene, linalool, and 3-carene. Statistical analysis (two-way ANOVA) revealed significant differences in extraction efficiencies and compound yields across maturity stages and extracting techniques. Through 50oxhlet extraction the highest yield for pepper oleoresin (10.7215±0.0237%) and piperine percentage (8.6936±0.0120%) has been recorded from medium-berry and the lowest oleoresins percentage (9.6850±0.0318%) and piperine content (7.4154±0.0236%) was recorded from the mature-berry dried black pepper. Through Refluxing (6:1) the highest yield for pepper oleoresin (9.7260±0.0395%) and piperine percentage (8.2141±0.0000%) has been recorded from medium berry sample confirming that there is a direct impact of maturity stage on bio active composition and quality. When compared to refluxing extraction, Soxhlet achieved significantly greater yields for both oleoresins and piperine across all maturity stages highlighting the enhanced solvent penetration and prolonged contact time associated with Soxhlet extraction, making it a more efficient technique for isolating bioactive compounds.

Keywords: Essential oil, Medium berry, Matured berry, Oleoresins, *Piper nigrum*, Piperine

**Corresponding author: dilmiranaweera2@gmail.com*

IMPACT MILLING SPEED ON RICE FLOUR TEMPERATURE AND PARTICLE SIZE DISTRIBUTION

S.K.B.N.P.K. Wijerathna[1*], B.D.M.P. Bandara[2] and R. Bawatharani[1]

[1]*Department of Agricultural Engineering, Faculty of Agriculture, Eastern University, Sri Lanka*
[2]*National Institute of Post-Harvest Management, Anuradhapura, Sri Lanka*

Abstract

Milling speed significantly impacts the physical properties of rice flour, influencing quality, yield, and processing efficiency. This study investigated the effects of milling speed on temperature and particle size distribution in BG352 rice flour using an FFC-45 disk mill at speeds of 2470, 3120, 3640, 3972, and 4290 rpm. Samples weighing 5 kg were processed at each milling speed, and measurements were taken in three replicates. Temperature was recorded immediately after milling to assess heat generation. Particle size distribution was analyzed using sieve analysis with a vibratory sieve shaker. The findings highlight the relationship between milling speed and flour properties, providing valuable insights into optimizing milling speed for enhanced quality and processing outcomes. Results indicate a strong positive correlation ($r = 0.99$) between milling speed and flour temperature, with temperatures rising from 43.57 °C at 2470 rpm to 63.93 °C at 4290 rpm. Higher speeds generate more heat due to friction. Particle size decreased significantly ($P<0.05$) with increasing speeds. For sizes >300 µm and 250–300 µm, reductions were notable at 3640 rpm and above. Sizes 180-250 µm gradually increased from 2470 rpm to 3640 rpm and decreased gradually up to 4290 rpm. Sizes 150–180 µm and 150–106 µm showed a gradual increase from 2470 rpm to 4290 rpm. Sizes 106–75 µm exhibited changes only at 4290 rpm. Optimal speed selection enhances the texture and functionality of flour, with significant implications for industrial applications requiring precise particle size distribution and thermal stability. This study underscores the importance of tailoring milling processes to specific product and processing requirements.

Keywords: FFC 45 disk mill, Flour temperature, Milling speed, Particle size, Rice flour.

**Corresponding author: nilminiprabhashani97@gmail.com*

MODIFICATION OF LDPE USING CINNAMON BARK OIL AND GARLIC EXTRACT FOR FRESH FOOD PACKAGING

B.L.H. Perera[1*], S.A.S.C. Samarasinghe[2] and L. Undugoda[3]

[1]*Faculty of Applied Sciences, University of Sri Jayewardenepura, Sri Lanka.*
[2]*Faculty of Applied Sciences, University of Sri Jayewardenepura, Sri Lanka.*
[3]*Faculty of Technology, University of Sri Jayewardenepura, Sri Lanka.*

Abstract

Food spoilage, intoxication, and food waste are modern-day global challenges. The development of packaging materials with extended shelf life is one of the solutions. Thus, the research aimed to design food packaging materials with antibacterial properties. Cinnamon bark oil and garlic extract mixture was incorporated into low-density polyethylene (LDPE) film for the packaging of fresh foods. The cinnamon bark oil was extracted using the hydro distillation method and the garlic extract was obtained simply by crushing garlic cloves. Surface modification of the LDPE was done by oxidizing the LDPE films using KMnO4/HCl solution. The coated LDPE film was characterized by using several test methods. The antibacterial property of the coated films was studied using gram-positive bacterial strains *E.feacalis*, *S.aureus*, and *L.monocytogenes*, and the gram-negative strains *E.coli*, and *S.typhi* in this research. Accordingly, the coated LDPE film showed the highest inhibition zone diameter (mm) for *S.typhi* and the least for *E.faecalis* at 34.18±0.55 mm and 11.63±0.58 mm respectively. The film was further analyzed through ATR-FTIR spectroscopy and contact angle measurements, to assess its chemical composition and surface properties. In water contact angle measurements, the uncoated pure LDPE film exhibited a contact angle of 82.812°±0.581, whereas the extract-coated LDPE film has a significantly reduced contact angle of 29.303°±0.284, indicating an enhancement in surface wettability following the surface treatment and presence of the plant extract coating. FTIR analysis provided further validation of the coating's presence on the LDPE surface and confirmed the incorporation of natural antimicrobial agents within the material. Further investigations on mechanical properties, thermal stability, barrier efficiency, cytotoxicity and sensory assessments are required to evaluate the performance of the developed packaging material. In conclusion, the developed packaging film demonstrates considerable potential for improving both the quality and storage stability of freshly packaged foods, offering a promising solution for extending shelf life and preserving product integrity.

Keywords: Packaging, Cinnamon, Garlic, Antibacterial, Natural preservatives

**Corresponding author: hansaneeperera99@gmail.com*

LEVERAGING SMART TECHNOLOGIES AND CONSERVATION AGRICULTURAL PRACTICES FOR SUSTAINABLE FOOD SECURITY: A SYSTEMATIC REVIEW

M.A.D.K. Jayathilaka[1*], T.S. Ukwatte[1] and G.Y. Jayasinghe[1]

[1]Department of Agricultural Engineering and Environmental Technology, Faculty of Agriculture, University of Ruhuna, Mapalana, Matara-Kamburupitiya Rd, 81100, Sri Lanka.

Abstract

The global population is projected to reach 10 billion by 2050 and population overgrowth, resource depletion, and climate change intensify pressures on the food security system. A sustainable food supply requires innovative, environmentally friendly, and socially sustainable approaches. This review aims to develop a comprehensive framework assessing how conservation agriculture, precision farming and smart technologies can be integrated to help achieve sustainable agriculture and global food security. A PRISMA protocol systematic review was undertaken to assess 45 peer reviewed articles published from 2015 to 2024 in Scopus, Web of Science and Google Scholar databases. Soil health, moisture retention, and climate resilience can be enhanced through conservation agriculture with minimal soil disturbance, permanent soil cover, and crop rotations. Integrating smart technologies such as the Internet of Things (IoTs), Artificial Intelligence (AI), and nanotechnology with precision tools like GPS mapping, remote sensing, and soil monitoring is necessary for resource-efficient and productive agriculture. For instance, IoT devices facilitate continuous monitoring of soil moisture and crop health, while drones are employed for aerial imaging and precision pesticide application, significantly optimizing resource allocation and increasing crop yields. Nanotechnology, form of the nano-fertilizers, and nano-pesticides, minimizes the resources and maximizes all efficiencies towards sustainable agriculture. Its potential increases yield by 20 % over existing practices such as intercropping maize with wheat and mungbean and improving water-use efficiency beyond the normal. Major concerns are that these technologies are expensive and that smallholder farmers in developing regions have lack technical knowledge. In order to address such challenges, a complete framework involving policy interventions, stakeholder partnerships for reducing costs, educating on production practices, and developing infrastructure must be essential. Future research should focus on scalable solutions relevant to regions, integrating innovative technologies in long-term sustainable agriculture for securing food.

Keywords; Agricultural innovation, Conservation agriculture, Food security, Precision farming, Sustainable agriculture

**Corresponding author: jayathilaka11gt@ags.ruh.ac.lk*

HIGH-THROUGHPUT PHENOTYPING FOR IN-SEASON MAIZE PLANT HEIGHT PREDICTION USING UAV-BASED MULTISPECTRAL IMAGING AND MACHINE LEARNING IN BREEDING AND PRECISION AGRICULTURE

T.L.J. Prasanna[1*], S.H.N.P. De Silva[1*], M. Ariyaratne[1], K.M.K.I. Rathnayake[2], R.A.M. Chandana[2], S.W.R.A.P. Ayesha[2], S. Herath[3] and B. Marambe[1]

[1] *Department of Crop Science, Faculty of Agriculture, University of Peradeniya, Sri Lanka*
[2] *Lanka Sugar Company (Pvt) Ltd., Pelwatte, Sri Lanka*
[3] *Rice Research & Development Institute (RRDI), Batalagoda, Ibbagamuwa, Sri Lanka*

Abstract

In-season maize (*Zea mays* L.) plant height (PH) prediction using remote sensing methods is a powerful tool for precision agriculture, breeding, and stress management. It enhances crop productivity, resource efficiency, decision-making and efficiency of breeding, ultimately leading to higher yields and lower cost. This study aimed develop a methodology to predict maize PH using machine learning (ML) models and UAV-based multispectral imagery, considering different Nitrogen (N) fertilization treatments. Multispectral images of *MI maize hybrid 01*, grown under N doses of 0%, 25%, 50%, 75%, and 100% of Department of Agriculture recommendations, were captured at V6 (28 days after planting - DAP), V12 (42 DAP), and panicle initiation (PI) (50 DAP) stages in the maize phenological cycle. The images were analyzed using Pix4D field software (version 1.10) to calculate 12 vegetation indices (VIs). The effectiveness of four machine learning models random forest (RF), support vector regression (SVR), decision tree (DT), and XGboost (XGB), along with linear regression (LR) was assessed for predicting PH using the most correlated VI. Correlation analysis revealed that the normalized difference vegetation index (NDVI) exhibited the strongest correlation with PH (r= 0.95), leading to its selection as the predictor variable for the ML models. The data consisting of PH and corresponding NDVI values were split with 80% of the data used for training the models and the remaining 20% for validation. Among the models, the RF model demonstrated the highest R^2 (0.95) and the lowest RMSE (6.01cm). Consequently, the RF model outperformed LR, SVR, DT, and XGB in predicting maize PH. This RF-trained model offers a valuable tool for predicting maize PH based on NDVI values derived from UAV imagery, enabling precise N application and supporting breeding efforts to improving maize productivity.

Keywords: High-Throughput phenotyping, Machine learning, Maize, NDVI, Precision agriculture, UAV

**Corresponding author: tljayaprasanna@gmail.com*

COMPARATIVE STUDY OF MACHINE LEARNING MODELS FOR PREDICTING SHRIMP GROWTH PERFORMANCE USING WATER QUALITY PARAMETERS

M. Maura[1*], S. Ravikumar[2], G.W.M.M.K. Dheerasinghe[3] and S.S. Herath[1]

[1]*Department of Fisheries and Aquaculture, Faculty of Fisheries and Marine Science and Technology University of Ruhuna, Sri Lanka.*
[2]*National Aquaculture Development Authority, Batticaloa of Sri Lanka.*
[3]*Department of Mathematics, Faculty of Science, University of Ruhuna, Sri Lanka.*

Abstract

Water quality parameters are critical in maintaining optimum growth performance in shrimp farming. The prediction of growth performance is crucial for the early detection of stress or disease and, the determination of optimal feeding schedules and harvest time to improve productivity and sustainability in commercial farming. Therefore, the objective of this study was to investigate the relationship between key water quality parameters and shrimp growth performance and to develop a supervised machine learning (SML) model for predicting the growth performance of *Litopenaeus vannamei*. This study was conducted at Lotus Aquaculture Lanka (Pvt) Ltd and water quality parameters and weekly Average Day Gain (ADG) data were collected for the period. The dataset included six key water quality parameters: dissolved oxygen (DO), pH, temperature, alkalinity, salinity, and turbidity, all used to predict the weekly ADG of shrimp. SML models, including Random Forest Regressor, XGBoost, Stacking Regressor, Decision Tree, and Logistic Regression, were trained and validated using metrics such as Pearson correlation, Root Mean Square Error (RMSE), Mean Absolute Error (MAE), Mean Square Error (MSE), Nash-Sutcliffe Efficiency (NSE), and Coefficient of Determination (R^2). The Random Forest Regressor model achieved the highest correlation (0.8200) and NSE (0.6401), indicating its superior performance in capturing non-linear relationships between water quality parameters and shrimp growth. Additionally, the study was able to predict the optimal growth parameters based on available data, providing the optimal conditions for growth: DO 6.10 mg/L, pH 7.95, temperature 27.5°C, alkalinity 115 ppm, salinity 10 ppt, and turbidity 15 NTU. This machine learning approach provides a more efficient, accurate, and time-saving alternative to traditional manual methods, reducing errors and streamlining the process.

Keywords: Machine learning, Predictive modeling, Random Forest regressor, Shrimp growth, Water quality

*Corresponding author: *maura19975@gmail.com*

DESIGN AND DEVELOPMENT OF AN AUTOMATED COCOPEAT DRYING MACHINE FOR SUSTAINABLE HORTICULTURE

A.K.S.S. Nipunsara[1*], U.R.D. Lakpriya[1], H.M.D.M. Herath[1], M.M.I.S. Kumara[1] and H.V.H.H. Senavirathna[1]

[1]*Department of Engineering Technology, Faculty of Technology, University of Ruhuna, Sri Lanka*

Abstract

Cocopeat, a by-product of the coconut coir industry, plays a crucial role in horticulture for its superior water retention and aeration properties. However, inconsistencies in product quality and the inefficiencies of conventional drying methods restrict its broader adoption. This study presents the design and construction of a fully automated cocopeat drying machine aimed at optimizing drying efficiency and ensuring consistent product quality. The machine incorporates a rotary drum system with a spiral mixer, ceramic heaters, and an integrated fan for uniform heat distribution. Temperature control is provided through an automatic on/off controlling mechanism from real-time sensor input. The system produces heat through a 2000W heater and ensures air circulation through a fan. It efficiently keeps the drying temperature constant between optimal range. Powered by an Arduino-based interface, it provides real-time monitoring and adjustment of critical Operating temperature of the machine, retention time of cocopeat and speed of airflow are critical parameters of the drying process and those were controlled by Arduino based interface. By maintaining the operating temperature range of the chamber between 120 – 150 °C, airflow speed at 0.686 CFM and feeding rate of cocopeat at 10 kg of per hour, the moisture content can be reduced up to 19 ± 1 %. Experimental results demonstrate significant improvements in the drying time. Even though energy consumption in this method is high compared to traditional methods, the overall cost to produce 1 Kg of cocopeat is lower than the traditional method when considering the labor cost. Therefore, the machine is cost effective than the traditional methods. The quality of dried cocopeat was measured by continuously monitoring pH value and moisture content of dried cocopeat. According to the results the pH value of the dried cocopeat (5.75 ± 3) and moisture content (19 ± 1 %) is within the range, therefore it demonstrates the quality of the dried cocopeat. This innovation addresses challenges in cocopeat production and aligns sustainable agricultural practices by reducing resource waste and enhancing scalability for diverse agricultural needs.

Keywords: Automated cocopeat drying, Cocopeat, Energy-efficient agriculture, Moisture content optimization, Rotary drum system

**Corresponding author: sujith_2019591@fot.ruh.ac.lk*

DEVELOPMENT AND EVALUATION OF A LOW-COST AUTOMATED SEED DRYER SYSTEM

W.A.J. Pushpakumara[1], M. Sugirtharan[2], G. Niroash[2], D.M.T.G. Dissanayaka[2*] and T. Kapilathan[3]

[1]*Department of Biosystems Technology, Faculty of Technology, Eastern University, Sri Lanka*
[2]*Department of Agricultural Engineering, Faculty of Agriculture, Eastern University, Sri Lanka*
[3]*Department of Multidisciplinary Studies, Faculty of Technology, Eastern University, Sri Lanka*

Abstract

In developing countries, 30–40% of agricultural production is lost after harvest, with paddy especially vulnerable. Reducing moisture content is crucial to extending shelf life and preventing microbial growth, which is traditionally achieved through sun drying. However, sun drying is weather-dependent and labour-intensive. This study aimed to develop an automated temperature-controlled seed dryer as an alternative to improve drying efficiency and reduce post-harvest losses. The automated dryer was tested with three temperature ranges (30–35, 35–40, and 40–45 °C) and three drying masses (1.0, 0.5 and 0.25 kg) using a two-factor Factorial Complete Randomized Design (CRD). Its performance was then compared with solar and open sun drying, using a fixed drying mass of 1.0 kg. Results showed that temperature did not significantly affect the drying rate (DR) in the automated seed dryer ($p>0.05$). In contrast, drying mass significantly influenced the DR ($p<0.05$), indicating a high probability that the observed impact was a real effect rather than a random occurrence. The 0.25 kg mass dried the fastest (11.59 kg/h), significantly higher than the 1.0 kg and 0.5 kg masses. The optimal drying condition was 0.25 kg at 40–45 °C. Open sun drying was the fastest, followed by the automated seed dryer and solar dryer, with drying times of 2.0, 2.4 and 3.0 hours, respectively. The moisture ratio (MR) analysis revealed the solar dryer had the highest MR (0.90), followed by the automated dryer (0.88) and open sun drying (0.86). Additionally, the automated seed dryer demonstrated its potential as a more controlled and efficient alternative to traditional drying methods, particularly for smaller loads.

Keywords: Automated seed dryer, Drying efficiency, Drying rate, Moisture content, Paddy drying

**Corresponding author: tharukagimhani98@gmail.com*

ESTIMATING THE TEA LEAF YIELD CANOPY USING REMOTE SENSE BASED VEGETATION INDICES

B. Praveen[1] and E.D.J. Prince[1*]

[1]*Department of Agricultural Engineering, Faculty of Agriculture, Eastern University, Sri Lanka*

Abstract

Sri Lanka is popular for producing Tea, one of the country's main exports, and a significant contributor to the national economy. Hence, precise yield estimation is essential for improving tea plantation management, increasing resource allocation, and ensuring sustainable agriculture. The study aims to determine and assess the relationship between field-based tea yield and remote sensed-based vegetation indices using Sentinel-2A satellite imagery to identify suitable vegetation indices for estimating the tea yield. The study was conducted at Liddesdale Tea Plantation at Walapane Divisional Secretariat Division (DSD), Nuwara Eliya District. Sentinel-2A satellite imageries from 2017-2024 were used as spatial data along with annual field base tea yield obtained from the plantation. The study evaluates the effectiveness of five vegetation indices: Green Normalized Difference Vegetation Index (GNDVI), Normalized Difference Red Edge Index (NDREI), NDREI_Narrow Index, Normalized Green Red Difference Index (NGRDI), and Normalized Difference Vegetation Index (NDVI) to predict the yield of the Tea. Correlation and regression models were developed to assess the strength of the association between the selected vegetation indices and tea yield using scatter diagrams. The highest mean NDVI was recorded as 0.75, whereas the minimum was recorded as 0.45 in 2022 and 2019. The mean GNDVI ranged between 0.42 and 0.68 from 2017 to 2024. The highest mean NDREI (0.51) was recorded in 2022, while 2019 indicated the lowest mean NDREI (0.30). In 2022, the mean NDREI_Narrow was at its highest (0.52) whereas, in 2023, at its lowest (0.32). The mean NGRDI peaked in 2022 at 0.17 and reached its lowest in 2020 at 0.03. The regression analysis revealed that the NGRDI, NDREI, NDREI_Narrow, NDVI, and GNDVI indices showed strong and moderate relationships with tea yield with the R^2 values of 0.67, 0.59, 0.58, 0.57, and 0.57, respectively. The study finds that adopting remote sensing technology can promote an efficient and sustainable estimation of tea yields especially by using NGRDI and NDREI as reliable indices.

Keywords: Indices, NDVI, Regression analysis, Remote sensing, Sentinel-2A, Tea plantations

**Corresponding author: delinap@esn.ac.lk*

SUSTAINABLE LIVESTOCK AND AQUACULTURE MANAGEMENT

EFFECT OF VARYING LEVELS OF DIETARY EGG YOLK POWDER ON GROWTH PERFORMANCES, SALINITY TOLERANCE, AND PIGMENTATION IN GUPPY (*Poecilia reticulata*)

J.P.S.R. Bandara[1*] and M.S.M. Nafees[1]

[1]*Department of Animal Science, Faculty of Agriculture, Eastern University, Sri Lanka*

Abstract

Ornamental fish farming plays a crucial role in global aquaculture, substantially contributing to the economy and supporting livelihoods. However, sustainability and profitability of this industry are challenged by high feed costs associated with protein source, and dependence on synthetic additives. Recent research has focused on finding natural, affordable feed alternatives that can sustain or enhance fish health and visual quality. Hence, the present study was conducted to analyze the effect of dietary egg yolk powder on growth, pigmentation, and salinity tolerance in rainbow guppy (Poecilia reticulata). Four experimental diets were prepared using fishmeal, soybean meal, wheat flour, rice bran, coconut meal, coconut oil, and varying levels of egg yolk powder (0, 5, 10, and 15%). Guppies were randomly assigned to 12 aquaria, with 10 fish per aquarium, to form four experimental groups, each with three replicates. The fish were fed the prepared diets to satiation twice daily at 9:00 AM and 3:00 PM for 43 days. Results indicated that there were no significant differences ($P>0.05$) in water quality parameters and fish survival among the treated groups throughout the experimental period. Specific growth rate (1.74 % day-1) and feed conversion efficiency (1.69) were significantly higher ($P<0.05$) in fish fed 15% dietary egg yolk powder than those fed 0 – 5% egg yolk powder. Salinity tolerance of fish fed egg yolk powder exhibited greater resilience, suggesting enhanced health benefits. Body color analysis demonstrated increased redness ($P<0.05$) in fish fed 10% egg yolk powder than those fed 0% and 15% egg yolk powder. These findings revealed that 10% dietary egg yolk powder could be a natural feed supplement to enhance pigmentation in guppy without compromising their growth and health. The finding of this study could be used to formulate a cost-effective feed and promote sustainable farming of guppy fish.

Keywords: Aquafeed, Color enhancement, Livebearers, Ornamental fish culture

**Corresponding author: rathnayakasumith111@gmail.com*

MICROBIAL ANALYSIS OF SAUSAGES PREPARED FROM *Oreochromis mosambicus, Stolephorous commersonnii, Mugil cephalus*, AND *Channa orientalis*

L.G.C.M. Karunarathne[1*] and M.S.M. Nafees[1]

[1]*Department of Animal Science, Faculty of Agriculture, Eastern University, Sri Lanka*

Abstract

Fisheries and aquaculture play an important role in nutrition, food security and livelihoods. Fish are highly nutritious with first class animal protein and balanced food with essential amino acids in correct proportions for human Globally, 165 million tonnes of fish produced in 2022 with the involvement of 61.8 million people. Fish production shows copiousness in some seasons and shortage in others. Hence, there is a need to preserve fish when there is surplus harvest to use them in good condition during scarcity because fish are highly perishable after their death. In 2022, around 12% of the world fish production was available for human consumption in the processed form. In this context, the present study was aimed to produce sausages using *Oreochromis mosambicus, Stolephorous commersonnii, Mugil cephalus,* and *Channa orientalis* and to evaluate their shelf life through microbiological analysis. The sausages were prepared using minced fishes, salt, sugar, spices, finger millet flour, corn flour, sunflower oil, soybean oil, milk powder, and lime. The sausages were packed and stored at -4 ℃. Microbiological analysis was carried out at the first, third and fifth week of storage. Results revealed the absence of *Salmonella* sp. in all fish sausages during the storage period. Likewise, *Escherichia coli* also was not detected except 6×10^2 $\mathrm{CFU/g}$ in sausage prepared with *Stolephorous commersonii* during the fifth week of storage. Concentration of *Coliform* was negative in all sausage samples after the first week of storage. However, *Staphylococcus aureus* exceeded the harmful limit (100 CFU/g) except a negative in sausage made with *Channa orientalis*. Accordingly, it could be concluded that *Channa orientalis* is an appropriate species to prepare fish sausages with more than 35 days of shelf life.

Keywords: Anchovy, Grey mullet, Snakehead. *Escherichia coli, Staphylococcus aureus,* Tilapia

*Corresponding author: *chathurikakarunarathna915@gmail.com*

EFFECT OF DIETARY REPLACEMENT OF FISHMEAL WITH SUCKERMOUTH CATFISH (*Pterygoplichthys pardalis*) MEAL ON THE GROWTH AND COLORATION OF OSCAR FISH (*Astronotus ocellatus*)

P.C.M. Perera[1*] and M.S.M. Nafees[1]

Department of Animal Science, Faculty of Agriculture, Eastern University, Sri Lanka

Abstract

Fish feed is a critical component in ornamental fish farming. Nutritionally balanced diets enriched with pigments are necessary for health, growth, and vibrant coloration. Protein is the key nutritional component in fish feed and is mainly obtained from fishmeal which is rich in protein, but also costly. Reliance on fishmeal not only increases feed costs but also poses challenges to the sustainability of the industry. Hence, this study evaluated the effects of partially replacing fishmeal with suckermouth catfish (*Pterygoplichthys pardalis*) meal on growth performance, feed efficiency, coloration, and economic viability of Oscar fish (*Astronotus ocellatus*). A 35-day trial was conducted with six dietary treatments, five experimental diets replacing 0 – 40 % of fishmeal with suckermouth catfish meal and a commercial control diet (Hikari food stick). Twenty-eight days old juvenile Oscars were allocated to 18 aquaria (20 L each) in a completely randomized design, with a stocking density of four fish per tank. Water quality was monitored daily. Fish were fed to satiation six times per day. Results indicated no significant differences ($P > 0.05$) in specific growth rate, weight gain, and length gain across the treatments. Feed conversion ratio (1.0 – 1.2) and daily feed intake (4.0 – 4.8 % BW d^{-1}) indicated efficient nutrient utilization and feed acceptability. Fish fed 30 – 40 % dietary suckermouth catfish meal showed significantly higher ($P<0.05$) redness and yellowness than those fed other diets. Increasing the rate of dietary suckermouth catfish meal reduced feed costs, proving its sustainability and cost-effectiveness as a fishmeal alternative. This study suggested that suckermouth catfish meal can replace up to 40% of fishmeal in Oscar fish diets without compromising growth, survival, feed efficiency, coloration, and feed costs. Further research is recommended to assess higher inclusion levels and their long-term impacts on fish health and quality.

Keywords: Aquaculture, Aquafeed, Egg layers, Fishmeal replacement, Ornamental fish

**Corresponding author: pererachamal95@gmail.com*

ASSESSING THE TRENDS IN POPULATION DYNAMICS OF KEY FRESHWATER FISH SPECIES IN SAMANALAWEWA RESERVOIR, SRI LANKA

D.I.P. Kularathna[1*] and C.N. Walpita[1]

[1] *Department of Livestock Production, Faculty of Agricultural Sciences, Sabaragamuwa University of Sri Lanka, Belihuloya, Sri Lanka*

Abstract

The Samanalawewa Reservoir (SWR) is one of the largest reservoirs in Sri Lanka, covering a catchment area of 372 km^2 and supports a diverse array of economically valuable freshwater fish species. Despite its economic significance, the dynamics of the fish population in SWR remain underexplored. Understanding these dynamics is critical for informing sustainable fishery management strategies. So, the present study aims to investigate the population dynamics and exploitation status of commercially important fish species in SWR, including *Catla catla, Cirrhinus cirrhosis, Cyprinus carpio, Etroplus suratensis, Labeo rohita, Ompok cylonensis*, *Oreochromis niloticus*, and *Tor khudree.* The stock assessment parameters were estimated based on the length frequency distribution of study species. Sampling was conducted monthly at SWR's associated main two landing sites encompassing the Walawe Riverside and the Kinchigune, from November 2023 to January 2024. The model lengths with cohorts were identified based on the length frequency distribution observed during the study period to assess population structure. The exploited length frequency distributions of corresponding species were between 30-60, 30-60, 20-70, 15-40, 25-65, 20-45,15-45, and 15-60 cm respectively. The analysis indicated that the population consisted of multiple-size groups with distinct model lengths representing different cohorts. The computed limits of exploitation (E) values of corresponding species were 0.14, 0.11, 0.04, 0.63, 0.45, 0.55, 0.45, and 0.18 respectively. Observed exploitation rates (E) ranged from 0.04 to 0.63, which suggests varying exploitation status among the selected species in the SWR. As per the results under-exploitation ($E<0.5$) for certain species like *Catla catla, Cirrhinus cirrhosis, Cyprinus carpio, Labeo rohita, Oreochromis niloticus*, and *Tor khudree* and moderate exploitation for others *Etroplus suratensis, Ompok cylonensis* ($E = 0.63$ and 0.55 respectively were suggested). Within the constrained observational timeframe, these results, provide a preliminary snapshot that may not fully capture seasonal dynamics. Despite this limitation, the findings highlight key management priorities, including protecting underutilized species and monitoring those facing higher exploitation levels. So, the critical assessment of some fry stocking programs, given the challenges of high costs and significant mortality affecting recruitment success and population sustainability.

Keywords: Exploitation, Length frequency distribution, Population dynamics, Recruitment, Von Bertalanffy

**Corresponding author: dipkularathna1997@gmail.com*

INVESTIGATION OF LUMPY SKIN DISEASE IN CATTLE IN BATTICALOA DISTRICT, SRI LANKA

P. Mithushan[1*], M. Pagthinathan[1] and P. Mathurangani[1]

[1]*Department of Animal Science, Faculty of Agriculture, Eastern University, Sri Lanka*

Abstract

Lumpy skin disease (LSD) is a transboundary viral disease affecting cattle and buffaloes, causing significant economic losses. The objective of this study is to investigate the emergence, and impact of Lumpy Skin Disease in Batticaloa district, Sri Lanka, during an outbreak from July to September 2023. LSD caused by a virus of the genus *Capripoxvirus* and characterized by fever, cutaneous nodules, anorexia, and edema. The disease was first reported in Sri Lanka in 2020 and has since spread across multiple districts. The study surveyed 110 cattle farmers, covering 1,279 animals. The result of this study was identified 412 affected cattle, yielding a morbidity rate of 32.2%. Local breeds were more susceptible (94.5%), with a 12.73 times higher risk of infection compared to crossbreeds. The overall mortality rate was 5.3%, and the case-fatality rate was 16.5%. Clinical symptoms included swelling of the dewlap, skin nodules, fever, and enlarged lymph nodes, with lesions primarily concentrated on the neck and body. Complications such as abortion and mastitis were also reported. The findings highlight the need for effective control measures and vaccination programs to mitigate the economic impact of LSD in Sri Lanka.

Keywords: Cattle, Lumpy skin disease, Morbidity, Mortality

**Corresponding author: prabamithushan@gmail.com*

THE EFFECT OF SHORT-TERM EXPOSURE TO BISPHENOL-A AND ITS ANALOGUE, BISPHENOLS ON STRESS RESPONSE OF JUVENILE ZEBRAFISH (*Danio rerio*)

K.P.W.D. Shanika[1] and G. Rajapaksa[1*]

[1]*Department of Zoology and Environmental Management, Faculty of Science, University of Kelaniya, Sri Lanka*

Abstract

Bisphenol-A (BPA), is a popular industrial compound and xenoestrogen that significantly affects the health of living organisms. Consequently, Bisphenol-S (BPS) was introduced as a safer substitute. However, recent studies have reported BPS-induced endocrine disruption and health impacts calling for comparative studies to assess the relative safety of BPS. This study aimed to compare the effects of BPA and BPS on physiological stress in zebrafish, focusing on swimming performance, aggression (via mirror-biting test), and ammonia excretion as indicators of physiological stress. The stress response involves behavioral and physiological reactions to restore homeostasis. Twenty-one-day-old juvenile zebrafish were exposed to environmentally relevant concentrations of 100 µg/L of BPA, and BPS respectively, with a control treatment in triplicate. The swimming speed, aggression, and ammonia were measured at the end of 21 days. Results revealed that BPA and BPS significantly reduced the mean maximum swimming speed of fish compared to control fish (BPA: 0.45±0.04 m/s, BPS: 0.43±0.02 m/s, control: 0.60±0.03 m/s; $p<0.05$), with no significant difference between BPA and BPS ($p>0.05$). BPA-treated fish showed significantly higher aggression (108.0±50.9 bitings/minute) than BPS-treated fish (48.3±29.9 bitings/minute). Aggression induced by both bisphenols was significantly higher than the control (1.2±1.6 bitings/minute; $p<0.05$). Ammonia excretion was significantly elevated in both BPA- (1.23±0.36 ppm) and BPS-exposed fish (0.90±0.90 ppm) compared to the control fish (0.40±0.16 ppm, $p<0.05$). However, no significant difference was observed between BPA and BPS treatments ($p>0.05$). In conclusion, both BPA and BPS adversely affected swimming performance and comparably increased ammonia excretion, indicating bisphenol-induced physiological stress. While both bisphenols elevated aggression levels, BPA led to significantly higher aggression compared to BPS. These findings suggest that BPS is not a safe BPA alternative, as both compounds contribute to physiological stress in zebrafish. Further research is recommended to investigate the cellular pathways underlying the physiological stress caused by bisphenols in zebrafish.

Keywords: Aggression, Ammonia, Bisphenol-analogues, Environmentally-relevant concentrations, Swimming performance

**Corresponding author: gayani@kln.ac.lk*

QUALITY CHARACTERISTICS OF CHICKEN SAUSAGES BY COMBINATION OF KIDNEY BEANS (*Phaseolus vulgaris*) AND SOYBEANS (*Glycine max*)

S.S.T. Ranathunga[1*] and M. Pagthinathan[1]

[1]*Department of Animal Science, Faculty of Agriculture, Eastern University, Sri Lanka*

Abstract

This study investigated the effects of incorporating soybean (*Glycine max*) and kidney bean (*Phaseolus vulgaris* L.) powders as plant-based protein sources in chicken sausages. Seven formulations with varying ratios of these legumes were analyzed over a four-week storage period for dry matter, ash, protein, pH, texture, color, and sensory properties. Results showed that dry matter and ash content increased over time, with T6 (Sausage with 1% soybeans and 4% kidney beans) and T7 (Sausage with 0% soybeans and 5% kidney beans) exhibiting the highest values (29.51% and 3.59%, respectively) at week four, while protein levels have no significant difference, with T4 (Sausage with 3% soybeans and 2% kidney beans) showing the highest content (25.38%). pH levels decreased, indicating microbial activity, with T6 (Sausage with 1% soybeans and 4% kidney beans) having the highest initial pH (6.48) and T1 (Sausage with 0% soybeans and 0% kidney beans) the lowest (4.68) by week four. Texture analysis revealed increased firmness, with T3 (Sausage with 4% soybeans and 1% kidney beans) being the firmest (0.67 N) at week four. In contrast, color analysis showed increasing lightness, with T1 (Sausage with 0% soybeans and 0% kidney beans) having the highest lightness (26.86) at the end of storage. The sensory evaluation highlighted enhanced flavor, texture, and overall acceptability, particularly in formulations with higher plant protein levels. The findings demonstrate that incorporating soybean and kidney bean powders improves chicken sausage's nutritional and sensory qualities, offering a promising approach to developing innovative, plant-enriched meat products while balancing quality and shelf stability.

Keywords: Chicken sausages, Kidney bean, Plant-based protein, Sensory evaluation, Soybean

**Corresponding author: thilokaranathunga20@gmail.com*

COMPARATIVE STUDY ON THE IMPACT OF VARIABLE FEEDING REGIMENS ON GROWTH PERFORMANCE AND SURVIVAL RATES OF COMMON CARP (*Cyprinus carpio*) FROM POST-LARVAE TO FINGERLING STAGES

G. Anitha[1], S. Piratheepan[1] and V. Kalaivizhi[1*]

[1]*Department of Animal Science, Faculty of Agriculture, University of Jaffna, Sri Lanka*

Abstract

This study evaluates the effects of various feeding regimens on the growth performance and survival rates of Common Carp (*Cyprinus carpio*) during the transition from post-larvae to fingerling stages over 60 days. The primary objective was to identify optimal feeding strategies that enhance the growth and survival in aquaculture systems. The experiment initiated with fry averaging 1.16 cm in length and 0.01 g in weight. Two feeding ratios were evaluated: 3% (R8 tank) and 5% (R9 tank) for their body weights. Survival rates and growth metrics were recorded to assess the impact of these regimens. The mean length and weight of R9 fry was recorded as 2.49 cm and 0.374 g respectively. The R9 group displayed a 28.5% increase in length and a 111% increase in weight relative to the R8 group. Survival analysis revealed that the R9 tank achieved a 76% survival rate, with 190,000 fry surviving out of 250,000 post-larvae. Conversely, the R8 tank demonstrated a slightly higher survival rate of 80%, with 200,000 fry surviving. These findings indicate that higher feeding ratios improve the growth during the fry stage significantly, while the growth diminish at the transition up to fingerling stages. Higher feeding levels promote rapid early growth, which may contribute to highly survived fish stocks. Therefore, feeding regimens should be optimized to achieve a balance growth performances and survival rates. However, the diminishing returns in growth at later stages suggest the need for staged feeding adjustments. The study provides valuable insights for improving aquaculture practices by optimizing feeding strategies to enhance growth efficiency and sustainability. Future research should focus on refining feeding protocols and evaluating their long-term effects on fish health and productivity.

Keywords: Aquaculture, Common carp, Feeding regimens, Growth performance, Survival rates

**Corresponding author: angelinakalaivizhi@gmail.com*

ENRICHMENT OF FRESHWATER ROTIFER (*Brachionus calyciflorus*) AND ITS APPLICATION IN RED-BLONDE GUPPY (*Poecilia reticulata*) FISH LARVICULTURE

K.M. Nicholos[1], S. Varthani[1*] and P.M. Withanage[2]

[1]*Department of Biosystems Technology, Faculty of Technology, University of Jaffna, Sri Lanka*
[2]*Development and Training Section, NAQDA, Udawalawe, Sri Lanka*

Abstract

Freshwater Rotifer (*Brachionus calyciflorus*) is an important zooplankton for juvenile fish and crustacean larval growth and survival in hatcheries. This study investigated the feasibility of modified fish waste extract with *Spirulina* powder and modified chicken manure extracts with purple yam (*Dioscorea alata*) as an enrichment media for freshwater rotifers intended to be fed to guppy fish. The research was conducted at the National Aquaculture Development Authority (NAQDA) Centre in Kurunagala, Sri Lanka. The effect of enriched freshwater rotifers as a live feed on the growth performance and survival rate of a day-old Red-blonde guppy fish larvae (*Poecilia reticulata*) were examined during twenty-one days under consistently maintained water quality parameters. In this experiment, four treatments were designed (*Artemia* (T0), fish waste extract Enriched rotifers (T1), poultry manure Enriched rotifers (T2), and unenriched freshwater rotifers (T3)). Fish larvae were fed with each experimental diet (2 times/day) and nursery feed (3 times /day) for three weeks. Growth performance and survival rate were evaluated during the rearing period and at the end of the experiment. The crude protein content and fat content of feeds were measured. The crude protein and fat content of fish waste extract enrichment media (6.87%, and 2.07%, respectively) were higher than poultry manure extract enrichment media (3.73%, and 1.17%, respectively). The treatments T1 and T2 showed a higher mean length difference (1.49 cm), and specific growth rate (1.58%) significantly ($p < 0.01$) differed from other treatments. However, the weight and condition factor were not significantly different among treatments. The survival rate ranged from 78-95%, and T3 had a low value and significantly differed from other treatments. The growth performance of guppy fish revealed that the enriched rotifers fed fish perform better than *Artemia* and unenriched rotifer. Thus, it is concluded that the enriched live feed B. *calyciflorus* is suitable for the optimum growth and survival of *Poecilia reticulata* under the current experimental set-up and is recommended for feeding juvenile guppies.

Keywords: Freshwater rotifer, Growth performance, Larviculture, Red-blonde guppy

**Corresponding author: vsusruthan@gmail.com*

SOIL, WATER, ENERGY, AND ENVIRONMENT

SUITABILITY OF BOLGODA LAKE WATER FOR AQUACULTURE AND AGRICULTURE INTERMS OF SOME PHYSICO-CHEMICAL PARAMETERS

D.G.V. Sathsarani[1*] and M. Sugirtharan[1]

[1]*Department of Agricultural Engineering, Faculty of Agriculture, Eastern University, Sri Lanka*

Abstract

The present study was conducted to assess the variation in some water quality parameters of the Bolgoda Lake in Sri Lanka, with a particular focus on their suitability for aquaculture and agriculture from August to September 2024. Twelve sampling locations were identified in both mangrove and non-mangrove areas. Water temperature, electrical conductivity (EC), total dissolved solids (TDS), pH, dissolved oxygen (DO), salinity, and turbidity were measured at a depth of 15–30 cm below the water surface. The study revealed the following ranges for the water quality parameters of the Bolgoda Lake: water temperature (28.01-32.86 °C), pH (6.82-8.21), EC (0.25-48.40 mS/cm), TDS (127-24210 mg/L), salinity (0.12-31.42 PSU), DO (1.71-5.44 mg/L), and turbidity (0-9.94 FTU). The findings indicated that EC, TDS, and salinity decreased progressively with increasing distance from the sea mouth toward the inland. Rainfall was identified as a major factor influencing the observed variations in the water quality. The non-mangrove areas exhibited higher levels of EC, TDS, and salinity, suggesting a greater influence of saltwater intrusion. In contrast, mangrove areas demonstrated more stable water quality, with higher DO levels and lower salinity. The study indicates that, while Bolgoda North Lake to Panadura estuary is more suitable for brackish water species like shrimp cultivation, Weras River and Bolgoda North Lake may support freshwater species like tilapia cultivation during this period. High salinity and conductivity, limiting their agricultural use due to salinity issues, particularly for salt-sensitive crops. The findings of this study will be important in providing information about the variation of water quality for relevant agencies to plan and protect the lake's water for aquaculture and for future studies in the Bolgoda Lake.

Keywords: Aquaculture, Bolgoda Lake, Dissolved oxygen, Salinity, Water quality parameters

**Corresponding author: vindyasathsarani1232@gmail.com*

IMPACT OF NITROGEN SOURCES ON MAINTAINING CHLOROPHYLL CONTENT OF MUNG BEAN LEAVES UNDER SALINITY

M.D.A.M. Perera[1*], A.R.S.A. Athauda[1], B.G.U. Janith[1], T.M.R. Rusarani[1], C.K. Benaragama[1] and L.D.B. Suriyagoda[1]

[1]*Department of Crop Science, Faculty of Agriculture, University of Peradeniya, Peradeniya, Sri Lanka*

Abstract

Soil salinity is one of the most significant abiotic stresses for crops, affecting the photosynthetic performance of plants. Photosynthesis is a key physiological process that determines the growth and yield of crops. The mung bean (*Vigna radiata* L.) is an important legume crop that provides plant-based dietary nitrogen requirements and performs symbiotic nitrogen fixation. An experiment was conducted under salinity-induced stress conditions on mung beans with urea and poultry manure as chemical and organic nitrogen sources. Responses of mung bean to the stress were evaluated by measuring chlorophyll a and b, shoot dry weight, and SPAD data. Due to soil salinity, the leaf chlorophyll content of mung bean was reduced by 9.77%. Under saline conditions, chlorophyll degradation is a critical problem that compromises photosynthesis and plant productivity. The application of poultry manure showed pigment and growth increments of 1.29% and 44.05%, respectively, under salinity stress, serving as an effective strategy to mitigate the adverse effects of salinity stress on mung beans. Poultry manure enriches the soil with essential nutrients, improves soil structure, and enhances water retention capacity, thereby reducing osmotic and ionic stress on plants, leading to better physiological functioning.

Keywords: Leaf greenness, Ion toxicity, Organic amendment, Osmotic stress, Shoot dry weight

**Corresponding author: ag18120@agri.pdn.ac.lk*

MICROPLASTIC POLLUTION IN BOLGODA LAKE

R.M.S.K. Rathnayake[1,2], A.S. Dikkumbura[1] and M.G.Y.L. Mahagamage[2]*

[1]*Department of Chemistry, Faculty of Natural Sciences, The Open University of Sri Lanka, Nawala, Nugegoda, Sri Lanka.*
[2]*Centre for Environmental Studies & Sustainable Development, The Open University of Sri Lanka, Nawala, Nugegoda,10250, Sri Lanka.*

Abstract

Global plastic production is on the rise due to rapid population growth, and managing this increase poses significant challenges because plastic is non-biodegradable. Unfortunately, plastic waste is often discarded at open dump sites and in uncontrolled areas. As a result, plastic debris frequently enters oceans through land-based water bodies and accumulates in the environment over extended periods. Ultimately, these plastics break down into tiny particles, leading to microplastic pollution in aquatic ecosystems. The present study aimed to investigate microplastic pollution in the surface water of Bolgoda Lake, located in the Western Province of Sri Lanka. The research was conducted during the wet season. Fifteen sampling locations around Bolgoda Lake were randomly selected. Surface water samples were taken from these locations, and duplicate samples were analyzed for accuracy. A total of 25 liters of water from each site was filtered through a 300 µm sieve, following standard protocols to extract microplastics. The extracted microplastics were identified based on their types, shapes, and colors using a stereomicroscope. The results revealed an average concentration of 396.0 ± 155.6 particles per cubic meter (particles/m³) of microplastics in the surface water of Bolgoda Lake. The highest concentration was recorded at location BL 6, near Moratuwa city, with 680.0 ± 313.9 particles/m³. The lowest concentrations were found at locations BL 7 and BL 11, both registering 180.0 ± 77.2 particles/m³ and 180 ± 90 particles/m³, respectively, near the Panadura estuary. Additionally, the study found 0.08 ± 0.49 particles/m³ of foam, 22.7 ± 24.5 particles/m³ of fragments, and 346.7 ± 139.7 particles/m³ of microfibers. In terms of color patterns, the following hierarchy was observed among the microplastics: black > blue> red > transparent > green > yellow > white. The findings of this study underscore the urgent need to improve waste management practices and enhance community awareness programs to mitigate plastic pollution in Bolgoda Lake.

Keywords: Bolgoda lake, Microplastics, Plastic pollution, Surface water

**Corresponding author: mgyma@ou.ac.lk*

STUDY ON THE EFFECT OF BIOSOLIDS AND SUGARCANE FILTER CAKE INTEGRATED WITH CHEMICAL FERTILIZERS ON THE OKRA CULTIVATION IN SANDY REGOSOLS

M.P. Kosgallane[1]* and P. Premanandarajah[1]

[1]*Department of Agricultural Chemistry, Faculty of Agriculture, Eastern University, Sri Lanka*

Abstract

Biosolids and sugarcane filter cake, which are nutrient-rich organic byproducts derived from wastewater treatment plants and the sugar and alcohol industries, can be effectively utilized as soil amendments in agriculture. A pot experiment was conducted in a Completely Randomized Design (CRD) to investigate the impact of biosolids (BS) and sugarcane filter cake (SFC), integrated with chemical fertilizers (CF), on okra cultivation in sandy Regosols at the University Farm, Eastern University, Sri Lanka. The experiment was carried out with seven treatments, each replicated four times. The seven treatments were: T1 (100% SFC – 20t/ha), T2 (100% BS – 20t/ha), T3 (50% SFC + 50% BS), T4 (50% SFC + 50% CF), T5 (50% BS + 50% CF), T6 (25% SFC + 25% BS + 50% CF), and a control treatment (T7), consisting of 100% CF based on the Department of Agriculture (DOA) recommendations. The experiment was conducted over a 90-day period, from July to October 2024. Soil organic matter and pod parameters were recorded at the time of harvest, which occurred 8 weeks after planting. Data were statistically analyzed using Minitab software, and Tukey's test was used to compare significant differences between treatment means at the 5% significance level. Among the treatments, the application of 100% organic amendments (T2 and T3) resulted in the significantly ($p<0.05$) highest soil organic matter content (1.65%), while the integrated applications of BS and SFC combined with chemical fertilizers (T4, T5, and T6) had the most significant ($p<0.05$) effect on the number of pods per plant (5.75, 4.25, and 6.50, respectively) and the fresh weight of the pod (22.00g, 23.93g, and 24.34g, respectively), outperforming the 100% CF treatment (0.46%, 1.25 pods, 14.80g, respectively). Therefore, these integrated applications provide a better alternative to conventional chemical fertilizers, as they demonstrated superior results in improving okra yield characteristics.

Keywords: Biosolids, Integrated applications, Organic matter content, Pod parameters, Sugarcane filter cake

**Corresponding author: piyumali1314@gmail.com*

INTEGRATED EFFECTS OF FISH POND SEDIMENTS AND FISH AMINO ACID LIQUID FERTILIZERS WITH INORGANIC FERTILIZERS ON OKRA (*Abelmoschus esculentus*) GROWTH IN SANDY REGOSOL SOIL

D.S.S. Rathnasekara[1*] and P. Premanandarajah[1]

[1]*Department of Agricultural Chemistry, Faculty of Agriculture, Eastern University, Sri Lanka*

Abstract

Excessive use of inorganic fertilizers can harm the environment and degrade the soil properties while the accumulation of aquacultural waste contributes to pollution, necessitating sustainable solutions. Aquaculture byproducts are a mixture of organic and essential minerals, making them a potential organic source for agricultural use. Integrating organic and inorganic fertilizers is an effective approach to enhance soil fertility and crop productivity while reducing inorganic fertilizer dependency. A pot experiment was conducted at the farm area of Eastern University, Sri Lanka, from August to October 2024, to evaluate the integrated effects of fish pond sediments (pond silt) and Fish amino acid (FAA) liquid fertilizer, in combination with Recommended inorganic fertilizers – RIF (Urea + TSP + MOP) on okra growth in sandy regosol soil. FAA was prepared through fermentation using fish waste, brown sugar, *lactobacillus* inoculum and water. Seven treatments, including sole organic inputs and combinations with inorganic fertilizers, were tested in a complete randomized design with four replications. Treatments included; 100% FAA (T1), 100% pond silt (T2), 50% FAA + 50% pond silt (T3), 50% FAA + 50% RIF (T4), 50% pond silt + 50% RIF (T5), 25% FAA + 25% pond silt + 50% RIF (T6), and 100% RIF as control (T7). Results revealed that T6 significantly ($P<0.05$) maintained a near-neutral soil pH, enhanced soil nitrogen availability and improved nutrient uptake. Additionally, T6 significantly ($P<0.05$) increased leaf area and plant performance compared to the control and sole organic treatments. This integration of pond silt, FAA liquid fertilizer and inorganic fertilizers reduced nutrient leaching and reliance on synthetic fertilizers, demonstrating its potential to support sustainable agriculture.

Keywords: Fish amino acid, Fish pond sediments, Inorganic fertilizer, Okra, Sandy regosol soil

**Corresponding author: dilmisaga.123@gmail.com*

EFFECTS OF LIQUID FERTLIZERS MADE FROM GLIRICIDIA LEAF EXTRACTS AND ORGANIC MANURES ON THE PERFORMANCE OF OKRA *(Abelmoschus esculentus)* IN SANDY REGOSOLS IN COMPARISON WITH INORGANIC FERTILIZERS

W.U.S.T. Fernando[1*] and P. Premanandarajah[1]

[1]*Department of Agricultural Chemistry, Faculty of Agriculture, Eastern University, Sri Lanka*

Abstract

Prolonged use of chemical fertilizers led to soil degradation and groundwater contamination particularly in sandy regosol soil which are characterized by low nutrient levels and poor retention capacity. To address these challenges, organic alternatives are being explored as nutrient substitutes in agriculture to improve soil fertility and reduce environmental harm. Organic liquid nutrient solutions consist of considerable nutrient levels and beneficial microorganisms to condition the soil and reduce the usage of chemical fertilizer. Therefore, a polybag experiment was conducted at the farm of the, Eastern University, Sri Lanka from July to October 2024 to study the effect of liquid fertilizer made from Gliricidia leaf extracts and organic manures on the performance of sandy regosol soil and plant parameters of Okra *(Abelmoschus esculentus)* in comparison with inorganic fertilizer. Three different organic liquid fertilizers were prepared by microbial fermentation of Gliricidia leaves with either fresh cow dung, poultry manure, or goat manure under anaerobic conditions for 21 days. The treatments included 100% Gliricidia organic liquid fertilizers using fresh cow dung (T1), poultry manure (T2) or goat manure (T3) as well as their combinations with 50% Department of Agriculture (DOA) recommended inorganic fertilizer (T4, T5, T6). DOA recommendation was used as the control (T7). The experiment was carried out with seven treatments replicated four times in a complete randomized design (CRD). The experiment was evaluated soil chemical properties including soil pH, soil available nitrogen content of sandy regosols and plant parameters; Leaf area. Data were statistically analyzed using Minitab and the differences between treatment means were compared using Turkey's test at 5% significance level. The results revealed that integrating Gliricidia leaf extract with fresh cow dung in combination with 50% NPK chemical fertilizer application enhanced soil fertility and plant growth performance compared to chemical fertilizers alone (Control).

Keywords: Cow dung, Goat manure, Integrated Plant Nutrient Management, Poultry litter, Soil fertility, Sustainable agriculture

**Corresponding author: muthuupuli@gmail.com*

PRODUCTION OF BIODEGRADABLE BIOPLASTIC PACKAGING MATERIAL IN AGRICULTURE

W.P.P.S. Rajarathna[1], K. Jeyavanan [2] and R. Viharnaa[1*]

[1] *Department of Biosystems Technology, Faculty of Technology, University of Jaffna, Sri Lanka*
[2] *Faculty of Agriculture, University of Jaffna, Sri Lanka*

Abstract

Biopolymers play a vital role in alleviating the waste problem in our society. Biodegradable products can reduce the amount of produced waste, landfill diversion and increase material recycling. The experiment was conducted using a completely randomized design. In this study there were eight different types of treatments (T1-T8) tested such as T1-100% Glycerol + Gelatin mixture; T2-98.5% Glycerol + Gelatin mixture + 1% Azolla +1% Saw dust ; T3-98 % Glycerol + Gelatin mixture +1% Azolla +1%Saw dust; T4-97% Glycerol + Gelatin mixture +1% Azolla+2% Saw dust.;T5-74% Glycerol + Gelatin mixture+1%Azolla + 25% Resin; T6-73.5% Glycerol + Gelatin mixture + 1% Azolla +25% Resin + 0.5% Saw dust; T7-73 % Glycerol + Gelatin mixture + 1% Azolla +25% Resin + 1% Saw dust; T8-72 % Glycerol + Gelatin mixture +1% Azolla +25% Resin + 2% Saw dust. The statistical analysis was done by using SAS software and Minitab 17 edition. The moisture content, water absorptivity, degradability and transparency of polymers were investigated to analyze the properties of the polymers. It showed the high transparency polymers applicable for air layering produced from treatment-1(T1 100% Glycerol + Gelatin mixture). Treatment-5(T5-74% mixture+1%Azolla + 25% Resin), Treatment-6 (T6-73.5% mixture + 1% Azolla +25% Resin + 0.5% Saw dust) and Treatment-7 (T7-73 % mixture + 1% Azolla +25% Resin + 1% Saw dust) exhibited low moisture content, low degradability and high thickness making implying them suitable for root balling and nursery pot. All types of polymers were applicable for seed packets which kept in refrigerator and it was proved by experiments. The researcher suggested using nano-sized ingredient it helps to get a uniformly distributed polymers.

Keywords: Azolla, Biodegradable, Ecofriendly, Nano, Polymer

**Corresponding author: vraveenthira@gmail.com*

POTENTIAL OF SELECTED PERENNIAL BIO-MASS FOR BIO FUELS PRODUCTION: A COMPREHENSIVE REVIEW

S.P.U.S. Wickramasinghe[1*]

[1]*Sri Lanka Institute of Information Technology, Sri Lanka*

Abstract

The bio-mass cultivated for the production of bio-fuels had attracted criticism on the basis that in actual fact the fuels so produced are not economical and the prices are maintained at low levels due to governmental intervention- subsidies. In addition, the main concern raised that to the use of fossil fuels in the process leading to higher Greenhouse gases (GHGs) emission in the atmosphere, however it is the least documented. Hence, the present review study was conducted to assess the potential of processing perennial biomass for bio fuels production while minimizing the environmental costs. Findings showed that the increase in the production of GHG gases caused by annual biomass for bio fuel production is due to fuel required by the machinery used in the plantation and at the processing centers. Furthermore, criticism has been levelled against the heavy draw of ground water and the disposal of high levels of wastewater in the process. Moreover, results show that the main source of criticism is based on the current selection of bio-mass for the production of bio fuels being plants with a life cycle of one year- annuals. If and when the biomass is related to plants with long life cycles- perennials, these problems could be avoided. This study also suggests the resort to *Artocarpus heterophyllus* (Jack plant) with a life cycle of at least 40 years, *Musa* (Banana plant) with a life cycle of at least 30 years and *Cocos nucifera* (Coconut plant) with a life cycle of in excess of 50 years more likely 90 years. The material to be harvested from *Artocarpus* and *Musa* are fruits composed of cellulose and starch. It is found that ethylene gas generated by the leaves of *Glyricidia sepium* be utilized for the purpose of ripening. Therefore, process engineering strategies should be focused on enhancing the bio fuel extraction while employing (non- use of fossil fuels eg: Nitrogen, Hydrogen, use of Carbon dioxide harnessed form processes eg: Ethyl alcohol and Butyl alcohol fermentation) to minimize the GHGs.

Keywords: Bio-Fuels, Bio-processing, Greenhouse gas emission, Fermentation, Perennials biomass.

**Corresponding author: spupalisw@yahoo.com*

PROCESS OPTIMIZATION AND ENERGY ANALYSIS OF THE BIO-FUEL INDUSTRY (ETHANOL): A REVIEW ON ETHANOL PRODUCTION

S.P.U.S. Wickramasinghe[1*]

[1]*Sri Lanka Institute of Information Technology, Sri Lanka*

Abstract

Ethanol is widely used as a fuel in different industries. It is used in spark ignition engines in mix of 85:15 with petrol and in compression ignition in place of diesel, also as 100% ethanol in vehicles with modified ignition engines. However, using Ethanol in various industries encounter multiple concerns and thus, the present review study was conducted to access the potential of processing and energy analysis of biofuel industry using selected perennial crops. Results show that ethanol production is subjected to tax subsidies in some countries due to many reasons. All the operations in converting the raw material to concentrated ethanol high viz (i) obtaining the raw material after multifarious operations in the field (ii) converting the raw material to a fermentable base (glucose) (iii) process of fermentation (iv) process of converting the fermented base to ethanol (distillation) In addition, cost of services is high re-draw on water resources, disposal of waste water, energy required for ethanol production. Unutilized nutrients supplied to the field but not used flow into waterways and cause eutrophication. These effects cause numerous environmental issues. As a solution there exist a potential to employ perennial crops. *Artocarpus heterophyllus* (Jack) has the potential to yield 26,847.7 lts/ha, *Musa* (Banana) 1521.7 lts/ha and *Cocos nucifera* (Coconut 694,163,449.71 lts collected island wide in Sri Lanka. Initially de-contaminated from Bacterial, the water can be stores and used in place of water. Musa are grown in the same land as Artoicapus as they provide protection against soil dehydration, the unharvested section of the false stem provides nutrients. Leaves of *Glyricidia sepium* release ethylene gas that facilitate ripening of the fruits. Distillation of ethanol takes place in two major systems Pot stills and continuous stills.Pot still yield alcohol for drinking – Brandy, Arrack, Rum while continuous still alcohol is used as fuel and in industry. Continuous still ethanol is distilled at 90% v/v (in some states in the US) and at 95-96%v/v. (Rectified alcohol). The systems used is the system devised by M/s Savalle of France and modifications of that system.

Keywords: Distillation, Rectified Ethanol, Packed Bed Reactors, Perennials, Savalle systems

**Corresponding author: spupalisw@yahoo.com*

FOOD AND NUTRITION

OPTIMIZATION OF FERMENTATION AND EVALUATION OF SENSORY, PHYSICOCHEMICAL, AND FUNCTIONAL PROPERTIES OF FERMENTED BETEL LEAF TEA

P.H.M.C. Wijerathna[1*] and A.A.M. Subodinee[1]

[1]*Department of Food Science & Technology, Faculty of Agriculture, University of Ruhuna, Kamburupitiya, Sri Lanka*

Abstract

Betel leaf tea, derived from *Piper betel*, is noted for its antioxidant, antimicrobial, and anti- inflammatory properties, suggesting potential health benefits. This study aimed to investigate how varying fermentation conditions impact the sensory, physicochemical, and functional properties of partially and fully fermented betel leaf tea. The leaves were subjected to fermentation at 30°C under different conditions: partial fermentation for 1, 2, 3, and 4 hours, and full fermentation for 12, 24, 36, and 48 hours. Sensory evaluation, conducted by a panel of 30 semi-trained participants, identified 4 hours as optimal for partial fermentation and 48 hours for full fermentation based on overall acceptability and preference. Physicochemical analysis demonstrated that both partially and fully fermented teas exhibited similar water activity (0.64), but other properties differed significantly. The partially fermented tea had a moisture content of 7.77±0.14% and a pH of 5.98±0.05, while the fully fermented tea showed a slightly lower moisture content (7.65±0.12%) and a higher pH of 6.03±0.02. Titratable acidity was notably lower in the fully fermented tea (0.006±0.004) compared to the partially fermented tea (0.03±0.003). Colour analysis revealed that fully fermented tea had higher lightness (L*23.83±2.19) with more negative values (a*–9.99±0.86) and (b*–2.86±1.68), indicating enhanced oxidation and a shift towards a lighter, yellowish hue. In terms of functional properties, the fully fermented tea had a higher total polyphenol content (46.5±1.77 mg GAE/g), while the partially fermented tea showed a greater flavonoid content (23.26±0.21 mg QE/g). Antioxidant activity, assessed by the DPPH radical scavenging assay, was higher in the partially fermented tea (190±156 Trolox mg/g) than in the fully fermented tea (140±170 Trolox mg/g). Both teas exhibited no microbial growth during 4 weeks of storage in triple-laminated aluminum bags at room temperature, indicating effective microbial control. This study highlights the impact of fermentation time on the quality, sensory properties, and functionality of betel leaf tea, providing insights for optimized production methods.

Keywords: Antioxidant, Betel, Fermentation, Flavonoid, Polyphenol

**Corresponding author: chathurikamadushi123@gmail.com*

FIBER AND PROTEIN ENRICH INSTANT MUFFIN MIX USING DEFATTED DESICCATED COCONUT (*Cocos nucifera L.*) FLOUR

M.K.K.P. Rupasinghe[1], H.P.D.T. Hewa Pathirana[2,3*], B.G.R.R. Bandara[2] and L.L.W.C. Yalegama[2]

[1]*Department of Biosystems Technology, Faculty of Technology, University of Jaffna, Sri Lanka*
[2]*Coconut Processing Research Division, Coconut Research Institute, Lunuwila, Sri Lanka*
[3] *Department of Functional Food Products Development, Faculty of Biotechnology and Food Science, Wroclaw University of Environmental and Life Sciences, Chelmonskiego 37, 51-630 Wroclaw, Poland*

Abstract

Defatted desiccated coconut flour (DDCF) is a by-product after the virgin coconut oil extraction process. It is a fiber and protein rich flour with many nutritional benefits. This research focuses on the formulation of fiber and protein enrich instant muffin mix for the bakery industry substituting DDCF with wheat flour. DDCF was substituted with whole wheat flour in varying proportions (40%, 50% and 60% w/w) to prepare the instant muffin mix with other ingredients. The instant muffin mix was used for muffin baking. The samples with DDCF and control (only wheat flour) were evaluated for sensory properties using a five-point hedonic scale to evaluate the acceptability of the instant muffin mix. The selected ratio of instant flour mixture was evaluated for flour properties and proximate nutritional analysis. Forty per cent was the maximum incorporation level of DDCF instead of wheat flour for muffin making while preserving the sensory qualities. The addition of DDCF was affected significantly ($p<0.05$) in appearance, texture and overall acceptability of muffins. Incorporation of 40% of DDCF into muffins significantly increased the water absorption (0.40 ± 0.00), oil absorption (1.20 ± 0.00), hygroscopicity (0.34 ± 0.00) and swelling index (5.33 ± 0.58a). The instant muffin mixture containing 40% DDCF exhibited significantly higher nutritional values, with 7.97% moisture, 5.9% ash, 17.61% protein, 7.8% fiber, and 7.79% fat, compared to wheat flour, which contains 6.87% moisture, 1.31% ash, 8.72% protein, 2.49% fiber, and 1.03% fat. The fiber and protein-rich instant muffin mix with 40% DDCF is the best alternative for bakery production with more than 42 days of shelf life.

Keywords: Defatted desiccated coconut flour, Instant muffin mix, Physiochemical properties, Nutritional composition

**Corresponding author: dilthihewa@gmail.com*

QUALITY ATTRIBUTES OF CLOVE, HONEY AND GREEN TEA TREATED CHICKEN MEAT DURING STORAGE

R.M.K.P. Gunawardhana[1*] and M. Pagthinathan[1]

[1]*Faculty of Agriculture, Eastern University, Sri Lanka*

Abstract

The present study was conducted to investigate the effect of natural preservatives on the quality and shelf life of broiler meat. Four treatments were applied in a Complete Randomized Design (CRD) with three replicates: T1 (control: distilled water), T2 (2.5 % clove extract), T3 (2.5 % honey), and T4 (2.5 % green tea extract). The meat samples were coated with the respective solutions and stored at 4 °C for four weeks. Quality attributes such as dry matter content, pH, protein content, water holding capacity, ash content, color, microbial evaluation, and sensory attributes were assembled weekly. For sensory evaluation, the meat samples were deep-fried before serving. After four weeks of storage T3 consistently exhibited superior performance, with the significantly higher dry matter content (27.63±0.15 %), the most stable pH (6.72±0.01), and the significantly higher water holding capacity (19.33±0.58 %). Sensory evaluations indicated that honey-treated meat scored highest for flavor, texture, and overall acceptability. The findings suggest that integrating 2.5 % honey as a natural preservative significantly improves the quality attributes and shelf life of broiler meat. It is recommended as an alternative to synthetic preservatives in meat preservation.

Keywords: Broiler meat, Clove extract, Green tea extract, Honey, Natural preservatives

**Corresponding author: kavishagunawardhana1998@gmail.com*

COMPARATIVE CHARACTERIZATION OF PHYSICOCHEMICAL, NUTRITIONAL, AND FUNCTIONAL PROPERTIES OF COCONUT MILK FROM DIFFERENT DOMESTIC EXTRACTION METHODS

S.A.M. Mahsoom[1], H.M. Jans[1], P.A.B.N. Perumpuli[1*], G.S.N. Fernando[1] and B.G.R.R. Bandara[2]

[1]*Department of Food Science & Technology, Faculty of Agriculture, University of Ruhuna, Matara, Sri Lanka.*
[2]*Coconut Processing Research Division, Coconut Research Institute, Bandirippuwa Estate, Lunuwila, Sri Lanka*

Abstract

Hand squeezing and blending are the most commonly used coconut milk extraction methods, where both first and second milk extraction will be done either using normal water or lukewarm water. Thus, the study aimed to comparatively analyze the physicochemical, nutritional and functional properties of coconut milk extracted through following methods: hand squeezing with normal water (HN1, HN2) and lukewarm water (HH1, HH2) for the first and second extractions, respectively, and blending with normal water (BN1, BN2) and lukewarm water (BH1, BH2) for the first and second extractions, respectively. Comparing the nutritional values, the highest protein (0.53±0.32 g/100 g), fat (0.81± 0.15 g/100 g) and ash contents were given by the BH1 method. Considering the chemical properties, the highest total soluble solids (8.53±0.92 °Bx), pH (6.23±0.01) and titratable acidity (TA) (0.51±0.03%) were also obtained by BH1, while HN2 was given the lowest value expect for TA. Comparing fatty acid composition, BH1 showed significantly higher lauric acid (46.20%) and capric acid (5.98%), while BN1 showed higher linoleic acid percentage (11.72%). The blending method shows higher functional properties compared to the hand squeezing method, and a significant decline in the functional properties was observed in the second extraction. BH1 showed the highest total phenolic content (153.26 ± 0.51 mg GAE/100 mL), total flavonoid content (45.97±12.56 mg QE/mL) and antioxidant capacity (47.83±2.18%) while the lowest values were observed in HH2. In conclusion, the coconut milk extracted by blending was found to be the best method of milk extraction as it yields the highest physicochemical, nutritional, and functional properties. The use of lukewarm water for coconut milk extraction was found to be effective, yielding better results than normal water, with the first milk extraction exhibiting higher values for all the tested properties compared to the second extraction.

Keywords: Antioxidant activity, Coconut milk, Extraction methods, Nutrition properties, Physical properties

**Corresponding author: buddhikap@fst.ruh.ac.lk*

IDENTIFICATION OF CHEMICAL CONSTITUENTS RESPONSIBLE FOR ORGANOLEPTIC QUALITIES OF CEYLON CINNAMON (*Cinnamomum zeylanicum* Blume)

A.A. Wijeweera[1*], J.W. Hewage[3], W.S. Hemalika[2], G.G. Jayasinghe[1] and S.R. Hettiarachchi[3]

[1]*National Cinnamon Research and Training Centre, Department of Cinnamon Development, Sri Lanka.*
[2]*Department of Chemistry, University of Ruhuna, Sri Lanka.*
[3]*School of Applied Science, Dickinson State University, Dickinson, ND 58601, USA.*

Abstract

Ceylon cinnamon: *Cinnamomum zeylanicum* Blume is commonly used as a spice and the essential oils distilled from it are used as flavoring agents in the food and beverage industry. This study focused on identifying the relationship between the chemical components and organoleptic qualities. Sample collection was done from seed-propagated cinnamon varieties in different agro-ecological zones. The taste of the collected bark samples was examined through a sensory evaluation by three expert personnel regarding cinnamon taste categories and recorded under three taste categories: Sweet and pungent, Bitter, and Astringent. According to the recorded data, relative abundance of each taste type in the cinnamon population in Sri Lanka, Sweet and pungent: 52.1%, Astringent: 32.4%, and Bitter: 15.5%. For chemical evaluation, the extracted oil from the cinnamon bark samples, using the hydro distillation method was analyzed using GC-MS methods to reveal the chemical composition. The recorded taste was statistically analyzed to check whether there was a correlation between organoleptic properties and chemical composition. There was no significant difference ($P<0.05$) in the percentage of chemical constituents in cinnamon with different taste groups except for eugenol. Eugenol percentage showed a significant difference in the taste of the bark. Astringent and bitter types have significantly higher ($P<0.05$) eugenol content, respectively 9.16 and 8.26 %; than the eugenol content (5.63 %) in sweet and pungent taste type. Sweet and pungent taste type which has the lowest eugenol content (5.63 %) shows the highest total cinnamaldehyde content (70.30%). Most of the less volatile and lipophilic chemical substances present in cinnamon remain in oleoresin. Analysis of bark oil for the organoleptic properties is therefore limited to certain volatile compounds in the plant. The absence of clear identification of chemical constitutes responsible for the organoleptic properties is due to this limitation, further studies including oleoresin are necessary for a clear categorization.

Keywords: Chemical composition Cinnamon, Organoleptic, Taste categories

**Corresponding Author: achiniawije@gmail.com*

IMPACT OF WHEY MARINATION ON PHYSIOCHEMICAL, SHELF LIFE AND SENSORY QUALITY OF CULLED LAYER CHICKEN MEAT

K. Anujaani[1*] and M. Pagthinathan[1]

[1]*Department of Animal Science, Faculty of Agriculture, Eastern University, Sri Lanka*

Abstract

Culled layer hen meat is often tough and has a strong flavor, which many consumers find unappealing. However, marinating this meat in whey may improve its tenderness and taste, making it a more attractive product. This study evaluated the impact of marinating with different concentrations of whey (0%, 2.5%, 5%, 7.5%, and 10%) on quality, shelf-life, and sensory properties of culled layer chicken. In this study, the effects on proximate composition, pH, microbial activity, shear force, marinade absorption, water-holding capacity (WHC), cooking loss, and sensory appeal were analyzed for whey-treated chicken meat during the three weeks of storage. Dry matter, ash, protein, pH, color, water holding capacity and marinade absorption were significantly ($p<0.05$) different among treatments on day 1. Dry matter (26.99±0.83%) was significantly ($p<0.05$) higher in culled chicken meat marinated with 5% whey, while ash content (4.5±0.76%) was significantly ($p<0.05$) higher in culled layer chicken meat marinated with 2.5% whey. Protein and marinade absorption were significantly ($p<0.05$) higher in culled layer chicken meat marinated with 10% whey. The control (10% distilled water) culled layer chicken meat sample had significantly ($p<0.05$) higher hardness (2.2±0.31N), pH (7.31±0.09), and WHC (15±2.08%) compared to whey- marinated culled layer chicken meat samples. Whey marination significantly ($p<0.05$) enhanced the color of the meat, particularly in redness and yellowness at higher concentrations at one week of storage, potentially improving its visual appeal for consumers. The 7.5% concentration provided a well-balanced profile in flavor, texture, and appearance, and it enhances sensory qualities effectively over time. This study indicated that whey marination, particularly at a 7.5% concentration, can improve the physiochemical quality, and sensory properties of culled layer chicken meat.

Keywords: Culled layer chicken meat, Marination, Sensory quality, Tenderness, Whey

**Corresponding author: anujani2021@gmail.com*

IMPACT OF ATOMIZATION SPEED AND INLET TEMPERATURE ON THE ORGANOLEPTIC PROPERTIES OF SPRAY-DRIED SOYBEAN POWDER

R.B.T.M. Piyasinghe[1*], H.R.P. Fernando[2] and R. Bawatharani[1]

[1] *Department of Agricultural Engineering, Faculty of Agriculture, Eastern University, Sri Lanka*

[2] *Food Research Unit, Gannoruwa, Peradeniya*

Abstract

Glycine max, or soybean, is a nutritious legume from the Fabaceae family, valued for its high protein content. A spray drying process for producing a dried soy milk powder that is soluble and without loss of nutritive value is highly desirable. Soy milk is nutritious, but its use is limited due to its beany flavor and anti-nutritional factors like trypsin inhibitors, saponins, and oligosaccharides. The study evaluated the effects of inlet temperature (120°C, 140°C, and 160°C) and atomization speed (4500 rpm and 5000 rpm) on the organoleptic properties of soybean powder using a Completely Randomized Design (CRD) with 18 spray drying trials at a fixed outlet temperature of 75°C. Soybean seeds were cleaned, dehulled, soaked at 70°C, and ground with hot water (1:6 ratio) to produce homogenized soymilk. Boiled soymilk was flavoured with chocolate (10 g/L), $CaCl_2$ (0.1 g/L), and maltodextrin (100 g/L) for spray drying. The mixture was blended, filtered, and prepared for processing. Three soymilk samples, selected for superior physical qualities, were evaluated for sensory properties by a semi-trained panel of 35 judges using a five-point hedonic scale for aroma, color, taste, texture, and overall acceptability. The sensory evaluation of chocolate-flavored soy milk powder revealed that inlet temperature and atomization speed had no significant effect ($P > 0.05$) on color (3.43–3.86), aroma (3.43–3.83), or texture (3.37–3.86). However, taste showed significant differences ($P < 0.05$), with the highest preference observed in samples produced at 160°C and 5000 rpm. The highest overall acceptability score (3.97) was also recorded under these conditions, indicating that higher inlet temperature and atomization speed enhanced sensory appeal. The optimal spray drying conditions for producing high-quality chocolate-flavored soy milk powder are 160°C inlet temperature and 5000 rpm atomization speed, resulting in a product with excellent organoleptic qualities.

Keywords: Atomization speed, Inlet temperature, Organoleptic qualities, Spray drying, Soy milk powder

**Corresponding author: thushariktm@gmail.com*

PROXIMATE COMPOSITION AND PHYSICOCHEMICAL PROPERTIES OF RED SEAWEED: *Kappaphycus alvarezii*

S. Simmaky[1,2*], S. Srivarathan[2], R.G.S. Wijesekara[3] and K.D.P.P. Gunathilake[1]

[1] *Department of Food Science and Technology, Faculty of Livestock, Fisheries and Nutrition, Wayamba University of Sri Lanka, Makandura. Sri Lanka*
[2]*Department of Biosystems technology. Faculty of Technology, University of Jaffna, Sri Lanka.*
[3]*Department of Aquaculture and Fisheries, Faculty of Livestock, Fisheries and Nutrition, Wayamba University of Sri Lanka, Makandura. Sri Lanka.*

Abstract

People are now more interested in marine based foods compared to terrestrial plants as alternate food source due to increase in population, depletion of natural resources and limited land. Seaweeds have been proved to offer nutritional value as a food or supplement. The red seaweed (*Kappaphycus alvarezii*) is one of the edible tropical seaweeds commercially cultivated in Sri Lanka. This study was aimed to investigate the nutritional and physicochemical properties of *K. alvarezii*. Seaweeds were dried at 40°C in dehydrator until it reached constant weight and pulverized into powder (< 475 µm). Proximate and physicochemical properties were determined. Fresh *K. alvarezii* contained 89.8 ± 0.01% of water in wet weight basis (WB). Compositional analysis showed that dried powder of *K. alvarezii* contained high amount of carbohydrates (58.4 ± 0.4%), ash (28.9±0.1%), fiber (9.8 ± 0.2 %), protein (3.4 ± 0.3%) and low amount of fat (0.7 ± 0.4%) in dry weight basis (DW). *K.alvarezii* contained water-soluble red pigment phycobiliprotein (1.13 ± 0.04 mg/g DW). The pH and salt content of *K.alvarezii* powder were 6.44 ± 0.06 and 9.1 ± 0.01% respectively. Carrageenan content was 37.7 ± 0.26 % (DW). The bulk density and tapped density of *K.alvarezii* powder were 0.483 ± 0.01 g/cm^3 and 0.652 ± 0.01 g/cm^3 respectively. It showed fair flowability and intermediate cohesiveness. *K.alvarezii* powder showed good solubility (0.26 ± 0.01 g/g DW), swelling (11.07 ± 0.12 ml/g DW), water holding (8.87±0.01 g/g DW), and oil holding (3.04 ± 0.02 g/g DW) capacity. In conclusion, nutritional and physicochemical properties found in *Kappaphycus alvarezii* may suggest its potential as a functional food or ingredient in the food industry to improve the nutritional quality and textural properties.

Keywords: Functional food**,** *K. alvarezii*, Nutritional properties, Physicochemical properties, Seaweed

**Corresponding author: simmaky.s@gmail.com*

DEVELOPMENT OF JAM USING KING COCONUT (*COCOS NUCIFERA VAR AURANTIACA* L.) KERNEL AND EVALUATE ITS SENSORY, PHYSICOCHEMICAL, PROXIMATE AND FUNCTIONAL PROPERTIES

H.P.P.D. Perera[1], G.S.N. Fernando[1*] and P.C.D. Perera[2]

[1]*Department of Food Science and Technology, Faculty of Agriculture, University of Ruhuna, Sri Lanka*
[2]*Department of Agricultural Biology, Faculty of Agriculture, University of Ruhuna, Sri Lanka.*

Abstract

King coconut (*Cocos nucifera var. aurantiaca* L.) water is widely utilized on a commercial scale, particularly in bottled form for the export market. However, after extracting the water, the remaining kernel is often underutilized. Identifying potential opportunities for the further commercialization of the king coconut kernel is essential to maximize resource efficiency and add value to the production process. Therefore, the present study was focused to develop a king coconut kernel jam and evaluate its physiochemical, nutritional and functional properties. The product optimization was done by changing the sugar (44, 45, 46% (w/w)), king coconut pulp (54, 55, 56% (w/w)), and pectin (0.25, 0.5, 0.75% (w/w)) levels while keeping constant levels of citric acid (0.12%) and king coconut water (10%). Sensory evaluation was conducted by 30 semi-trained panelists using 5-point hedonic scale and data were analyzed using Kruskal-Wallis non-parametric method. The developed product was stored in a sterilized glass jar under refrigerated conditions (4 °C). The physicochemical, proximate, functional properties and shelf-life of the developed product was analyzed using standard methods. According to the sensory data, the king coconut kernel jam sample with the highest level of sensory acceptance had a king coconut pulp to sugar ratio of 55:45 (w/w) and pectin content of 0.25% (w/w). The developed product showed 39.15 ± 0.74% moisture, 2.51 ± 0.2% ash, and 4.02±1.09% crude fiber while showing 68.46 ± 0.25% total soluble solids (TSS) and 4.23±0.06% pH value. The DPPH radical scavenging activity of the developed product was 17.20 ± 2.44 mg TE/ 100 g. A decrease in pH and an increase in both TSS and water activity of the jam were observed, with no microbial growth detected throughout the storage period. It can be concluded that the developed king coconut kernel jam can be stored under refrigerated conditions (4 °C) for one-month period.

Keywords: King coconut kernel, Jam, Physicochemical properties, Functional properties, Proximate composition, Shelf- life

**Corresponding author: gsnfernando@fst.ruh.ac.lk*

APPLICATION OF CEYLON CINNAMON (C*innamomum zeylanicum* BLUME*)* IN PRODUCTION OF CARBONATED BEVERAGES

K.P.R.D. Pathirana[1], A.A. Wijeweera [2*] and H.D.J. Jayasooriya[1]

[1] *Department of Bio-Systems Technology, Faculty of Technology, University of Jaffna, Sri Lanka.*
[2] *National Cinnamon Research and Training Center, Palolpitiya, Thihagoda, Matara, Sri Lanka.*

Abstract

Consumption of carbonated beverages is highly perceived by consumers irrespective of age and nationality. However, regular intake of sweet carbonated beverages has been proven to link with to several health issues. Health concerns of modern consumers led to new categories including "all-natural" ingredients. Therefore, the research formulated a cinnamon flavoured carbonated drink that brings the natural flavour with valuable functional benefits. Cinnamon-flavored carbonated drinks with different; bark oil of 0.005%, 0.01%, and 0.05% and oleoresin of 0.1%, 0.25%, and 0.4% were developed and subjected to sensory testing. The sensory properties (taste, color, aroma, appearance and mouth feel) were assessed using 30 un-trained panels and a seven-point hedonic scale according to ISO 13299. Cinnamon bark oil (0.005%) added and oleoresin added (0.1%) sample was selected for physio-chemical analysis. A significant difference has existed among the treatments (Oil incorporated, oleoresin incorporated, and the control with artificial preservatives, Sorbet) except the Colour values. Water activity and Brix The control sample had a significantly lower Brix value than the other two, while the bark oil and oleoresin-incorporated drinks did not differ significantly. In terms of colour, the bark oil drink and the oleoresin drink significantly differed concerning L* a*. Cinnamon bark oil, oleoresin, and sorbet-incorporated carbonated drinks did not show a significant difference ($p>0.05$) for tested physio-chemical parameters, except for Brix and colour values. The preservative activity of Cinnamon oil and Oleoresin had the same effect as the artificial preservative added. Cinnamon; 0.005% bark oil and 0.01% oleoresin are recommended to use as flavouring agents for carbonated drinks.

Keywords: Bark oil, Carbonated drink, Cinnamon, Oleoresin, Physiochemical property, Oleoresin

**Corresponding Author: achiniawije@gmail.com*

DEVELOPMENT OF CRACKER INCORPORATED CEYLON CINNAMON (*Cinnamomum zeylanicum* Blume) BARK AND EVALUATING ITS QUALITY AND MEDICINAL PARAMETERS

A.M.T.R. Amarakoon[1], A.A. Wijeweera[2] and W.P.K.M. Abeyesekara[1*]

[1] Department of Biosystems Technology, Faculty of Technology, University of Sri Jayewardenepura, Homagama 10206, Sri Lanka
[2]National Cinnamon Research & Training Center, Department of Cinnamon Development, Palolpitiya, 81280, Sri Lanka

Abstract

Cinnamon is a prominent spice, with Ceylon cinnamon (*Cinnamomum zeylanicum* Blume) being particularly noted for its health benefits. Currently, there are limited value-added products available that incorporate cinnamon, and no scientifically validated medicinal crackers are made from Ceylon cinnamon. This research aims to develop a cracker that incorporates Ceylon cinnamon bark powder and offers medicinal benefits. This study used C5 grade Ceylon cinnamon to develop a cracker, following the SLS 251:2010 biscuit specifications. Crackers were made with varying cinnamon bark powder concentrations (2%, 4%, 6%, and 8% w/w), without cinnamon powder incorporated cracker as the control. The sensory properties (color, texture, taste, odour, appearance, and overall acceptability) were assessed using 30 un-trained panels and a seven-point hedonic scale according to ISO 13299. Two samples (2% and 8%) were selected which gained the same score from sensory evaluation. Their physical (weight, thickness, volume, density, baking loss, L*, a*, b*), chemical (water activity, pH, moisture), proximate (total ash, acid insoluble ash, protein), microbiological (yeast and mold count), and functional properties (DPPH radical scavenging activity, total procyanidin content) were then analyzed. The results indicated that physical properties (weight, thickness, volume, density, baking loss, L*, a* and b*) of 2% and 8% crackers were in the range of 3.88±0.11 – 3.92±0.12g; 2.33±0.01 – 2.34± 0.00mm; 2.58±0.02 – 2.59±0.00cm^3; 1.51±0.04 – 1.51±0.05gcm^3; 1.34±1.37 – 1.36±0.12g; 31.83±1.51 – 43.06±1.12; 9.03±0.71 -12.89±0.48; 15.09±1.50 – 26.19±0.78 respectively. Moreover, chemical properties (water activity, pH, and moisture) of both crackers were in the range of 0.3023 ± 0.08 0.3026±0.08; 5.79±0.04 – 5.92±0.07; 2.70 ± 1.64 – 3.48± 1.16% respectively, while their proximate properties (total ash, acid insoluble ash, and protein) of both crackers were in the range of 3.33 ± 0.02 – 3.54±0.02%; 0.03±0.00 – 0.004±0.00%; 8.03±0.03-10.35±0.01% respectively. Both these crackers were found to be free of yeast and mold contamination. Further DPPH radical scavenging activity and total procyanidin content of two samples were in the range 8.95±0.66 -12.84±0.61 mg TE/g of sample dry weight basis and 5.78± 0.89 – 7.62±0.67 mg/cyanidin equivalent/1g of sample dry weight basis, respectively. In conclusion, generally, both samples have similar physical, chemical, proximate, and microbiological properties. However, 8% (w/w) of Ceylon cinnamon bark powder incorporated crackers had high procyanidin content and DPPH radical scavenging activity. Therefore, it is concluded that developing a cracker incorporating Ceylon cinnamon bark powder offers medicinal benefits.

Keywords: Cinnamon, Cracker, DPPH, Procyanidin, Sensory evaluation, Medicinal benefits

**Corresponding author: kaushalyaabey@sjp.ac.lk*

BODY MASS INDEX DISTRIBUTION AMONG ADOLESCENTS FROM JAFFNA DISTRICT

M. Sivakaran[1*], V. Arasaratnam[2] and R. Surenthirakumaran[3]

[1]Unit of Home Economics, Faculty of Arts, University of Jaffna, Sri Lanka.
[2]Department Biochemistry, Faculty of Medicine, University of Jaffna, Sri Lanka.
[3]Department of Family and Community Medicine, Faculty of Medicine, University of Jaffna, Sri Lanka.

Abstract

Adolescence is a critical developmental stage marked by rapid physical, emotional, and social changes. During this period, maintaining a healthy Body Mass Index (BMI) is essential for proper growth and overall health. The study aimed to assess the nutritional status of 362 adolescents aged between 17 and 19 years from Jaffna district. Data were collected through a cross-sectional household survey, with an interviewer-administered questionnaire to gather socio-demographic information. Weight and height of the participants were measured to calculate their BMI. Ethical approval for the study was obtained from the Ethics Review Committee, Faculty of Medicine, University of Jaffna. Among the adolescents 46.1% (n= 167) males and 53.9% (n=195) females were have the mean age of 17.95 (±0.8) and 18.15 (±0.8) years respectively. The mean BMI of the females was 20.16 kgm^{-2}, ranging from 13.3 to 35 kgm^{-2}, while the mean BMI of the males was 20.35 kgm^{-2}, ranging from 12.5 to 39 kgm^{-2}. Both averages are within the normal weight range (18.5-24.9) indicating that most adolescents in both genders maintain a healthy body weight. Both genders show a relatively low prevalence of overweight status (males 9.6% and females 8.7%). Of the males 37.7% and females 40.5% were in the underweight category having the BMI below 18.5 kgm^{-2}, suggesting that a significant number of adolescents are at a risk for malnutrition. In contrast 1.8% and 3.1% of males and females respectively were obese (BMI above 30 kgm^{-2}). The study highlights the importance of the interventions addressing the adolescents underweight in Jaffna district. Further studies are important to explore the underlying factors contributing to underweight status of adolescents in Jaffna district.

Keywords: Adolescents, Body Mass Index, Jaffna, Nutritional status, Underweight

**Corresponding author: jmenakaj@yahoo.com*

DEVELOPMENT OF NOODLES INCORPORATING CEYLON CINNAMON (*Cinnamomum zeylanicum* BLUME) AND EVALUATION OF ITS QUALITY PARAMETERS

P.H.N.M. De Silva[1], Achini Wijeweera[2*] and J.A.N Gimhani[1]

[1]*Institute for Agro-Technology and Rural Sciences, University of Colombo, Hambantota, Sri Lanka*
[2]*National Cinnamon Research and Training Center, Department of Export Agriculture, Thihagoda, Sri Lanka*

Abstract

Ceylon or True cinnamon (*Cinnamomum zeylanicum Blume; syn. Cinnamomum verum* Presl.) is native to Sri Lanka. Noodles are a popular food their ease of preparation, yet they often face criticism regarding potential negative health impacts. This study aimed to develop noodles incorporating cinnamon, utilizing its beneficial components to enhance nutritional value while designing appropriate packaging solutions to safeguard their physiochemical and biochemical properties. In accordance with guidelines from the Sri Lanka Standards Institute (SLS 420-2019), this research was conducted at the National Cinnamon Research and Training Institute. Sensory evaluations were performed on three formulations: mixing 100g wheat flour with either 0.16 mL, 0.33 mL, or 0.66 mL of cinnamon bark oil. Sensory evaluation conducted by using thirty untrained panelists and 7-point hedonic scale. Three noodle treatments involved incorporating different percentages (5%, 10%, and 20%) of ground Cinnamon into wheat flour. Following this evaluation, samples infused with 0.66 mL of cinnamon bark oil and those containing 5% cinnamon powder were chosen for further research due to their superior consumer acceptance. According to the nutrition testing result, cinnamon oil-incorporated noodles contain 13.4% protein, while those with cinnamon powder boast 14.7%. They exhibit a remarkable 10% reduction in fat compared to standard market noodles. Additionally, these noodles offer lower sugar levels (3% - CBOIN, 2.9% - CBPIN) and optimal carbohydrate (62.4% - CBOIN, 67.7% - CBPIN), energy (354Kcal – CBOIN, 380Kcal – CBPIN), and crude fibre (1.1% - CBOIN, 2.5% - CBPIN) content. In the initial stage of testing, the acid insoluble ash content, pH value, yeast, and mold count after 72 hours (CFU value) showed no significant differences ($p>0.05$) between cinnamon bark oil incorporated noodles and cinnamon bark powder incorporated noodles. Other tested quality v parameters, moisture content, water activity, total ash content, three colour index (L*, a*,b*), yeast and mold count (CFU value) after 48 hours significantly differed ($p<0.05$) between cinnamon bark oil incorporated noodles and cinnamon bark powder incorporated noodles. Both noodles' varieties were subjected to shelf-life analysis for about eight weeks. The study found that triple-laminated packaging is the best solution, as it provides superior protection against moisture, water activity, pH, colour yeast, and mold growth. Further development should be carried out from utilizing automated noodles production system for cinnamon incorporated noodles to the market and should be investigation the Anti-oxidant and Antidiabetic properties cinnamon incorporated noodles to the market.

Keywords: Ceylon cinnamon, Cinnamon bark oil, Cinnamon bark powder, Noodles, Nutrients

**Corresponding author: achiniwije@gmail.com*

FISH POISONING ASSOCIATED WITH HISTAMINE – A REVIEW

S.A.R.U. Sooriyapperuma[1]* and M.S.W. De Silva[1]

[1] *Faculty of Livestock, Fisheries & Nutrition, Department of Food Science & Technology, Wayamba University of Sri Lanka*

Abstract

Histamine fish poisoning (HFP) is initially caused by consumption of fish muscle tissue containing a high level of free histidine. It is also known as Scombrotoxicosis. This review was conducted due to the increasing demand for fish among customers and the rising prevalence of fish intoxication cases in today's society. Several viewpoints have been shown to clarify the reason which histamine intake in contaminated fish is highly toxic than pure histamine that is consumed orally. Histamine poisoning is caused by consuming fish species from the Scombridae family, which are rich in histamine. Even though it is commonly concerned with the elevated degrees of histamine in spoiled fish by some bacterial species, the pathogenic conditions of histamine food poisoning were not specifically clarified. This study was done by reviewing research papers from 1980–2024 using the databases of Science Direct and Google scholar. The results and findings of the review are: histidine decarboxylase enzyme-producing bacteria like *Escherichia, Klebsiella, Salmonella* and *Shigella*; synthesize histamine from the naturally occurring histidine in fish that are contaminated. Improper canning or processing, improper fish storage, time and temperature abuse are few risk factors. Maintaining fish at or below 4°C and maintaining proper hygienic practices can be used as preventive measures. The clinical symptoms of histamine poisoning are quite similar to those of allergic reactions. Therefore, HFP is sometimes misunderstood as having allergic conditions and the treatment is delayed. The epidemiological features, clearly mentioned that Asian countries like Japan are facing histamine poisoning mostly due to the consumption of raw fish. The efficacy of antihistamine therapy, the allergic like symptomology, and the finding of high levels of histamine in the implicated foods suggest strongly that histamine is the causative agent. Histamine ingested with spoiled fish appears to be much more toxic than histamine ingested in an aqueous solution.

Keywords: Biogenic amines, Histidine decarboxylase, Scombroid, Toxicology.

**Corresponding author: ruvaniuthpala@gmail.com*

REVIEW ON THE BIOACTIVE COMPOUNDS IN FUNCTIONAL FOODS: THERAPEUTIC APPLICATIONS AND CURRENT TRENDS

W.K.A.K.H. Weerasingha[1*], D.D.S.N. Jayathilaka[1] and A. Sugirtharan[1]

[1]*Department of Agricultural Chemistry, Faculty of Agriculture, Eastern University, Sri Lanka.*

Abstract

Functional foods have garnered significant attention in recent years due to their potential to improve health and prevent chronic diseases beyond basic nutritional benefits. This review highlights the latest advancements in functional foods, emphasizing the critical role of bioactive compounds in promoting health and wellness. Bioactive compounds, including polyphenols, flavonoids, carotenoids, peptides, polyunsaturated fatty acids**,** vitamins and minerals, probiotics and prebiotics have demonstrated promising therapeutic effects in mitigating oxidative stress, inflammation, and metabolic dysregulation, which are key contributors to chronic illnesses such as cardiovascular diseases, diabetes, obesity, and cancer. The growing interest in functional foods is driven by a paradigm shift toward preventive healthcare and the increasing demand for personalized nutrition. This article provides a comprehensive analysis of the current trends in bioactive compounds, including the discovery of novel compounds, advancements in extraction and encapsulation technologies, and the development of functional food products tailored to specific health conditions. Recent studies have unveiled the synergistic interactions of bioactive compounds within food matrices, enhancing their bioavailability and efficacy. Emerging technologies such as nanoencapsulation, biotransformation, vacuum impregnation and fermentation have further revolutionized the delivery and stability of these compounds in functional food applications. Beyond technological innovations, this review examines the alignment of functional foods with evolving dietary patterns and consumer preferences. For instance, the popularity of plant-based diets has driven the development of bioactive-rich products derived from legumes, seeds, algae, and other sustainable sources. The review concludes by highlighting key challenges faced by researchers in the development of bioactive-enriched functional foods. These challenges include functional verification, high production costs, the search for new bioactive strains, and concerns related to food nutrition and safety. Additionally, ensuring the sustainable sourcing and production of bioactive-rich foods is imperative to maintain environmental and economic viability. Overall, advancements in functional foods and bioactive compounds have the potential to redefine global health paradigms, offering innovative solutions for disease prevention and health promotion.

Keywords: Bioactive compounds, Biotransformation, Encapsulation, Functional foods, Health promotion

**Corresponding author: kweerasinghe2017@gmail.com*

EFFECT OF FERMENTATION DURATION ON THE ANTIOXIDANT ACTIVITY OF BEVERAGES PREPARED FROM *Coffea robusta* PERICARP AND SEED POWDER BLENDS

P. Abijah[1*] and H.A.P.W. Hettiarachchi[2]

[1]*Institute for Agro-Technology and Rural Sciences, University of Colombo, Sri Lanka*
[2]*South Eastern University of Sri Lanka*

Abstract

Coffee pericarp is a rich source of bioactive compounds and is frequently thrown away as waste during the wet processing. This study aimed to assess pH and antioxidant activity of beverage made with blends of pericarp and roasted coffee powder from *Coffea robusta*. Coffee seeds and pericarp were separated, and samples of the pericarp were fermented for 12, 18, and 24 hours by soaking the pulps in the water. The fermented samples were ground into a powder after being dehydrated for six hours at 50 ± 2°C. Coffee seeds were ground similarly after being roasted for 10 minutes at 170 ± 2°C. IN order to make beverages, the powders were mixed in four different ratios (5g:0g, 4.5g:0.5g, 4g:1g, and 3.5g:1.5g) and dissolved in hot water (95± 2°C) for five minutes to make beverages. Finally, pH and antioxidant activity were analyzed by Standard techniques. DPPH assay was used for antioxidant activity. The availability of bioactive compounds was affected by fermentation, as evidenced by the significant increase in antioxidant activity from 8.67 percent at 12 hours to 13.48 percent at 18 hours and then to 10.91 percent at 24 hours. A clear pattern emerged in the pH: it began at 6.76 (12 hours), dropped to 6.47 (18 hours), signifying increased acidity, and then returned to near-neutral conditions at 6.90 (24 hours). The changes in the antioxidant content and pH were ascribed to fermentation-induced nutrient metabolism and organic acid production. Fermentation of the coffee pericarp improves antioxidant activity and sustains pH stability for the best periods of time. Coffee pericarp and roasted coffee powders combine to make a functional beverage that may find use in the creation of goods high in antioxidants. By turning waste into a useful ingredient, this study promotes sustainability in coffee processing and highlights the value of coffee pericarp as an underutilized resource.

Keywords: Antioxidant activity, Beverage, Coffee pulp, *Coffea robusta,* pH.

**Corresponding author: pradeepa76@seu.ac.lk*

MEDICINAL PLANTS AND PHYTOCHEMICALS

DISTRIBUTION OF MEDICINAL PLANTS USED IN PAEDITRIC AILMENTS IN THE AREA AROUND THE SANTHIRASEGARA PILAIYAR TEMPLE, NALLUR NORTH

S. Nithyapriya[1*]

[1]*Department of Kuzhanthai and Mahalir Maruthuvam, Faculty of Siddha Medicine, University of Jaffna, Sri Lanka*

Abstract

Medicinal plants are abundantly grown different areas such as pool area, cultivated area, coastal area, mountain area and mangal area. According to the WHO, about 80% of the population of the world depends on herbal medicine, mostly herbal remedies, for their primary health care needs and some allopathic secondary metalize also derived from herbal base. The study was carried out around the Santhirasegara Pilaiyar temple located in the place is situated in Nallur North, Jaffna. This area has a pond, after the heavy rain and flood situation, large number of medicinal plants abundant around Santhirasegara Pilaiyar temple and Lack of identification skill and up now we does not have inventerization therefore, and the two reasons for researcher has selected this study. The aim of the study was to identify present situation of medicinal plants around temple. This was a descriptive and observational study. Data were collected with the help of questionnaire from mid of October 2024 to December 2024. All relevant information for this study was gathered from records of ninety-eight medicinal plants. The data were processed and analysed by simple statistical method. Based on survey, out of 98 medicinal plant species come from 47 families. Majority 11.22 plants from Labiatae. Majority of plant's morphology is shrub with 26.53%. Majority 27.5 plants had diuretic action. Majority 69.38% plants were perennial. Most of plants (22 %) used in paediatric skin condition, 16% of plants used for Gastro intestinal disease and 13% of plants were rejuvenating plants. Finally, huge numbers of conventional ethno medicinal plants were used for paediatric skin diseases and also treating respiratory conditions, fever, urinary tract infection, gastro intestinal diseases and rheumatism in children. Further scientific studies identified plants should be performed in future.

Keywords: Nallur north, Paediatric ailments, Rejuvating plants, Respiratory conditions, Skin disease

*Corresponding author: *nithyapriya@univ.jfn.ac.lk*

PHYSICO-CHEMICAL, PHYTOCHEMICAL AND CHROMATOGRAPHICAL ANALYSIS OF *Phyllanthus debilis* J.G. KLEIN EX WILLD

K.B.W.I.G. Abeywardhane[1*], S.K.M.K. Herapathdeniya[1] and D.M. Nallaperuma[1]

[1]*Faculty of Indigenous Medicine, University of Colombo, Sri Lanka*

Abstract

Phyllanthus debilis J.G. Klein ex Willd. (*Pitawakka*) which belongs to the family Euphorbiaceae is an annual herb grown in Sri Lanka. It features smaller leaves, whitish green flowers and greenish smaller fruits arranged linearly. The whole plant is used in Sri Lankan traditional medicine for liver diseases particularly in the form of porridge. However, limited scientific data exist to validate its hepatoprotective properties. This study is aimed to bridge this research gap by conducting a comprehensive physico-chemical, microscopical, qualitative and quantitative phytochemical analysis and chromatographical analysis of this plant. Physico-chemical analysis included the determination of total ash (4.95±0.1%), acid-insoluble ash (0.4±0.2%), water-soluble ash (2.55±0.26%), ethanol- soluble extractive value (12.8±0.15%), water-soluble extractive value (61.6±0.3%) and moisture content (10.58±0.2%) which were within the standard limits. The ethanol extract of the whole plant was obtained for qualitative phytochemical and chromatographical analyses using Soxhlet apparatus at 60°C. Developed chromatogram (Ethyl acetate: Acetic acid: Water 10:1.1:1.1) was visualized under 256nm and 366nm Ultra Violet light and scanned using High Performance Thin Layer Chromatograph scanner. Ethanol extract tested positive for alkaloids, flavonoids, tannins, saponins and terpenoids. In the quantitative analysis, 100g of plant sample had 2.044±0.2g of alkaloids, 50.7±0.15mg TAE/g of tannins, 10.11±0.2g of flavonoids and 113±0.3mg GAE/g of phenols. Previous studies indicated alkaloids, flavonoids and tannins are effective in hepatoprotective action. HPTLC fingerprint profile gave one peak with a R_f value of 0.03. In conclusion, *Phyllanthus debilis* J.G. Klein ex Willd exhibits promising pharmacological potential due to its phytochemical diversity, which may correlate with its traditional uses in liver diseases within Sri Lankan traditional medicine. Future research could focus on development of plant-based formulation for hepatoprotective therapies based on these findings.

Keywords: Hepatoprotective, HPTLC, *Phyllanthus debilis*, Phytochemicals, TLC

**Corresponding author: imashag97@gmail.com*

IN VITRO ANTIOXIDANT POTENTIAL AND ALPHA AMYLASE INHIBITION OF SEEDS AND SPROUTS OF *Trigonella foenum-graecum*

K. Kamshana[1], S. Sivasinthujah[1] and S. Thuvaragan[1*]

[1]*Department of Pharmacy, Faculty of Allied Health Sciences, University of Jaffna, Sri Lanka*

Abstract

The seeds of *Trigonella foenum-graecum*, commonly known as fenugreek, have been used in various medicinal systems due to their diverse pharmacological properties, including antioxidant, antidiabetic and anticancer activities. This study aimed to evaluate the *in vitro* antioxidant and alpha-amylase inhibitory activities of methanolic extracts of seeds and sprouts (Day 1, Day 3, and Day 5) of *T. foenum-graecum*. Seeds and sprouts were dried, powdered, and macerated in methanol to obtain the methanolic extract. The antioxidant activity was assessed using the 2,2-diphenyl-1-picrylhydrazyl (DPPH) radical scavenging assay and phosphomolybdenum method using ascorbic acid as standard. The antidiabetic potential was evaluated by the alpha-amylase inhibitory assay using acarbose as standard. Qualitative phytochemical screening was performed on the crude methanol extracts. DPPH assay revealed the lowest half maximal inhibitory concentration (IC_{50}) for Day 3 sprout extract (22.67 µg/ml) whereas the IC_{50} of ascorbic acid was 12.4 µg/ml, indicating the highest antioxidant capacity. In the phosphomolybdenum method, the Day 3 sprout extract exhibited the highest antioxidant activity, followed by Day 1, dry seeds, and Day 5 sprouts extracts. Regarding alpha-amylase inhibition, the dry seed extract exhibited the highest inhibitory activity (IC_{50} = 104.56 µg/ml), whereas IC_{50} of acarbose was 829.03 µg/ml, followed by Day 1 and Day 3 sprout extracts. The qualitative phytochemical analysis confirmed the presence of alkaloids, flavonoids, saponins, tannins, gum, mucilage, sterols, glycosides, and phenolic compounds in the extracts. The Day 3 sprout extract exhibited the highest antioxidant activity, while the dry seed extract showed the highest alpha-amylase inhibition. The findings suggest that *T. foenum-graecum* sprouts, particularly on Day 3, could be beneficial in managing diabetes and its complications. Further, methanol extract of *T. foenum-graecum* could be used to identify the specific antidiabetic compounds with antioxidant activity, providing further insight into their therapeutic potential.

Keywords: Alpha amylase inhibition, Antioxidant activity, Seeds, Sprouts, *Trigonella foenum-graecum*

**Corresponding Author:* *sthuvaragan@univ.jfn.ac.lk*

PHYTOCHEMICAL AND ANTIBACTERIAL STUDY ON THE BARK OF *Odina wodier* – A SCIENTIFIC SCREENING

S. Kasthuri[1], G.A.W. Sam Antony[1], T. Divarjitha[1] and T. Thayalini[1*]

[1]*Faculty of Siddha Medicine, University of Jaffna, Sri Lanka*

Abstract

Odina wodier is a medium or large sized tree which bark was extensively used by ancient *Siddhars* in order to prevent and treat wound infections. *Staphylococcus aureus* and *Pseudomonas aeruginosa* were the most commonly isolated pathogens from infected wounds. This present study was to screen phytochemicals in the bark of *Odina wodier* and to evaluate its antibacterial activity against *S. aureus* and *P. aeruginosa*. The phytochemical screening of bark of *Odina wodier* was done in aqueous extract and the antibacterial activity was evaluated against *S. aureus* – NCTC 6571 and *P. aeruginosa* – NCTC 10662 in aqueous and ethanolic extracts by using cut well agar diffusion method. Based on the results of the phytochemical screening, tannins, glycosides and saponins were present in the aqueous bark extract. The mean diameter of the zone of inhibition of the aqueous bark extract was 17.33 ± 0.47mm for *S. aureus* and it was 13.00± 0mm for *P. aeruginosa*. Similarly, the mean diameter of the zone of inhibition of the ethanolic bark extract was 22.33± 0.47mm for *S. aureus*. This shows that the bark of *Odina wodier* has the antibacterial potential against both Gram positive (*S. aureus*) and Gram negative (*P. aeruginosa*) bacteria in aqueous bark extract while it has antibacterial activity only against Gram positive bacteria (*S. aureus*) in the ethanolic bark extract. The antibacterial activity against both Gram positive and Gram negative bacteria in aqueous bark extract of *Odina wodier* can be due to the presence of tannins and saponins. These results provide the evidence of antibacterial activity in the bark of *Odina wodier* and validate that the bark of this plant can be used in the treatment of wound infection. Therefore, the findings of this study will be helpful to develop antibacterial solutions or creams in future from the bark of *Odina wodier*.

Keywords: Antibacterial, *Odina wodier*, Phytochemicals, Wound infection

**Corresponding author: tthayalini@univ.jfn.ac.lk*

SCREENING THE ANTIDIABETIC AND ANTIOXIDANT PROPERTIES OF SRI LANKAN FLORA: A COMPARATIVE STUDY OF ETHANOLIC EXTRACTS FROM YOUNG LEAVES AND FLOWERS OF SELECTED MEDICINAL PLANTS

J.I. Bentharavithana[1*], G.D. Liyanaarachchi[2], J.K.R.R. Samarasekera[2], B.E.P. Mendis[1] and R.P.N.P. Rajapakse[2]

[1] *Department of Food Science and Technology, Faculty of Agriculture, University of Peradeniya, Sri Lanka*
[2] *Herbal Technology Section, Industrial Technology Institute, Sri Lanka*

Abstract

Diabetes mellitus and oxidative stress are global health concerns traditionally managed in Sri Lanka using medicinal plants, requiring scientific validation of their therapeutic potential. This study focused on young leaves of *Artocarpus heterophyllus, Andrographis paniculata, Coccinia grandis*, and *Ficus racemosa*, as well as flowers of *Aloe barbadensis*, due to their documented traditional use in Sri Lankan medicine and high phytochemical content, making them promising for further investigation. The total phenolic content (TPC), total flavonoid content (TFC), 2,2-diphenyl-1-picrylhydrazyl (DPPH) and Ferric Reducing Antioxidant Power (FRAP) assays determined the antioxidant activity. Alpha-amylase and alpha-glucosidase inhibitory activities determined the antidiabetic potential. *Artocarpus heterophyllus* exhibited the highest TPC (54.225±0.754 mg GAE/g), followed by *Ficus racemosa* (46.183±0.715 mg GAE/g), while *Andrographis paniculata* had the lowest (19.975±0.516 mg GAE/g). Similarly, *Artocarpus heterophyllus* had the highest TFC (18.3402±0.1384 mg QE/g), whereas *Ficus racemosa* recorded the lowest (8.1918±0.0593 mg QE/g). Notably, *Coccinia grandis* and *Aloe barbadensis* demonstrated moderate levels of both phenolics and flavonoids. Among the young leaf extracts, *Ficus racemosa* exhibited the strongest ferric-reducing antioxidant power (FRAP) with a value of 23.836±1.133 mg TE/g. Andrographis paniculata and *Coccinia grandis* showed comparable FRAP values with no significant difference between them. The flower extract of *Aloe barbadensis* demonstrated a FRAP value of 9.118±0.826 mg TE/g. *Artocarpus heterophyllus* and *Coccinia grandis* had the highest IC50 values of 236.636±0.44 and 337.649±1.456 ppm, respectively for the DPPH Free Radical Scavenging Activity. *Andrographis paniculata, Aloe barbadensis* and *Ficus racemosa* are considered to have low DPPH free radical scavenging activity. *Coccinia grandis* displayed the strongest alpha-amylase inhibition (IC50 = 9.145±0.0485 ppm), while *Artocarpus heterophyllus* leaves exhibited the strongest alpha-glucosidase inhibition (IC50 = 1.49367±0.00379 ppm). All five plants exhibit varying antidiabetic and antioxidant properties, potentially aiding in diabetes and oxidative stress management, making them a promising candidate for natural therapeutics, warranting further in vivo studies.

Keywords: Antioxidant, Anti-diabetic, Diabetes mellitus, Medicinal, Oxidative stress

**Corresponding author: jinangibv97@gmail.com*

POSTER PRESENTATIONS

AGRICULTURAL ECONOMICS AND EXTENSION

PREFERENCE FOR PLANT-BASED MEAT ALTERNATIVES AMONG VEGETARIANS AND VEGANS IN SRI LANKA: A CASE STUDY IN KANDY DISTRICT

P.S.M.S. Gunasekara[1*], W.M.H.N. Jayasooriya[1], U.K. Srimali[1] and U.B.E. Sasanka[1]

[1]*Department of Agribusiness Management, Faculty of Agricultural Sciences, Sabaragamuwa University of Sri Lanka, Belihuloya, Sri Lanka*

Abstract

The global trend of plant-based meat alternatives is gaining momentum, driven by cultural, health, and ethical factors. In Sri Lanka, this trend is gradually influencing dietary habits, particularly among vegetarians and vegans. This study explores key aspects of this phenomenon in the Kandy district, focusing on identifying the most commonly consumed plant-based meat products, analyzing factors influencing consumer preferences, and assessing the impact of marketing and branding strategies on behaviour. A sample of 125 participants was selected using a judgmental sampling method. The study examined key parameters, including consumer preference for plant-based meat alternatives, frequency of consumption, influencing factors, and the impact of marketing strategies on purchasing behaviour. Necessary data were collected from the 6th of August to the 10th of October 2024 via an online questionnaire through WhatsApp groups. Data were analyzed using descriptive statistics. The findings indicated that more than half of the sample (66%) preferred to consume plant-based meat products. Based on all the food and beverages consumed, the majority were flexitarians (56.9%). Jackfruit (75.9%), chickpeas (71.6%), and mushroom and mushroom-based products (70.7%) were the most consumed plant-based meat alternatives among vegetarians and vegans. This research identified two primary factors that influence consumption patterns; the nutrition content (79.3%) and the availability (69.8%). According to our results, consumers consume plant-based meat alternatives several times per week (49.1%). Further, results revealed the importance of effective marketing strategies, recommending a focus on appealing packaging (72.80%), clear health messaging (64%), and strong brand reputation (57.6%). Leveraging social media engagement and positioning plant-based products as sustainable and innovative solutions could be identified as a key strategy for popularizing plant-based meat alternatives among the participants. Further, a combination of social media, mass media, and online advertising, along with word-of-mouth and in-store promotions, could be suggested to maximize consumer reach and impact. These insights offer a deeper understanding of the consumption behaviour of plant-based meat alternatives among vegetarians and vegans in Sri Lanka, contributing to the promotion of sustainable dietary practices and the growth of the plant-based meat industry.

Keywords: Consumer behaviour, Dietary trends, Food Marketing strategies, Plant-based diet, Sustainable food choices

**Corresponding author: sugandiguna29@gmail.com*

OPPORTUNITIES AND CHALLENGES IN CINNAMON (*Cinnamomum zeylanicum Blume*) CULTIVATION IN HAKMANA DS DIVISION

H.A.D. Madushani[1*] and K. Thirumarpan[1]

[1]*Department of Agricultural Economics, Faculty of Agriculture, Eastern University, Sri Lanka*

Abstract

Cinnamon (*Cinnamomum zeylanicum Blume*) is a globally renowned spice and one of Sri Lanka's most significant agricultural exports, providing substantial income, particularly in the Matara District. This study explores into the economic and socio-economic dimensions of cinnamon farming among smallholder farmers in the Hakmana DS Division, with an emphasis on labor dynamics, input utilization, challenges. Data were gathered from 100 farmers across 12 agriculturally prominent Grama Niladhari (GN) Divisions through structured questionnaires and data were analyzed using SPSS software. Findings revealed that the majority of farmers were male (91% married) and relied heavily on traditional farming techniques, cultivating an average of 1.11 acres per farmer. Labor-intensive practices dominated, with male workers primarily handling land preparation and pesticide application, while female workers focused on weeding and planting. Mechanization was scarcely utilized, with limited adoption for land preparation. The study highlighted an average production cost of Rs. 1.428 million per acre, with harvesting and processing representing the highest expenditure due to significant labor demand. Key challenges included escalating fertilizer costs, labor shortages, and restricted access to skilled peelers, significantly impacting productivity and profitability. Despite these constraints, cinnamon farming remains productive. Most farmers relied on hired lorries for transportation, emphasizing the importance of efficient logistics. Policy recommendations include promoting mechanization, implementing targeted labor training programs, and fostering cooperative input purchasing to reduce costs and enhance sustainability. This study provides critical insights into the operational challenges of cinnamon farming, offering a foundation for strategic interventions aimed at improving productivity, sustainability, and farmer livelihoods while reinforcing Sri Lanka’s position in the global cinnamon market.

Keywords: Cinnamon, Economic Analysis, Labor, Production cost, Smallholders

**Corresponding author: Email: madushanidinusha@gmail.com*

ASSESSING THE ALTERNATIVE LIVELIHOOD OPTIONS PRACTICED BY THE RELOCATED AGRICULTURAL VICTIMS IN THE WET ZONE OF SRI LANKA

M.W.K.K. Dilrukshi[1*]

[1]*Department of Agricultural Economics, Faculty of Agriculture, University of Ruhuna, Sri Lanka*

Abstract

Landslides and flooding have become serious hazards that occur with the changing climates with irregular rainfall patterns. Permanent or temporary displacements are increasing inside vulnerable households, voluntarily or involuntarily. Relocation is the process practiced by governments as the ex-post strategy for serious landslide-related hazards. With these migration patterns, traditional farming communities have moved to various alternative livelihood options. This study focused on analyzing the effectiveness of the relocation program by addressing the degree of satisfaction level and identifying the alternative livelihood options practiced by the landslides and related repercussions affected agricultural communities. Primary data was collected using a semi-structured questionnaire survey. Sixty sample units were purposefully selected from 4 Grama Niladhari Divisions (GNDs) in Ratnapura (Mahawala and Kiriella) and Kalutara (Iluppata and Maragahadeniya) districts. Farming households were randomly picked by using lists available from the GN officers in each area. Data were analyzed by using descriptive statistics. Results revealed that most respondents are dissatisfied with the relocated places and provided facilities with the programs, $z = -3.064$, $p = 0.002$, with the effect size of $r = 0.39$ (Wilcoxon Sign Rank test). The most prominent alternative livelihood option is working as laborers (28.6%), while 25% of respondents are still engage in smallholder-level farming activities (tea, cinnamon, and vegetables) in the available land areas. Women play a crucial role in income generation through migration to Middle East countries as housemaids (14.2%). Else, 7.14% of the community suffers from poverty without having a proper income-generating source. Smaller but still significant percentages have attitudes to start their own businesses (2.86%). However, more than 90% of the victims would like to return to agriculture. Land tenure issues, lack of cultivating areas, lack of initial capital, and related issues to starting previously practiced agricultural activities are the main constraints. It suggested that people can be adopted for possible alternative livelihood and income-generating options as a short-term and long-term climate change adaptation strategy. Furthermore, proper alternative income-generating programs must be introduced to the relocated agricultural communities with enough motivation, awareness, knowledge dissemination, and flexible credit facility programs with transparent mechanisms. This study will provide insight into possible alternative options to initiate development programs.

Keywords: Adaptation, Alternative livelihood, Climate change, Landslide, Relocation

Corresponding author: mwkkdilrukshi@gmail.com

CONSUMER PREFERENCE FOR HEALTHY PALMYRAH PRODUCTS IN NON- PALMYRAH PRODUCING AREAS IN SRI LANKA: A CASE STUDY IN WESTERN PROVINCE, SRI LANKA

A. Kurinchimalar[1], J. Sathana[1], A. Dilaiksana[1*] and U.B.E. Sasanka[1]

[1]*Department of Agribusiness Management, Faculty of Agricultural Sciences, Sabaragamuwa University of Sri Lanka, Sri Lanka*

Abstract

This study investigates the key factors influencing consumer preferences for palmyrah-based products in the districts of Kalutara, Gampaha, and Colombo, Sri Lanka. A quantitative research approach was employed, using a structured questionnaire and a snowball sampling method to collect data from 202 respondents (revised from the expected 300 due to practical constraints). The study examines how health consciousness, product attributes, availability and accessibility, product pricing, and seasonality impact consumer decisions. The multiple regression analysis findings indicate that while product features and pricing negatively affect consumer preference, health consciousness, availability, accessibility, and seasonality have significant positive effects. The model's adjusted R^2 value of 0.685 confirms that 68.5% of the variation in consumer preferences is explained by these factors. Furthermore, the Durbin-Watson value of 2.151 suggests that there is no substantial autocorrelation in the regression model, affirming the reliability of results. These findings highlight the importance of accessibility and health consciousness as key drivers of consumer preference, offering valuable insights for marketers and policymakers. Businesses should focus on improving product accessibility and health awareness while reassessing pricing strategies to enhance market appeal. Future research could expand the sample size, include more districts, or explore additional variables such as digital marketing and cultural influences to deepen the understanding of consumer behavior. Despite its limitations, this study provides crucial insights into enhancing customer satisfaction and loyalty in the palmyra product market.

Keywords: Availability and accessibility, Consumer behavior, Consumer preferences, Health consciousness, Product attributes

**Corresponding author: adilaiksana@gmail.com*

EXPLORING THE CONSUMER BUYING BEHAVIORS TOWARDS INSTANT FOOD PRODUCTS IN RATNAPURA DISTRICT, SRI LANKA

K.R. Dilhani[1*], P.H.A.S.K. Dilrukshi[1], R.P.H.R. Sewwandi[1] and S.H.P. Malkanthi[1]

[1]*Department of Agribusiness Management, Faculty of Agricultural Sciences, Sabaragamuwa University of Sri Lanka*

Abstract

The study explored the factors influencing consumer preferences, purchase patterns, and brand loyalty in the context of Sri Lanka's rising demand for instant food products in Ratnapura District. The research aimed to analyze consumer purchasing frequency of instant food products, identify key factors influencing consumer purchase decisions, and examine the extent of brand loyalty among consumers in this area. Necessary data were collected using a structured questionnaire with the support of 130 respondents who were selected using the convenience sampling method. The questionnaire included questions related to brand awareness, purchasing frequency, media influence, and key factors affecting purchase decisions. Descriptive statistics, regression analysis, and Chi-square tests were employed to assess relationships among variables such as price, convenience, quality, and brand loyalty using SPSS V.30 software. Key findings revealed that 73.85% of respondents demonstrated brand loyalty, indicating its strong influence on purchasing decisions. The primary consumer group consists of young individuals aged 19-30 years, with most respondents making occasional purchases (mean purchasing frequency of 2.14, equivalent to 3-5 times per week), and buying medium quantities (3-5 items per purchase, mean = 1.58). Regression analysis indicates that brand loyalty has a statistically significant impact ($p = 0.000$) on repeat purchases, surpassing price and convenience factors. Additionally, the Chi-square test confirms a significant association ($p = 0.006$) between consumer buying behavior and brand loyalty. The study highlights the need for businesses to focus on brand consistency, target younger consumers, and introduce diversified product offerings to appeal to both price-sensitive and health-conscious individuals. The findings provide valuable insights for food industry stakeholders to adapt their marketing strategies, ensuring sustained growth, consumer satisfaction, and market competitiveness in the instant food sector.

Keywords: Affordability, Consumer buying behavior, Consumption, Convenience, Instant food products

**Corresponding author: ruchiradilhani6@gmail.com*

FACTORS AFFECTING THE SUCCESSES AND FAILURS OF SMALL AND MEDIUM SCALE ENTREPRISES (SMES) IN SRILANKA: CASE STUDY IN MATARA DISTRICT

K.A.R. Dharmasena[1*], L. M. Abeywicrama[2] and A. L. Sandika[2]

[1] *Ministry of Agriculture, Livestock, Land and Irrigation, Sri Lanka*
[2] *Faculty of Agriculture, University of Ruhuna, Sri Lanka*

Abstract

This study investigates the factors influencing the success and failure of Small and Medium-sized Enterprises (SMEs) in Sri Lanka's Matara District, focusing on their crucial role in driving rural economic development. SMEs contribute significantly to income generation, job creation, and equitable income distribution within rural communities. Drawing inspiration from successful SME policies implemented in East and South Asian nations, this paper emphasizes the potential for similar strategies in Sri Lanka, where rural development programs have traditionally prioritized infrastructure over livelihood. As Matara is rural led district 3 divisions Kotapola, Akuressa and Malimbada were selected for the research study. The questionnaire survey was applied to gather data from 150 samples. The independent variable is family income increased and independent variables include 12 success and 14 failure related variables. Spearman rank correlation test data revealed key success factors included enterprise background, previous financial difficulties, Competition, risk bearing skill and key failure factors included Debt in time, knowledge on debt in bank, rules and regulation of the banks and inadequate infrastructure. The survey reveals a concerning trend in SME sustainability, with 40% of businesses surviving only two years, 27% lasting one year, and only 15% operating for three years. The findings underscore the internal factor, previous financial difficulties experience and risk bearing, competition were considered as positive improvement of entrepreneur and urgent need of government intervention in bank related inherent drawbacks which are considered as significant failures. These insights provide a valuable foundation for policymakers to develop robust, SME-centric rural development plans that bolster economic resilience and promote long-term prosperity in rural sector of Sri Lanka.

Keywords: Businesses, Enterprises, Innovation, SMEs

**Corresponding author: anuradharuwanmali@gmail.com*

CROP PRODUCTION AND BIODIVERSITY CONSERVATION

EFFECT OF DIFFERENT TYPE OF FERTILIZERS ON GROWTH AND YIELD OF OKRA (*Abelmoschus esculentus* L.), KILINOCHCHI, SRI LANKA

G.K.T. Rathnasoma[1], S.J. Arasakesary[1] and K. Pakeerathan[1*]

[1]*Department of Agricultural Biology, Faculty of Agriculture, University of Jaffna, 44000, Ariviyal Nagar, Kilinochchi, Sri Lanka*

Abstract

To overcome the malnutrition, economic and food crisis existing in Sri Lanka, our agricultural productivity needs to be increased. Okra, *Abelmoschus esculentus* (L.), is reported to have been a hardy, very important source of nutrition and potential economic returns for many tropical and subtropical countries. The development of agricultural technology to optimize production and growing plants, fertilizers also become more pertinent. This research deals with different types of fertilization and their effect on growth, development, and yield of Okra. The three fertilizer treatments, namely Department of Agriculture's recommendation (T1) as control, SAS fertilizer (T2), and vermicompost +50% of T1 (T3), were compared. The treatments were laid out in RCBD with three replicates for the evaluation of the growth and parameters, pod production, and root biomass. Two-way ANOVA was performed using the SAS software. Duncan's Multiple Ranges Test (DMRT) was used to determine the least significant differences among the treatments at $P < 0.05$. Results from the study showed variations influenced by the treatments. T1 significantly increased the height of the plant (161.73 cm), stem girth (9.77±0.76 cm), and pod yield of 23.45 pods/plant over T2 and T3. Additionally, T1 revealed that the maximum pod girth of 7.58±0.52 cm and number of pods 23.45±4.17, showing that inorganic fertilizer resulted in better overall growth and yield performances. However, T3, representing organic methodology, evinced continued benefits, as well, in the form of a more balanced nutrient supply and improved soil health. In this, it is possible to interpret that while inorganic fertilizers improve productivity immediately, the integrated use of organic alternatives like vermicompost can actually encourage long-term soil fertility and sustainability in okra cultivation.

Keywords: *Abelmoschus esculentus*, Inorganic fertilizers, SAS fertilizer, Vermicompost, Yield

**Corresponding author: pakeerathank@univ.jfn.ac.lk*

EFFECT OF DIFFERENT WEED MANAGEMENT PRACTICES ON MACHINE -TRANSPLANTED RICE

J. Vijayakumari[1*] and S. Sivaneson[1]

[1]*Rice Research Station, Department of Agriculture, Paranthan, Sri Lanka*

Abstract

Rice is an important cereal crop extensively grown in Sri Lanka. Weed infestation is the major threat to productivity of rice for dry zone. Weeds have high adaptability and faster growth rate and reduce the yield potential of the rice. In machine transplanting, inter row spacing is a fixed value of 30 cm. It allows severe weed infestation and remarkable yield loss. Weed management is an essential practice in machine transplanting. The Objectives of this study was to select efficient weed management practices in machine transplanted rice. The treatments were designed to evaluate different weed management strategies in the experimental setup. These included W1:Oxyfluorfen 240g/l EC(Goal)applied at 3DAT (Days after planting); W2: Bispyribac sodium 20% WP (Kensolo) applied at 14DAT;W3: Pretilachlor 300g/l + Pyribenzobium 20g/l EC(Solito 320EC) applied at 10DAT; W4:mechanical weeder weeding-once at 20 DAT; W5: mechanical Weeder weeding conducted twice at 20 DAT and 35DAT; W6: a combination of hand weeding and mechanical weeder at 15 and 35 DAT; W7 : Bispyribac sodium 20% WP-8.6g/16l combined with mechanical weeder at 14 and 35DAT; W8: Oxyfluorfen 240g/l EC combined with mechanical weeder at 3 DAT and 35DAT; W9:Pretilachlor 300g/l + Pyribenzobium 20g/l EC combined with mechanical weeder at 10 DAT and 35DAT; W10 : MCPA combined with mechanical weeder at 25DAT and 35DAT; W11: a control treatment without weeding interventions; and W12: hand weeding to maintain weed- free conditions at 15 and 35DAT using the variety Bg 406. The experiment was laid out in a Randomized Complete Block Design (RCBD) with four replications. The plot size was 4.5 m X 3.5 m. The results revealed that weed populations and dry weight per square meter at 30 DAT and 60 DAT were lower in the treatment of W6: 5.75de 15.40cd 8.25c 82.45bc; W7: 7.75de 8.25d 7.50c 64.85cd and W12: 3.75e 7.00d 4.75c 8.60d respectively. The treatment of Bispyribac sodium 20% WP+ mechanical weeder, mechanical weeder combined with hand weeding and hand weeding were well performed among all herbicide treatments in machine transplanted rice. Therefore, there is a need to use the high- efficiency herbicides in combination of mechanical weeder in transplanted rice to increase the range of weed control, save time, reduce the cost of cultivation and reduce the pollution to environment.

Keywords: Growth, Management, Transplanted Rice, Weed, Yield.

**Corresponding author: vvkkumari89@gmail.com*

ECOSYSTEM-BASED APPROACHES (EBAs) FOR SUSTAINABLE COASTAL ZONE MANAGEMENT TO COMBAT CLIMATE CHANGE AND HUMAN IMPACT

K. Keerthana[1*], W.M.A.T. Wanninayaka[1], H.M.R. Nimeshika[1], B.K.A. Bellanthudawa[1,2,3] and S. Sandamal[3,4]

[1]Department of Agricultural Engineering and Environmental Technology, Faculty of Agriculture, University of Ruhuna, Matara, 81100, Sri Lanka
[2]Research Center for Eco-Environmental Sciences, Chinese Academy of Sciences, Beijing, 100085, China
[3]University of Chinese Academy of Sciences, Beijing, 100049, China
[4]National Nanfan Research Institute (Sanya), Chinese Academy of Agricultural Sciences, Sanya, 572024, China

Abstract

Globally, coastal zone management has gained attention as it provides invaluable natural contributions to both present and future generations. Coastal zone management is followed in numerous ways; however, the reliable and sustainable approach for that is ecosystem-based approaches (EBAs). EBAs provide multiple ways of effective yet sustainable prospects for manage the coastal zone. Hence, we conducted with critical review; (1) to assess the status of EBAs, (2) to assess main tools and techniques used in EBAs, and (3) to explore key challenges, limitations and practical aspects of implementing EBAs in coastal zone management. We screened research articles using databases such as Google Scholar, and Web of science. Ecosystem-based approaches, Coastal zone, Coastal zone management, Integrated management, Coastal resilience were the keywords employed in the screening process. Peer-reviewed academic papers with open access and full-text format published in English language were considered. The analysis yielded a total of 28 research articles. Results shows EBAs to coastal zone management are gaining traction globally through integrated land-water-biotic management approaches, evidenced by increasing adoption of ecosystem health assessments and stakeholder participation frameworks to sustain coastal resilience. These approaches render multiple benefits, including biodiversity conservation, climate regulation, and sustainable resource use, while addressing the challenges of climate change and pollution. EBAs combine a set of tools like geographical information system (GIS) and Decision Support System to offer integrated, advanced management in coastal zones. In this regard, some technological tools include but are not limited to GIS, remote sensing to enable timely decision-making based on current information and ecosystem monitoring in almost real time. Some other methods and tools incorporate participation by stakeholders and adaptive governance, which provides the ability for management to be flexible according to environmental data. Approaches like Marine Protected Areas as highlight the linkage of EBAs to Integrated Coastal Zone Management by suggesting harmonized management of human activities and ecological conservation through coherent policies, partnerships, and funding as limitations arise from data gaps, stakeholder conflicts, and restrained resources.

Keywords: Climate change impacts, Coastal resilience, Coastal zone management, Ecosystem-based approaches (EBAs), Integrated coastal zone management

**Corresponding author: keerthanakanapathipillai4@gmail.com*

CLIMATE CHANGE IMPACT ON ADAPTIVE TRAITS OF SRI LANKAN WILD RICE (*Oryza rufipogon* AND *O. nivara*)

Parakkrama Wijerathna[1,2,3], Salinda Sandamal[4,5] and Disna Ratnasekera[1*]

[1] *Department of Agricultural Biology, Faculty of Agriculture, University of Ruhuna, Sri Lanka.*
[2] *CAS Key Laboratory of Tropical Marine Bio-Resources and Ecology/Guangdong Key Laboratory of Marine Materia Medica, South China Sea Institute of Oceanology, Chinese Academy of Sciences, Guangzhou 510301, China.*
[3] *University of Chinese Academy of Sciences, 100049 Beijing, China.*
[4]*National Key Facility for Crop Gene Resources and Genetic Improvement, Institute of Crop Sciences, Chinese Academy of Agricultural Sciences, Beijing 100081, China.*
[5]*National Nanfan Research Institute (Sanya), Chinese Academy of Agricultural Sciences, Sanya, 572024, China.*

Abstract

Climate change has become a major challenge to biodiversity and ecosystem stability, involving the study of phenotypic plasticity and adaptive responses in plant species. Wild rice species, *Oryza rufipogon* and *O. nivara*, are key progenitors of cultivated rice, providing valuable insight into the genetic and morphological adaptations that allow survival in a rapidly changing climate. This study aimed to investigate the responses of *O. rufipogon* and *O. nivara* to environmental variables in their natural habitats, focusing on morphology and phenology over four years (2016 to 2020). A three-year gap was maintained to assess trait divergence in relation to climate variability. Statistical analysis using a *t*-test revealed significant changes in key morphological traits of *O. nivara*, including increased plant height (159.92 ± 3.52 cm), flag leaf length (21.15 ± 1.49 cm), flag leaf width (1.16 ± 0.06 cm), anther length (3.84 ± 0.06 mm), and awn length (4.10 ± 0.40 cm) in response to higher precipitation in 2020. Conversely, *O. rufipogon* exhibited a stable morphological response due to its adaptation to deeper water habitats. Phenological shifts were also evident, with *O. nivara* flowering earlier in 2020 compared to 2016, whereas *O. rufipogon* exhibited delayed flowering. These findings highlight the crucial role of phenotypic plasticity in environmental adaptation and climate resilience. The observed morphological and phenological changes provide insights into the potential for genetic improvement in rice breeding for climate resilience.

Keywords: Adaptation, Climate resilience, Phenotypic plasticity, Sri Lanka, Wild rice

**Corresponding author: disnaratnasekera@gmail.com*

EVALUATION OF PERFORMANCE OF SELECTED TRADITIONAL RICE VARIETIES UNDER ORGANIC FARMING

R.M.N.M. Jayasena[1], W.G.R.S. Somarathna[2], S. Thanusan[1], S. Nishanthan[1] and S. Vinujan[1*]

[1]*Department of Biosystems Technology, Faculty of Technology, University of Jaffna, Sri Lanka*
[2]*Rice Research Station, Department of Agriculture, Sammanthurai, Ampara, Sri Lanka*

Abstract

Rice is the most important staple cereals in human nutrition and is consumed by most of the global population. Organic rice cultivation has been receiving a lot of attention in Sri Lanka. This research presents the outcome of evaluating the most suitable traditional rice varieties for organic farming. The experiment was carried out to assess the growth and yield performances of selected traditional rice varieties fertilized with compost. The compost was applied at two doses as 2 weeks before and 5 weeks after transplanting at the rate of 5 t/ha. The field experiment was arranged in Randomized Complete Block Design (RCBD) with seven traditional rice varieties in three replicates. In this study, the data on plant height, number of leaves, tillers, productive and unproductive tillers, filled and unfilled grains, length of panicle and seed weight were collected from randomly selected three plants. The results indicated significant differences for most of the growth and yield characteristics. Pokkali (92.93cm) variety reported the tallest plant among the seven varieties. The highest number of leaves per plant was recorded in Sulai (4) and Sudu Heenati (4). Pachchaperumal was observed with a greater number of tillers (8) per plant and leaf colour was also remarkably different in Pachchaperumal than other varieties. The total number of productive tillers per plant was high in Suwandal (9) and Madathawalu was recorded with the lowest total number of productive tillers (5). The highest unproductive tillers per plant was observed in Sudu Heenati (7) after the flowering stage. Before harvesting, Sudu Heenati was recorded with longest panicle (24.5 cm) while the lowest was recorded in Kaluheenati (17.5 cm). The number of filled grains was high in Madathawalu (84) and the high number of unfilled grains was recorded in Suwandal (71). Thousand seeds weight was high in Pokkali variety (29.81 g). After harvesting, dry weight was significantly highest in Pokkali (1.1 kg) than all other varieties. The lowest dry weight was recorded in Suwandal (0.5 kg). The varieties Pokkali, Pachchaperumal, and Madathawalu can be successfully cultivated with the application of compost in the Ampara district while Suwandal outperformed among the selected traditional rice varieties.

Keywords: Compost, Growth, Organic Farming, Traditional rice varieties, Yield

**Corresponding author: svinujan@univ.jfn.ac.lk*

CROP PROTECTION AND BIOTECHNOLOGY

INFLUENCE OF WEATHER PARAMETERS ON THE BROWN PLANTHOPPER (*Nilaparvata lugens*) INCIDENCES IN SRI LANKA

S.R. Sarathchandra[1*], T.A. Kamiss[2], A. Abeysekara[3], M.P.H.K. Jayaweera[1], L.B.T. Dilanka[1] and K.S. Sandadevani[1]

[1] Rice Research and Development Institute, Batalagoda, Ibbagamuwa, Sri Lanka
[2]National Agriculture Information and Communication Centre, Department of Agriculture, Sri Lanka
[3]Agro-Climatology and Climate Change Division, Natural Resources Management Centre, Department of Agriculture, Sri Lanka

Abstract

Rice is the staple food of half the world's population, including Sri Lanka. Rice Brown Planthopper (BPH) is one of the most destructive pests which is estimated to be responsible for approximately 5-10% of annual rice production losses in Sri Lanka. Among the various abiotic factors that influence of BPH population changes, weather parameters are important in managing BPH outbreaks. For this purpose, assessing the connection between the development of BPH and changing weather parameters is crucial. Hence, this study was conducted to observe the relationship between BPH incidence and weather parameters in selected 12 districts representing all three climatic zones. Data were collected from caller requests to the "1920" short code service in "Agricultural Advisory Service (AAS)" of the Department of Agriculture from 2017 to 2020. Weather data, including minimum and maximum temperature, morning and evening relative humidity, average rainfall and wind velocity were collected monthly by "The Agro-Climatology and Climate Change Division, Natural Resources Management Centre, Department of Agriculture. A correlation coefficient method was used to determine the relationship between the occurrence of pest incidence and the weather parameters. Based on the results wind velocity had a positive correlation with BPH incidences throughout the study period while the minimum temperature had a positive correlation with BPH incidences in 2017, 2019 and 2020, whereas the maximum temperature in 2018 and 2019 had a positive correlation with BPH incidences. However, relative to morning humidity was negatively correlated with BPH incidences in 2017, 2018 and 2019, while it was positively correlated in 2020. Rainfall and relative humidity in the evening were negatively correlated with BPH incidences throughout the study period. These results can be used for further studies and investigation into the occurrence and behavioral patterns of BPH during future climatic changes.

Keywords: Agricultural Advisory Service, BPH, Relative Humidity, Rainfall, Temperature

**Corresponding author: siriwardanadoa@gmail.com*

EVALUATION OF VARIOUS SUBSTRATES FOR MASS PRODUCTION OF *Metarhizium* sp. AND ITS BIO EFFICACY AGAINST WHITE GRUBS IN TEA CULTIVATION

M.S.T. Dulangi[1*], R.F. Niranjana[1], N.A.I.M. Nissanka[2] and R.D.P.D. Senanayake[2]

[1] *Department of Agricultural Biology, Faculty of Agriculture, Eastern University, Sri Lanka*
[2] *Tea Research Institute of Sri Lanka, Talawakelle, Sri Lanka*

Abstract

This experiment aimed to identify the most effective substrate for the mass production of *Metarhizium* sp. using various naturally available, low-cost, and biodegradable materials. The high cost of ingredients for synthetic growing media discourages farmers from using biocontrol agents like *Metarhizium*, as it increases production costs and subsequently increases the final product's price. Additionally, the study evaluated the bio efficacy of *Metarhizium* sp. against White Grubs (WG), which occasionally affects young and nursery tea plants in Sri Lanka. The goal was to develop an environmentally friendly biocontrol agent for Integrated Pest Management (IPM), as chemical control of WG has several drawbacks, including high costs, and pesticide residues in made tea. The research examined 11 inexpensive biodegradable solid substrates, including rice bran, a combination of rice bran and paddy husk, jackfruit seed, coconut pulp, potato, rice, pumpkin, maize, tea waste, banana peel, and coconut poonac, along with one liquid substrate (coconut water), to assess the growth and sporulation of *Metarhizium* sp. This was compared to the standard Potato Dextrose Agar (PDA). The findings revealed that the substrate made from a combination of rice bran and paddy husk resulted in a significantly higher spore count, which was statistically comparable to that of the jackfruit seed and coconut pulp substrates. Furthermore, spore viability for all three substrates was found to be 100%. To evaluate the bio efficacy of *Metarhizium* sp. against WG, three different concentrations of spore suspensions (10^6, 10^8, and 10^{10} spores/mL) were tested, alongside the recommended chemical Chlorantraniliprole as a positive control. However, none of the spore concentrations proved to be as effective as Chlorantraniliprole in controlling WG. All tested concentrations demonstrated similar levels of control effectiveness, even after 28 days post-application.

Keywords: Bio efficacy, Chlorantraniliprole, Mass production, *Metarhizium*, White Grubs

**Corresponding author: tharushisiriwardhane@gmail.com*

EFFECT OF ENDOPHYTIC FUNGI ON THE DEVELOPMENT OF TOMATO SEEDLINGS

F. Dovana[1*] and M. Mucciarelli[2]

[1] *Department of di Bioscienze, Biotecnologie e Ambiente (DBBA), Campus Universitario "Ernesto Quagliariello", Università degli Studi di Bari "Aldo Moro", Via Orabona 4, 70125 Bari, Italy*

[2] *Department of Life Sciences and Systems Biology, University of Torino, Torino, Italy*

Abstract

Plants have a remarkable ability to adapt to diverse environments, largely attributed to their plasticity and interactions with microorganisms, particularly endophytic bacteria and fungi. This study investigates the effects of four non-mycorrhizal endophytic fungi isolated from water mint (*Mentha aquatica*) on the growth of tomato seedlings (*Solanum lycopersicum*). In this experiment, tomato seedlings were inoculated with the mycelium of the selected endophytes, and their growth was assessed through measurements of fresh and dry biomass, as well as root morphology. Results indicated that three of the endophytes significantly enhanced the dry weight of the tomato plants, while only one endophyte notably increased fresh weight.Furthermore, two endophytes reduced root length, whereas two others promoted the development of lateral roots. Notably, isolate RT13 emerged as the most effective in enhancing fresh and dry weight. This study highlights the potential of non-mycorrhizal endophytes in modulating plant growth, suggesting that direct contact with fungal mycelium may serve as a viable method for inoculation in agricultural practices. The findings underscore the importance of further research to explore how these morphological changes may enhance plant resilience to environmental stresses.

Keywords: Ascomycota, Germination, In-vitro, Isolation, Root morphogenesis

**Corresponding author: francesco.dovana@uniba.it*

ANTIFUNGAL ACTIVITY OF SOME NATURAL PLANT EXTRACTS AGAINST CAUSAL AGENT OF ANTHRACNOSE DISEASE OF TOMATO FRUITS

R.M.A. Jeyawardhana[1] and A. Vengadaramana[1*]

[1]*Department of Botany, Faculty of Science, University of Jaffna, Sri Lanka*

Abstract

A common postharvest disease of tomato fruit in Sri Lanka is Anthracnose, which is caused by *Colletotrichum* species. The aim of the study was to isolate the tomato anthracnose disease causing *Colletotrichum* species and control the organisms by applying plants extracts. Two *Colletotrichum* isolates were isolated from tomato anthracnose-diseased fruits and were identified as *Colletotrichum acutatum* and *Colletotrichum dematium* respectively based on the morphological features. Crude extracts of ten spices, viz. *Aegle marmelos*, *Annona cherimola*, *Cinnamomum verum*, *Citrus aurantiifolia*, *Coleus amboinicus*, *Cynodon dactylon*, *Gnidia glauca*, *Justica adhatoda*, *Persea americana* and *Ruta graveolens* were made using methanol extraction and they were tested for their anti-fungal effects against the two *Colletotrichum* isolates isolated from tomato anthracnose diseased fruits. Pathogenic variations of the fungal isolates in terms of virulence were determined by *in vitro* inoculation assays using healthy tomato fruit. All ten spices studied showed significant anti-fungal activity *in vitro*. Methanolic extracts of *A. cherimola*, *A. marmelos*, *G. glauca*, *P. americana* and *R. graveolens* showed more than 10% inhibition against *C. acutatum* and methanolic extracts of *A. marmelos*, *P. americana* and *R. graveolens* showed more than 10% inhibition against *C. dematium*. Methanolic extracts of *R. graveolens* showed 10.6% and 47.4% of inhibition against *C. acutatum* and *C. dematium* respectively. *P. americana* inhibited *C. acutatum* and *C. dematium* repspectively by 25% and 28%. Recommended dosage (1.8 g L^{-1}) of the fungicide homai (Thiophanate-methyl 50% + Thiram 30% WP) did not completely inhibit the mycelial growth of two isolates *in vitro*. Virulence of the *Colletotrichum* spp. varied significantly in terms of rapidity and extent of disease spread. Two *Colletotrichum* isolates were pathogenic on tomato fruits and *C. acutatum* was more virulent than *C. dematium*.

Keywords: Anthracnose, Anti-fungal effects, Pathogenic variations, Postharvest disease

**Corresponding author: vengad@univ.jfn.ac.lk*

DIGITAL AND CLIMATE SMART AGRIUCLTURE

DEVELOPMENT AND VALIDATION OF LOW-COST IoT BASED TEMPERATURE AND MOISTURE MONITORING SYSTEM FOR COMPOST PILES: AN EXPERIMENTAL STUDY

K.H.T.H. Alecxender[1], M. Sugirtharan[2], G. Niroash[2], D.M.T.G. Dissanayaka[2*] and T. Kapilathan[3]

[1]*Department of Biosystems Technology, Faculty of Technology, Eastern University, Sri Lanka*
[2]*Department of Agricultural Engineering, Faculty of Agriculture, Eastern University, Sri Lanka*
[3]*Department of Multidisciplinary Studies, Faculty of Technology, Eastern University, Sri Lanka*

Abstract

The Internet of Things (IoT) provides an effective solution for precision management in agriculture. This study focuses on the development and evaluation of a low-cost real-time temperature and moisture monitoring system for compost piles. The system integrates a DHT22 sensor for temperature measurement and, a soil moisture sensor, and a Wi-Fi enabled ESP32 microcontroller. The Blynk IoT platform and an OLED display were used for data visualization. Temperature and moisture data from the compost piles were recorded over a month using DHT22, soil moisture sensors, standard thermometer and gravimetric method. The sensors' accuracy was evaluated using common performance metrics; error percentage, correlation coefficient (R), coefficient of determination (R^2), and root mean square error (RMSE). Results demonstrated that DHT22 sensor was accurate when it was verified along the standard thermometer, with an error percentage of 0.9645%, RMSE of 0.9820, and correlation values near 1 ($R = 0.9998$, $R^2 = 0.9997$). Similarly, soil moisture sensor showed high precision with a 2.6820% error, RMSE of 1.6377, and strong correlation ($R = 0.9948$, $R^2 = 0.9868$). These results indicate that the system was reliable for real-time monitoring in compost piles. Throughout the study, the DHT22 sensor functioned without failure, indicating that short-term monitoring without an enclosure is feasible. The system effectively monitors the compost parameters, such as temperature and moisture, enables efficient management of microbial activity and accelerates decomposition. The low-cost, user-friendly design is an effective solution for remote compost monitoring and process optimization. In future this system will integrate automated control measures, such as watering, aeration and turning mechanisms, along with protective measures for the prolonged use of DHT22 sensor. The findings validate that this system can significantly improve compost management by providing accurate, real-time insights into the composting process, thereby supporting sustainable agricultural practices and waste recycling.

Keywords: Compost, ESP32, IoT, Moisture, Sensors, Temperature

**Corresponding author: tharukagimhani98@gmail.com*

ENHANCING CROP YIELD PREDICTION FOR ACHIEVING FOOD SECURITY IN SRI LANKA: A HYBRID APPROACH OF MACHINE LEARNING ALGORITHMS

H.N. Munasinghe[1*] and E.G.T. Dasunika[2]

[1]*Department of Computer Science, The Open University of Sri Lanka, Nawala, Sri Lanka*
[2]*Department of Computer Science and Informatics, Uva Wellassa University of Sri Lanka, Badulla, Sri Lanka*

Abstract

Food security in Sri Lanka is a complex challenge with the current situation of the country. Sri Lanka's agricultural sector is the backbone of the country's economy, and it is essential to increase agricultural productivity in order to ensure food security. This research aims to demonstrate the potential of a hybrid approach that combines Machine Learning (ML) algorithms to improve crop yield prediction and advance food security in Sri Lanka. This study conducts a comprehensive systematic review and in-depth analysis of the most relevant literature on crop yield prediction using ML algorithms in the Sri Lankan agricultural context. Drawing on the findings of the literature review, this finding proposes a novel hybrid approach that integrates multiple ML algorithms to improve crop yield prediction. The hybrid model leverages key factors such as Humidity, Profile Soil Moisture, and yield for selected 11 districts representing the different climatic zones in Sri Lanka Considering crops such as Tea, Paddy, Rubber, and Coconut which makes a huge impact on the national Gross domestic product GDP in Sri Lanka. The performance of various ML algorithms, including Random Forest (RF), K-Nearest Neighbors (KNN), and Artificial Neural Networks (ANN), was evaluated separately to determine their ability to accurately predict crop yields and then hybrid models developed by combining KNN and RF, ANN and KNN, ANN and RF. As a result of these hybrid models, the highest performance was achieved by a hybrid model of KNN with RF with a Coefficient of determination (R^2) value is 0.9965, Mean Squared Error (MSE) is 0.0000002, Mean Absolute Error (MAE) is 0.0006 and Root Mean Squared Error (RMSE) is 0.0014. The findings of this research highlight the effectiveness of hybrid ML models in enhancing crop yield prediction accuracy, offering valuable insights for policymakers, agricultural stakeholders, and researchers. By leveraging advanced predictive analytics, Sri Lanka can optimize agricultural planning, mitigate risks, and improve food security.

Keywords: Artificial neural networks, Crop prediction, Hybrid approach, K-nearest neighbors, Random Forest

**Corresponding author: hnirasha14@gmail.com*

SOIL, WATER, ENERGY AND ENVIRONMENT

DEVELOPMENT OF BIODEGRADABLE ECO-FRIENDLY GRASS MATS USING *Eichhornia crassipes, Azolla pinnata,* AND BANANA PEELS: A SUSTAINABLE SOLUTION FOR MANAGING AQUATIC INVASIVE SPECIES AND AGRICULTURAL WASTE

I.C. Jayasinghe[1*] and V.I. Weerakoon[1]

[1]*Department of Environmental Technology, Faculty of Technology, University of Colombo, Sri Lanka*

Abstract

Water hyacinth (*Eichhornia crassipes*) is a well-known invasive aquatic plant that grows rapidly, causing severe environmental and economic damage in the world, including Sri Lanka. It forms dense mat-like structures on water surfaces, blocking waterways, destroying native biodiversity, and increasing water evaporation. Water fern (*Azolla pinnata*) is also effective in nitrogen fixation and wastewater treatment. Banana peels, a common agricultural waste, pose disposal challenges. This research aims to develop biodegradable, eco-friendly grass mats using *E. crassipes*, *A. pinnata*, and banana peels, providing sustainable solutions for the management of both invasive aquatic plant species and waste. *E. crassipes* and *A. pinnata* were harvested, cleaned, and dried as small pieces. Banana peels were, cleaned, dried, and powdered. The components are mixed in proportions of 50% *E. crassipes*, 30% banana peel, and 20% *A. pinnata*, with sufficient water added to facilitate mixing. Fifty grams of grass seeds were mixed with 1 liter of the prepared mixture until a homogeneous mixture was obtained. The mixture was spread evenly on a wooden frame made by attaching a canvas cloth to a thickness of 1 mm and left to dry for 3–4 days in a well-ventilated place. As a result, grass mats have effective soil stabilization and erosion control capabilities. The incorporation of banana peels enhanced the biodegradability and nutrient content of the mats. The invention transforms agricultural waste into a valuable economic product by repurposing invasive water hyacinths into productive grass mats. This study successfully developed biodegradable, eco-friendly grass mats using *E. crassipes*, *A. pinnata*, and banana peel. This innovative solution provides successful solutions to both the challenges of invasive species management and organic waste disposal. Grass mats promote environmental sustainability and resource utilization.

Keywords: Banana peels, Biodegradable grass mats, Invasive species management, Water fern, Water hyacinth

**Corresponding author: isindujayasinghe2000@gmail.com*

ADSORPTION TECHNIQUES TO REMOVE HEAVY METALS FROM INDUSTRIAL WASTEWATER: A REVIEW

H.M.S.T. Herath[1], R. Thivyatharsan[1], U. Kavithanjali[1*] and G. Niroash[1]

[1]*Department of Agricultural Engineering, Faculty of Agriculture, Eastern University, Sri Lanka*

Abstract

Heavy metal contamination in industrial wastewater is a critical environmental and public health issue, requiring effective treatment solutions. Removing heavy metals from wastewater is essential to prevent environmental pollution and protect public health. Their accumulation in the food chain can lead to serious health risks, while untreated wastewater contaminates soil and water, affecting agriculture and drinking water quality. This review highlights the adsorption techniques for heavy metal removal, analyzing mechanisms such as physical, chemical, and bio-adsorption. It evaluates adsorption capacities, removal efficiencies, and modifications for improved performance, including physical and chemical methods, oxidizing agents, and metal impregnation. Additionally, the study examines optimal operating parameters, isotherm models, and kinetic studies, providing a comprehensive understanding of adsorption processes. This work emphasizes the potential of advanced adsorbent modifications to enhance functionality, offering insights into sustainable and efficient wastewater treatment strategies. Modified biochar has maximum adsorption capacities than those of unmodified biochar. Cd (99.44%) with NaOH-modified tannery industry sludge and Zn (99.43%) with NaOH-modified tannery industry sludge have the highest removal efficiencies. Key operational parameters such as initial heavy metal concentration (Cr, Pb, and Cd ions at the range of 50 - 250 mg/l), temperature (percentage removal was higher at 60 for Cr, Pb), pH (6.5 – 6.9), contact time (Cd removal using zeolite-based geopolymer achieve optimum contact time at 7 hours and fly ash-based geopolymer for Pb removal gain optimum contact time at 2 hours), adsorbent dose (0.01 to 0.07 g/100 mL of Cr), agitation speed (removal efficiency of medium speed was 98.6% at 120 - 150 rpm), and particle size (600–425, 425–300, 300–150, 150–75 μ) are examined to determine their influence on adsorption efficiency. Cd, Pb, Cr, Zn and Hg mainly stem from industrial processes, mining activities, wastewater, landfills and agricultural practices. Modification of adsorbents for enhanced performance can involve physical and chemical methods. Additionally, various chemical agents such as oxidizing agents, neutral agents, and organic agents are used to improve their efficiency and effectiveness. Isotherm and kinetic models are analyzed to better understand the adsorption dynamics. This study explores isotherm and kinetic models, adsorbent regeneration techniques, and industrial applications of adsorption for heavy metal removal. Regeneration methods like chemical, thermal, and microbial approaches are highlighted. In conclusion, adsorption-based technologies offer an effective, sustainable, and cost-efficient solution for heavy metal removal from industrial wastewater. Future advancements in adsorbent design, process optimization, and artificial intelligence driven innovations will enhance wastewater treatment efficiency and sustainability.

Keywords: Adsorbent, Adsorption, Heavy metal, Wastewater

*Corresponding author: *saikavithanjali.u@gmail.com*

EFFECTS OF ORGANIC MANURE AND INORGANIC FERTILIZERS ON THE GROWTH AND YIELD OF OKRA IN SANDY REGOSOL

E.A.I. Madhushani[1*] and P. Premanandarajah[1]

[1]*Department of Agricultural Chemistry, Faculty of Agriculture, Eastern University, Sri Lanka*

Abstract

A field pot experiment was conducted at the Eastern University, Sri Lanka during the period of July to October 2024, to study the effects of organic manure and inorganic fertilizers on the growth and yield of Okra (*Abelmoschus esculentus* L. Moench) in sandy regosol. The major drawback of sandy regosol is its poor nutrition retention. In low fertility soils, applying organic manure as a soil amendment is feasible thus improving soil fertility and crop production. There were seven treatments replicated four times in the Completely Randomized Design. They included Farmyard manure, Poultry manure and Goat manure as organic amendments and urea, Triple Super Phosphate, and Muriate of Potash as the inorganic fertilizers. The organic manure samples were evaluated individually and in combination with recommended inorganic fertilizers at the rate of 50% from each in dry weight basis. These all treatments were tested with a control treatment with 100% inorganic fertilizer. Soil organic matter content, plant nitrogen content (N%), plant leaf area, and total yield were recorded at the time of harvest. Among these treatments, significantly highest soil organic matter content was registered in application of sole poultry manure. Plant nitrogen content, plant leaf area and total yield were registered in application of 50% poultry manure integrated with 50% inorganic fertilizers. Based on this 50% poultry manure integrated with 50% inorganic fertilizer can be suggested to the farmers for the cultivation of okra in sandy regosol.

Keywords: Farmyard manure, Goat manure, Inorganic fertilizer, Poultry manure, Sandy regosol

**Corresponding author: ishankamadhushani98@gmail.com*

FOOD AND NUTRITION

DEVELOPMENT AND QUALITY ASSESSMENT OF JACKFRUIT SEED BASED- PASTA ENRICHED WITH CINNAMON AND MORINGA

J.A. Sonali Ramesha[1*], K.S. Kumararathna[2], A.A. Wijeweera[3] and W.M. Deepika Priyadarshani[4]

[1] *Department of Bio-Systems & Bio-Technology, Faculty of Science, SLTC Research University, Sri Lanka*
[2] *Harischandra Mills PLC, Matara,* Sri Lanka
[3] *National Cinnamon Research and Training Center, Palolpitiya, Thihagoda, Matara, Sri Lanka*

Abstract

Incorporating Cinnamon and Moringa into jackfruit seed flour pasta presents a novel approach to enhancing the nutritional profile and sensory attributes of pasta products. This study aimed to develop and evaluate pasta made from jackfruit seed flour enriched with Cinnamon and Moringa. The pasta was formulated by substituting wheat flour (70%, 60%, 50%, 40% w/w) with Jackfruit seed flour at varying levels (20%, 30%, 40%, 50% w/w) while incorporating standardized quantities of Cinnamon bark powder (8%, 6%, 4%, 2% w/w) and Moringa leaves powder (2%, 4%, 6%, 8% w/w). The sensory properties were assessed by a thirty semi-trained panel using a five-point hedonic scale. The selected pasta formulation with the highest sensory scores was further analyzed for its proximate composition, including ash, fiber, fat, protein, and carbohydrate content. Physio-chemical properties such as pH, color, water activity, and moisture level were also evaluated. All data were analyzed using the method of one-way ANOVA with Tukey's Post-hoc multiple comparison test method. Results indicated that pasta made from 30%(w/w) jackfruit seed flour with added 6%(w/w) cinnamon and 4%(w/w) moringa scored the highest in sensory evaluations, demonstrating superior taste and texture. The proximate analysis revealed that this pasta had a balanced nutritional profile with significant fiber (2.6±0.17) and protein content (1±0.25).

Keywords: Cinnamon, Jackfruit, Moringa, Pasta, physio-chemical properties

*Corresponding author: sonaliramesha98@gmail.com

INSTANT NOODLES CONSUMPTION BEHAVIOR AMONG GENERATION Z IN SRI LANKA

E.M.K.C.S. De Seram[1*], W.A.K.P. Weerasooriya[1], T.R. Nanayakkara[1] and U.B.E. Sasanka[1]

[1]*Department of Agribusiness Management, Faculty of Agricultural Sciences, Sabaragamuwa University of Sri Lanka*

Abstract

The consumption of instant noodles has grown rapidly worldwide, especially among younger generations. In Sri Lanka, youngsters including Generation Z show a notable preference for instant noodles, driven by urbanization, fast-paced lifestyles, and globalization-influenced appetites. However, there is a lack of comprehensive understanding of the specific consumption patterns and decision-making processes of Generation Z regarding instant noodles in Sri Lanka. The aim of this study was to investigate the consumer behaviour of Generation Z in Sri Lanka with regard to instant noodle consumption, focusing on key drivers. The study used mix method approach and online questionnaire survey design to collect cross sectional primary data. Snowball sampling technique was used to contact 256 respondents belong to Generation Z across Sri Lanka. Descriptive statistical methods provided insights into consumption patterns, while thematic analysis identified underlying motivations. The findings revealed that taste (69.5%), convenience (66.8%) and affordability (22.7%) as the primary drivers behind consumption of instant noodles. Notably, responders consume instant noodles as an occasional snack (50%). Although respondents declared that they only consume instant noodles rarely (39.5%) or 2-3 times (37.1%) per month, according to the behaviour data of respondents, it was clearly that the majority (50%) consume at least a packet of instant noodles per week. Additionally, qualitative insights revealed that taste remains as the most critical factor for frequent consumption of instant noodles. In contrast to these data, there was a growing concern about the nutritional value of instant noodles and potential health hazards associated with them. Further many respondents expressed an interest toward healthier alternatives, which consist some characteristics of traditional instant noodles such as taste, convenience and affordability. The study contributes to understanding consumer behaviour among Generation Z and informs strategies for enhancing product development and targeted marketing in the future instant food market.

Keywords: Consumer behaviour, Convenience, Generation Z, Instant Noodles, Sri Lanka

**Corresponding author: chethanasandeepani28@gmail.com*

MEDICINAL PLANTS AND PHYTOCHEMICALS

PHYTOCHEMICAL SCREENING AND ANTIBACTERIAL ACTIVITY OF *Nigella sativa* L. AND *Cuminum cyminium* (IRUSEERAGAM)

V. Varuna[1*], T. Thayalini[2] and K. Velayuthamurty[3]

[1]*Faculty of Graduate Studies, University of Jaffna, Sri Lanka*
[2]*Department of Samooganala Maruthuvam, Faculty of Siddha Medicine, University of Jaffna, Sri Lanka*
[3]*Department of Chemistry, Faculty of Science, University of Jaffna, Sri Lanka*

Abstract

Iruseeragam is a compound drug consisting of *Nigella sativa* L. and *Cuminum cyminium* L. Microbial infections and antibiotic resistance pose significant global health challenges, necessitating the discovery of novel effective, and affordable antimicrobial agents. This study aims to screen the preliminary phytochemicals and antibacterial activity and determine the minimum inhibitory concentration (MIC) of *N. sativa* and *C. cyminium*. Aqueous and methanolic extracts of both plants were screened for phytochemicals and antibacterial activity against *Staphylococcus aureus* (NCTC 6571) and *Pseudomonas aeruginosa* (NCTC 10662) using an agar cut well diffusion method and MIC was determined using an agar dilution method. Alkaloids, tannins, flavonoids, and saponins are present in both extracts of both plants. Additionally, terpenoids are found in both extracts of *C. cyminium* and glycoside is in the methanolic extract. The antibacterial activity revealed that both extracts of both plants showed antibacterial activity against *S. aureus* (Gram-positive) and *P. aeruginosa* (Gram-negative). The mean diameter of zone of inhibition (ZOI) of aqueous extract of *N. sativa* and *C. cyminum* was 13.67±0.58 and 12.67±0.58 mm for *S. aureus* and 14.67±0.58 and 15.67±0.58 mm for *P. aeruginosa* respectively, while methanolic extract of *N. sativa* and *C. cyminum* showed inhibitory activity against *S. aureus* 14.67±0.76 and 16.67±0.58 mm and *P. aeruginosa* 18.50±0.50 and 17.67±0.58 mm respectively. The MIC of methanolic extract of *N. sativa* was 2.5 mg/mL for *S. aureus* and 5 mg/mL for *P. aeruginosa* whereas MIC of methanolic extract *C. cyminum* was 5 mg/mL for both *S. aureus* and *P. aeruginosa*. Moreover, the presence of tannins, saponins, and flavonoids in these plants plays a crucial role in their antibacterial activity. These findings suggest that iruseeragam could be a potential source of novel antimicrobial agents. Further studies are needed to identify and characterize the bioactive compounds responsible for the antibacterial activity in individual plants and compound drug.

Keywords: Antibacterial activity, *C. cyminium*, Minimum inhibitory concentration, *N. sativa*

**Corresponding author: varunav@esn.ac.lk*

AUTHOR INDEX

email: isa2025@esn.ac.lk

URL: https://isa2025.fag.esn.ac.lk

9 786245 731510

Supported by

From the People of Japan

CLIMATE PROMISE

UNDP

AVON PHARMO CHEM

දෙරණ

HEMSONS

BANK OF CEYLON

BOC

Bankers to the Nation