



**ICTRI-2025**

**PROCEEDINGS  
of the**

**2<sup>nd</sup> International Conference on  
Technological Research and Innovation  
2025**

*Unlocking the potential:  
Technovation in shaping tomorrow's world.*

**23<sup>RD</sup> JANUARY 2025**

**Organized by**

**Faculty of Technology, Eastern University, Sri Lanka**

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*“Unlocking the potential: Technovation in shaping  
tomorrow’s world.”*

23<sup>rd</sup> January 2025  
Faculty of Technology  
Eastern University, Sri Lanka

## ABSTRACTS

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## **2<sup>nd</sup> International Conference on Technological Research and Innovation 2025**

Faculty of Technology, Eastern University, Sri Lanka is organized to host its 2<sup>nd</sup> International Conference on Technological Research and Innovation with following thematic tracks, Biosystems Technology, Climate Energy and Environment and Innovative Technology for Entrepreneurship.

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## Message from the Vice Chancellor

*Prof. T. Prabakaran*  
*Acting Vice Chancellor*  
*Eastern University, Sri Lanka*



Dear distinguished guests, esteemed researchers, academic professionals, and students,

It is with great pride and pleasure that I address you at the inaugural session of **ICTRI-2025**, hosted by the Faculty of Technology, Eastern University, Sri Lanka.

Research is the cornerstone of discovery, providing insights that advance knowledge, solve problems, and create new opportunities. The theme of ICTRI-2025, “**Unlock the Potential: Technovation in Shaping Tomorrow's World,**” embodies a vision of innovation, collaboration, and sustainable progress that will define the future.

This conference serves as a vital platform where multidisciplinary ideas converge to address pressing global challenges. The four tracks—**Autonomation in Agriculture (Robotics, AI, IoTs), Biosystems Technology, Climate, Energy, and Environmental Technology, and Innovative Technology for Entrepreneurship**—highlight the transformative role of technology in revolutionizing industries, securing food systems, combating climate change, and fostering economic growth.

I am confident that the vibrant discussions, innovative ideas, and collaborative efforts during this event will set new benchmarks in research and practical applications. Let us embrace this opportunity to learn, share, and contribute to building a world where technology serves as a force for global development.

As we embark on this journey, I encourage each of you to approach these themes with creativity, curiosity, and a shared commitment to sustainability. Your contributions and active participation will undoubtedly shape the success of ICTRI-2025 and leave a lasting impact.

I extend my heartfelt gratitude to the Dean and the organizing committee for their tireless efforts in making this event possible. May ICTRI-2025 inspire collaboration and innovation that transcends boundaries and drives meaningful change.

Thank you, and I look forward to the impactful outcomes of your endeavors.



## Message from the Chairperson

*Prof. T. Mathiventhan*  
*Dean, Faculty of Technology*  
*Eastern University, Sri Lanka*



I am delighted to write this message for the Second International Conference on Technological Research and Innovation – 2025 (ICTRI 2025) under the theme of “Unlocking the potential: Technovation in shaping tomorrow’s world”. The theme will be an appropriate one for today’s world that expecting technological innovations in various fields such as agriculture, environment, medicine, engineering, and many more to shape up the world. I am confident that the technology will take the lead roles in any fields in near future, where AI is one of the very good example.

This ICTRI 2025 is a great platform for researchers, educators, students, and industries to exchange latest innovative research experiences/outputs, recent development, and trends in the field of technological innovation. Exchanging technological ideas, innovation and transformation generates much interest among scholars, practitioners, and policymakers as a critical instrument for achieving sustainable development goals (SDGs).

We received more than 45 research articles internationally and nationally under four tracks, Automation in Agriculture: Automation, AI and IOTs; Biosystems Technology; Climate, Energy and Environmental Technology; and Innovative Technology for Entrepreneurship. The research articles undergone rigorous review with number of experts in the relevant fields.

The Faculty of Technology first time plan to publish a referred journal “Journal of Techno Science (JTS),” which is a biannual publication. The selected research articles from the ICTRI 2025 will be published in this journal. I take this opportunity to welcome research articles for our JTS.

I hope that the ICTRI 2025 offers a great opportunity to bring researchers, scientists, engineers, and academicians together at regional, national, and international level to share their knowledge and innovative ideas.

I take this opportunity to congratulate all the faculty members who extended their fullest supports to become this event into reality. I wish the second ICTRI-2025 a grand success.



## Message from the Coordinator

*Dr. (Mrs.) Vanitha Prasannath*  
*Coordinator*  
*2nd ICTRI2025 - Faculty of Technology, EUSL*



It gives me immense pleasure to welcome you all to the 2nd International Conference on Technological Research and Innovation. This year, we gather under the captivating theme, “Unlock the Potential: Technovation in Shaping Tomorrow's World”, a call to harness the transformative power of technology for a sustainable and prosperous future.

This conference provides a unique platform to exchange ideas, showcase innovations, and forge partnerships across four key tracks:

- **Autonomation in Agriculture** – where Robotics, Artificial Intelligence, and IoT converge to revolutionize agricultural practices, ensuring sustainability and efficiency.
- **Biosystems Technology** – exploring advances in Crop Science, Food Science, and Technology to address global food security and health challenges.
- **Climate, Energy, and Environmental Technology** – presenting groundbreaking solutions to combat climate change and foster renewable energy innovations.
- **Innovative Technology for Entrepreneurship** – inspiring entrepreneurial minds to leverage technological advancements and create impactful ventures.

As conference coordinator, I am privileged to witness the wealth of knowledge and expertise you all bring to this gathering. This event is more than a forum: it is a space for collaboration, where the brightest minds unite to explore new horizons and create meaningful contributions to society.

I extend my heartfelt gratitude to our Vice-Chancellor, Dean, Faculty of Technology, organizing committee members, and collaborators for their unwavering support in making this conference a reality. A special thank you to all speakers, presenters and participants for your dedication and enthusiasm in advancing technological research and innovation.

Let us embrace this opportunity to learn, share, and inspire each other as we embark on a journey to shape tomorrow's world through technovation. I encourage you all to engage actively in the sessions, connect with peers, and make the most of this vibrant academic exchange.

Wishing you all a fruitful and inspiring conference!

Thank you.

## Message from the Secretary

*Mrs. Vassanthini Reshanth*  
*Secretary,*  
*2nd ICTRI2025 - Faculty of Technology, EUSL*



With great pleasure, I pen this message to welcome you to the 2nd International Conference on Technological Research and Innovation-2025 (ICTRI-2025), organized by the Faculty of Technology, Eastern University, Sri Lanka, under the theme "Unlocking the Potential: Technovation in Shaping Tomorrow's World."

The main objective of ICTRI-2025 is to bring together academics, researchers, and professionals from diverse fields to address emerging challenges and explore innovative solutions that unlock potential and shape a sustainable future across various domains, including agriculture, industry, and technology.

I sincerely appreciate and thank the Vice Chancellor of Eastern University, Sri Lanka, and the Dean of the Faculty of Technology for their unwavering support in making this event a success. I am deeply grateful to our distinguished keynote speaker, the guest of honour, the panel of reviewers, session chairpersons, and panel members for dedicating their valuable time and expertise to this conference.

I also extend my heartfelt gratitude to the staff and students of the Faculty of Technology for their hard work and dedication, often going above and beyond, to ensure the success of this event.

On behalf of the Faculty of Technology, Eastern University, Sri Lanka, I warmly welcome and thank all invitees, authors, participants, and well-wishers for being a part of ICTRI-2025.

The organizing committee is confident that your time at this symposium will be productive and enriching. We hope that ICTRI-2025 will provide opportunities to gain new knowledge, exchange innovative ideas, and pave the way toward a sustainable future.

Wishing you a fruitful and pleasant experience at ICTRI-2025!

## Message from the Editor

*Dr. A.L. Mohamed Rifky*  
*Editor,*  
*2nd ICTRI2025 - Faculty of Technology, EUSL*

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Dear authors, reviewers, and readers.....!

It gives me great pleasure to wish you all the best to the researcher, from the proceedings of the second International Conference of our faculty. I believe that these findings will support the research communities for further research and identify the gaps to go further in their future research projects.

I am honored and grateful to be a member of this peer-reviewed research proceedings, and we are working as a highly effective team to guarantee that it remains a reliable source in the relevant field of technology.

The innovative times of 2025 have demonstrated the importance and necessity of variety, and we are happy to present diverse research findings in our proceedings.

As an editor, I don't believe in rushing into shortcuts that may increase the reach of content. Instead, we should look for better articles that address fresh ideas and research paths, original articles that can pique the readership's attention, and information that academics will not want to miss, and our published papers are no exception.

I am extremely excited to be embarking on this very important role and wish to express my gratitude to the leadership and the selection committee of the ICTRI – 2025 and our editorial board members for their great support, and I would like to thank all the anonymous reviewers and contributors for their timely effort, and I would also be extending my thanks to all the academic and non-academic staffs for their valuable support.

Wishing you all a wonderful and inspiring conference!

Thank you.

## Abstract of the Guest of Honor Note

*Senior Prof. Buddhi Marambe*  
*Department of Crop Science, Faculty of Agriculture,*  
*University of Peradeniya.*



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### Smart Farming: Revolutionizing Agriculture in Sri Lanka

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Agriculture provides essential needs and nutrition to people, a crucial component of an economy. Sri Lanka is not an exception. Research on agriculture began with the idea that local systems are interconnected. Thus, it is crucial to consider farmers, crops, and farm animals as an integral part of the system. New advancements in technology, ranging from micro devices to macro networks, have completely transformed modern global agriculture in a productive way. Innovative agriculture techniques no longer depend on the application of inputs such as water, nutrients and crop protection substances equally to all fields<sup>1</sup>. The agricultural systems have undergone a revolution over decades through advancements in innovation and science. The data revolution is a reality in agriculture. Through the use of automation systems in different exercises, information technology has expanded the potential of the agricultural sector.

“Smart farming”, using modern information communication technology (ICT) and data analytics in agriculture, emerged as people progressively digitized farming with new information technology, to innovate and commercialize agricultural products and solutions. The transformative potential of smart farming in addressing the complex challenges that our world faces today cannot be underestimated. Digital agriculture is crucial in the efforts to feed a growing global population while safeguarding natural resources and ecosystems. It helps to empower farmers to make informed decisions, optimize resource use and enhance productivity. Through smart farming, practitioners can better adapt to the uncertainties brought by climate change, mitigate environmental impacts and promote resilience in agricultural production. It not only ensures food security but also contributes to a healthier planet.

Smart farming and precision agriculture leverage technologies like agricultural drones, robotics, Internet of Things (IoT) sensors, geographic positioning systems (GPS) and farm management information systems to improve production efficiency. It will optimize and increase the efficiency of food production – improving sustainability and therefore supporting biodiversity and planetary renewal – and help eliminate food waste. Smart farming offers a global vision of modern agriculture built around advanced technologies, such as agricultural

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<sup>1</sup> [https://www.cbsl.gov.lk/sites/default/files/cbslweb\\_documents/publications/annual\\_report/2019/en/13\\_Box\\_04.pdf](https://www.cbsl.gov.lk/sites/default/files/cbslweb_documents/publications/annual_report/2019/en/13_Box_04.pdf)

drones, robotics and IoT sensors<sup>2</sup>. It connects the entire food value chain seamlessly, linking systems through standardized data formats. Smart farming is data-driven, efficient and sustainable digital agriculture. It transforms traditional agricultural practices into data-driven, efficient and sustainable systems that address current challenges while laying the groundwork for a more secure and prosperous future in agriculture.

Heightened connectivity unlocks the potential of precision practices such as variable-rate fertilizer application, soil monitoring, yield mapping, and farm-animal monitoring. Innovative technologies collect data about crops, farm animals, soil conditions, weather patterns, etc. Analyzing such data helps farmers make informed decisions, leading to more efficient use of resources such as water, fertilizers, and crop and animal protection agents. This efficiency maximizes output while minimizing waste. The Smart Agriculture market is expected to reach US\$ 23.38 billion by 2029, up from US\$ 14.4 billion in 2024, at a CAGR of 10.2% from 2024 to 2029<sup>3</sup>.

Present-day farming has become data-driven, enabling timely, cost-effective, and ecologically sustainable farm management. Thus, developing countries such as Sri Lanka, with the agriculture sector as a key economic driver, should quickly transition their agriculture systems to data-driven systems. Developing nations lack the infrastructure for precision farming, and hence, a methodological paradigm is needed to connect ground sensors to compute nodes cost-effectively, considering data processing limits and constraints.

Precision farming will hold the largest market share in smart agriculture, being considered the most likely promotion for increasing productivity and reducing waste in resources as well as increasing the overall efficiency of farm management. Precision farm equipment, fleet management, and data analytics are increasingly used to realize the full promise of smart farming. With a commitment to robust data standards, smart farming can leverage technology to build sustainable food systems. Thus, smart farming is a powerful tool in the collective efforts to transform food systems and build a world where no one goes hungry and where agriculture contributes to a more resilient and sustainable future.

Natural disasters, erratic rainfall, poor genetic material, and weak management practices lower crop and farm-animal yields. Farmers, the primary producers, face significant challenges due to soil erosion, biodiversity loss, and increased food demand. They often give up and accept less than they deserve when faced with difficulties of this nature. Farmers must adopt novel technological platforms to keep constant tabs on their crops and animals leading to food production.

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<sup>2</sup> Chamara R.M.S.R., Senevirathne S.M.P., Samarasinghe S.A.I.L.N., Premasiri M.W.R.C., Sandaruwani K.H.C., Dissanayake D.M.N.N., De Silva S.H.N.P., Ariyaratne W.M.T.P. and Marambe B. (2020): Role of artificial intelligence in achieving global food security: a promising technology for future. Sri Lanka Journal of Food and Agriculture, 6(2), pp.43–70. DOI: <http://doi.org/10.4038/slifa.v6i2.88>

<sup>3</sup> [https://www.marketsandmarkets.com/PressReleases/smart-agriculture.asp?qad\\_source=1&qclid=Cj0KCQiAy8K8BhCZARIsAKJ8sfRdhr6vlijvt0fWZi8bQiHqHNblcluogcCvzCI5KWO4FPc5xPtklaAiDzEALw\\_wcB](https://www.marketsandmarkets.com/PressReleases/smart-agriculture.asp?qad_source=1&qclid=Cj0KCQiAy8K8BhCZARIsAKJ8sfRdhr6vlijvt0fWZi8bQiHqHNblcluogcCvzCI5KWO4FPc5xPtklaAiDzEALw_wcB)

New technological transformation is essential for Sri Lanka's agriculture to reach its anticipated heights<sup>4</sup>. It would largely invoke the countries' food sector, which is embattled with many challenges and constraints, such as lower productivity, downgraded product quality and disastrous impacts of climate change.

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<sup>4</sup> Chamara R.M.S.R., Senevirathne S.M.P., Samarasinghe S.A.I.L.N., Premasiri M.W.R.C., Sandaruwani K.H.C., Dissanayake D.M.N.N., De Silva S.H.N.P., Ariyaratne W.M.T.P. and Marambe B. (2020): Role of artificial intelligence in achieving global food security: a promising technology for future. Sri Lanka Journal of Food and Agriculture, 6(2), pp.43–70. DOI: <http://doi.org/10.4038/sljfa.v6i2.88>

## Abstract of the keynote

*Dr. Rajendra Adhikari,  
Senior Lecturer at the University of Queensland,  
Australia*



---

### **Keynote Speech: Unlock the Potential: Technovation in Shaping Tomorrow's World**

**Good morning, innovators and future leaders—the agents of societal transformation.**

First and foremost, I would like to express my sincere gratitude to the organisers for inviting me to this conference on a truly transformative topic: unlocking the potential of technovation to shape tomorrow's world.

This topic is particularly crucial for developing countries and the agrifood industry, which face unique challenges and opportunities. The seamless integration of technology and innovation is not merely a hallmark of the present or a vision of the future—it is the key to addressing the pressing challenges of our time, spanning the past, present, and future.

Imagine the world 25 years from now, when most of today's graduates will be in leadership roles, making decisions for themselves and future generations. Yet, we cannot be certain how the future will unfold next year, let alone in the distant future. One reason for this uncertainty is the rapid yet non-linear pace of technological innovation. In this age, the future is no longer a simple extension of the past or present.

Today's critical question, therefore, is: *How can we shape a future we cannot yet imagine?* In my view, we can prepare ourselves for the challenges and opportunities of the future by redefining how we comprehend the right questions, communicate with right mindset, collaborate with right people, and channel the energy and resources sustainably.

What we dream today shapes our actions, and those actions will impact billions of lives in the future. Thus, preparing for this unknown and uncertain future is essential to unlocking our potential.

Building on today's theme, I will structure my message in two parts: **Unlocking the Potential and Shaping the Future**, followed by stories that illustrate these ideas within the broader context of agrifood innovation systems in developing countries.

#### **Unlocking the Potential: Key Ingredients**

The first key ingredient in unlocking potential is **innovation**, which I will discuss in greater detail shortly.

The second key ingredient is **collaboration**. Innovators must learn to collaborate and co-innovate with policymakers to create enabling environments, with private sectors, including farmers, to scale up innovations, and with consumers to scale them out.

**Co-innovation** is particularly vital in the agrifood sector, where opportunities and challenges are increasingly complex and wicked. Co-innovation fosters multidisciplinary or interdisciplinary perspectives. Examples are abundant that highlight co-innovation in agrifood value chains is rewarding.



## **Co-Innovation: Shaping the Future**

While the uncertainty of the future can be daunting, the power of human creativity is unparalleled. To witness this, we need look no further than technovation.

When I use the term "innovation," I do so generically because innovation extends beyond technology. To fully realise the potential of technovation, we must embrace other forms of innovation as well. Unlocking potential requires an innovative mindset.

As Kahn suggests, innovation is an **outcome**, a **process**, and—most importantly—a **mindset**. This mindset can be cultivated at all levels: individual, family, organisational, community, and citizenship. It is the foundation of innovation as a process and an outcome.

While an innovative mindset is essential, the process of innovation is equally critical. We must ask ourselves: *Do we have the processes, frameworks, ecosystems, and cultures in place to foster innovation?*

To illustrate, I will share some stories of everyday innovators—the farmers from our part of the world. Farmers, whether men or women, young or old, rural or peri-urban, face numerous adversities. Yet, they are among the greatest innovators. We must learn from them, support them, and empower them to unlock the potential of technovation in the agrifood industry, which is essential for economic, environmental, and societal well-being. <Innovation Stories>

## **Reflections on the Future**

The future is not merely a point in time ahead of us; it is also a reflection of our hopes, fears, desires, and dreams. If we draw inspiration from the stories of farmers, the generational innovators, doors to new opportunities are wide open.

How do we approach the future? There is no single answer but depends on what strategic posture of Courtney et al. we take:

- Should we **shape** the future? That depends on our capacities and resources.
- Should we **adapt** to the future? That depends on our agility, speed, and flexibility in recognizing opportunities.
- Should we **prepare** for the future? That depends on our ability to discern whether what lies ahead is a challenge or an opportunity—perspectives that often depend on our innovative mindset.

The guiding principle is simple: **Innovative mindset must be directed toward achieving societal outcomes.**

## **To conclude,**

Let us seize this moment to act for a future brimming with immense potential and opportunity. Farmers, agribusinesses, educators, researchers, policymakers, and communities—east and west, north and south—must unite to unlock the transformative potential of human creativity and its outcomes, including technovation.

The process of co-innovation can foster a future of positive change and sustainability for generations to come. The mindset is ours to shape, and with it, we can champion innovation.

## **Thank you**

# **Biosystems Technology**

## Prevalence of Bovine Mastitis and Antibiotic Susceptibility Patterns of Bacterial Isolates in Jaffna District

Croos, A.N.R, Piratheepan, S, Kalaivizhi, V\*

\*Department of Animal Science, Faculty of Agriculture, University of Jaffna.

### Abstract

Mastitis is one of the most prevalent and economically significant diseases affecting dairy animals, primarily caused by bacterial infections. This condition not only reduces milk production but also leads to increased veterinary expenses and, in severe cases, the culling of affected animals. The current study aimed to determine the prevalence of mastitis in cattle in the Jaffna district and to evaluate the antibiotic susceptibility of the isolated bacterial pathogens. From April to September, 200 milk samples were collected from cattle at the veterinary range in Jaffna and screened using the California Mastitis Test (CMT). Milk samples testing positive were cultured on Nutrient Agar and MacConkey Agar media, and the bacterial species were identified through biochemical testing. The isolated pathogens were further subjected to antibiotic susceptibility testing using eight commonly employed antibiotics such as, enrofloxacin, doxycycline, cephalexin, ciprofloxacin, trimethoprim-sulfamethoxazole, gentamicin, erythromycin, and oxytetracycline. Of the 200 milk samples analyzed, 10% tested positive for mastitis. *Staphylococcus aureus* was the most frequently isolated pathogen, accounting for 50% of the cases, followed by *Streptococcus agalactiae*, *Escherichia coli*, and *Klebsiella* spp. Antibiotic susceptibility testing revealed that, enrofloxacin, doxycycline, cephalexin, and ciprofloxacin were the most effective antibiotics. In contrast, trimethoprim-sulfamethoxazole, gentamicin, erythromycin, and oxytetracycline showed lower efficacy. These findings suggest that enrofloxacin and doxycycline should be prioritized for mastitis treatment in buffaloes in the Jaffna region. This study highlights the need for ongoing monitoring and localized antibiogram assessments to guide effective treatment and mitigate the growing problem of antibiotic resistance in livestock management.

**Keywords:** Antibiogram, Antibiotic susceptibility, California Mastitis Test, Mastitis, *Staphylococcus aureus*

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## Development of Peanut Milk Drinking Yoghurt Incorporated with Flower of Hibiscus (*Hibiscus rosa sinensis* L.) Syrup

Nithusha, K\*, Thanusan, S, Vaishnavi, S, Rajeetha, J and Sukirtha, S

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### Abstract

Nowadays there are increasing concerns about lactose intolerance in cow milk, people are willing to use other alternative plant-based milk for new product preparation. Peanut milk is one of them and can be used instead of cow milk. Therefore, this study was conducted to develop drinking yoghurt from hibiscus flower syrup and peanut milk and to evaluate physicochemical and sensorial properties. The peanut milk drinking yoghurt incorporated with the flower of hibiscus (*Hibiscus rosa sinensis* L.) syrup samples were prepared with different ratios (3%, 5% and 24%). It was compared with yoghurt developed from 100% cow milk as a control sample. Sensory analysis (colour, texture, Aroma, taste and overall acceptability) was done by 30 untrained panelists using a 5-point hedonic scale. Based on the sensory result 5% hibiscus syrup incorporated drinking yoghurt was selected. Proximate analysis of selected peanut milk drinking yoghurt incorporated with the flower of hibiscus (*Hibiscus rosa sinensis* L.) syrup revealed that moisture, protein, fat, fibre, carbohydrate and ash with the percentage of  $81.25 \pm 1.68$ ,  $6.89 \pm 0.27$ ,  $4.43 \pm 1.76$ ,  $2.34 \pm 0.01$ ,  $4.83 \pm 0.001$  and  $0.2 \pm 0.813$  respectively. Total soluble solids, pH and titratable acidity were  $9.01 \pm 0.01$ ,  $4.59 \pm 0.01$  and  $0.80 \pm 0.01\%$  respectively. The antioxidant or radical scavenging activity of hibiscus (*Hibiscus rosa sinensis* L.) is  $73.46 \pm 4.67\%$ . Peanut milk drinking yoghurt incorporated with flower of Hibiscus (*Hibiscus rosasinensis* L.) syrup can be developed and 5% of hibiscus syrup incorporated drinking yoghurt was acceptable by sensory test. Peanut milk drinking yoghurt incorporated with flower of Hibiscus (*Hibiscus rosa-sinensis* L.) syrup had high level of Protein, fat, fibre and carbohydrate than cow milk drinking yoghurt.

**Keywords:** Antioxidant activity, *Hibiscus rosa sinensis* L., Lactose free, Nutrition content, Peanut milk drinking yoghurt.

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## The Effect of Mexican Mint (*Coleus amboinicus*) Extract on *Albugo candida* (White Blister Fungus)

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### Abstract

This study investigates the antifungal efficacy of Mexican mint (*Coleus amboinicus*) extract against *Albugo candida*, the pathogen responsible for white blister disease in vegetables mainly in broccoli, using the disk diffusion method. The research was motivated by the need for sustainable and eco-friendly alternatives to synthetic fungicides, which pose environmental and health risks and contribute to fungicide-resistant strains. The Mexican mint extract was tested at concentrations of 100% (T1), 75% (T2), 50% (T3), and 25% (T4), with distilled water as the negative control (T5) and fluconazole as the positive control (T6). The experiment was laid out according to a Completely Randomized Design consisting of six treatments with three replicates. The results revealed significant antifungal activity at higher concentrations of the extract. The 100% extract (T1) exhibited the highest inhibition zone diameter of  $2.1667 \pm 0.0667$  mm, followed by the 75% extract (T2) with an inhibition zone of  $1.4667 \pm 0.0333$  mm. Lower concentrations (T3 and T4) did not produce measurable inhibition zones. The Minimum Inhibitory Concentration (MIC) was determined to be at the 75% concentration level, effectively inhibiting fungal growth. The positive control (T6) showed the highest efficacy with an inhibition zone diameter of  $4.0000 \pm 0.0577$  mm, confirming its superior antifungal activity compared to the Mexican mint extract. Then the effective duration of the positive control (fluconazole) against *A. candida* was four days. The maximum effective duration of the Mexican mint extract against *A. candida* was two days with treatment provided at a higher concentration (T1). The study concludes that Mexican mint extract demonstrates significant antifungal properties against *A. candida*, particularly at higher concentrations, making it a promising natural alternative to synthetic fungicides. This research underscores the potential of Mexican mint extract as a sustainable and eco-friendly solution for managing white blister fungus in agricultural practices.

**Keywords:** Antifungal efficacy, Inhibition zone, Mexican mint, White rust disease.

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## Development of Coconut Milk-Based Ice Cream Incorporated with Soursop (*Annona muricata*. L) Fruit Puree

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### Abstract

Ice cream is a frozen dessert made from dairy products, such as cream or milk, combined with sugar, flavourings, and other ingredients. Coconut milk has nutritional benefits and is a superior source of several components of nutrients. Soursop (*Annona muricata*) is an underutilized fruit crop in some countries like Sri Lanka. This study aimed to develop coconut milk-based ice cream incorporating soursop fruit puree, an innovative approach aiming to provide a lactose-free alternative with potential health benefits from soursop. This study was carried out on coconut milk-based ice cream with varying levels of soursop fruit puree to enhance its nutritional and sensory attributes. Soursop puree was added at five different levels such as 10% (T<sub>1</sub>), 20% (T<sub>2</sub>), 30% (T<sub>3</sub>), 40% (T<sub>4</sub>), and 50% (T<sub>5</sub>). The developed fresh ice cream products were analyzed for physico-chemical characteristics including moisture, ash, fibre, protein, fat, pH, total soluble solids (TSS), overrun, meltability rate and organoleptic characteristics such as colour, texture, flavour, taste, mouthfeel, overall acceptability. The compositional analysis revealed that while the proportion of soursop puree increased from 10 to 50%, the moisture (60.33 to 69.67%), ash (0.45 to 0.73%), fibre (2.79 to 4.26%), protein (4.01 to 4.81%), fat (8.97 to 9.31%), total soluble solids (47.73 to 52.56%) and meltability rate (1.67 to 3.93%) were significantly ( $p < 0.05$ ) increased among the treatments. Conversely, pH and overrun were decreased significantly ( $p < 0.05$ ) from 7.23 to 6.90 and 75.67 to 61.0%, respectively. The sensory assessment demonstrated that there were significant differences ( $p < 0.05$ ) among the treatments. The formulation containing 40% soursop puree (T<sub>4</sub>) achieved the highest acceptability scores in terms of colour, texture, flavour, taste, mouthfeel and overall acceptability. The study concluded that the T<sub>4</sub> formulation, with 40% soursop puree, offers the best balance of nutritional and sensory qualities, making it a promising option for coconut milk-based ice cream production.

**Keywords:** Coconut milk, Ice cream, Physico-chemical characters, Sensory attributes, Soursop

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## Shoot and Root Performances of Vegetable Cowpea, Variety BS-1 in Response to Application of Municipal Sewage Sludge with Phosphorous and Potassium Chemical Fertilizers

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### Abstract

Vegetable cowpea (*Vigna unguiculata* L. Walp) is a leguminous crop requiring essential nutrients for optimal growth. An experiment in polybags examined the effects of municipal sewage sludge combined with phosphorus (P) and potassium (K) fertilizers on the growth of vegetable cowpea. It was laid out in a completely randomized design with eight treatments such as. no fertilizer (T1), full dosage of N, P, K chemical fertilizers (T2) and 10 t/ha or 20 t/ha sewage sludge without (T3 and T4) or with half (T5 and T6) or full dosage (T7 and T8) of P and K chemical fertilizers. Plant height, number of trifoliolate leaves per plant, number of leaves per plant, and dry weights of shoot and root per plant were measured. Data were analyzed with treatment means compared via Tukey's test at  $P=0.05$ . The varying rates of sewage sludge with P and K fertilizers significantly ( $P<0.05$ ) affected the number of trifoliolate leaves and number of leaves per plant in vegetable cowpea at 2nd, 4th, and 6th weeks after planting. At 9 weeks after planting, dry weights of shoot and root per plant varied significantly ( $P<0.01$ ) across treatments, with the highest recorded in 10 t/ha sewage sludge combined with half-dosage of P and K chemical fertilizers ( $13.78 \pm 0.82$  g and  $3.16 \pm 0.77$  g in T5). Application of 10 t/ha sewage sludge with half-dose P and K fertilizers significantly ( $P<0.05$ ) increased shoot and root biomass of vegetable cowpea compared to no fertilizer and full-dosage of N, P, and K chemical fertilizers. Plants with 10 t/ha sewage sludge and half-dose P and K chemical fertilizers produced high crop residues as leguminous crop biomass, useful for crop cultivation.

Keywords: Crop residue, inorganic fertilizer, organic fertilizer, Dry matter yield

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## **Sensory and Physico-Chemical Properties of Biscuits Developed from Wheat, Finger Millet and Jackfruit Seed Composite Flour**

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### **Abstract**

Cereal based ready-to-eat snack foods including biscuits, cookies, energy bars and shortbread have become very popular globally during the past few decades. Biscuits have several appealing qualities, including widespread consumption, digestibility, a longer shelf life and improved eating quality. Moreover, composite flours are ideal for making high quality, nutritionally enriched biscuits. Therefore, this study investigated the physico-chemical and sensory properties of innovative biscuits produced from blends of wheat and finger millet flours in different proportions of 100:00 (control), 80:10, 70:20, 60:30, 50:40 and 40:50 enriched with 10g of jackfruit seed powder. The prepared biscuits were subjected to physico-chemical analysis such as moisture, fat, total sugar, diameter and volume to assess the suitability of these biscuits for consumption. Sensory parameters such as appearance, taste, aroma, texture and overall acceptability of the formulated biscuits were assessed on a 7-point hedonic scale with 30 semi-trained panelists. The results showed that the moisture, fat and total sugar contents decreased from 4.08 to 3.11%, 9.40 to 5.85%, 8.34 to 6.05% whereas the diameter and volume were expanded from 4.93 to 5.06 cm and 8.27 to 9.97 cm<sup>3</sup>, respectively as the composite finger millet flour content increased. The study revealed that substitution of wheat flour with finger millet and jackfruit seed flour at a ratio of 60:30:10 yielded the most acceptable biscuits based on the physico-chemical and sensory characteristics. This implies that biscuits produced from this composite blend contain sufficient amounts of nutrients hence they can serve as relief for malnutrition globally.

**Keywords:** Biscuit, Composite flour, Finger millet, Jack fruit seeds, Wheat

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## First Report of Anthracnose, Caused by *Colletotrichum gloeosporioides* on *Hydrangea macrophylla* Leaves in Sri Lanka

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### Abstract

The present study aimed to isolate and identify the pathogen, causes anthracnose in *Hydrangea macrophylla* leaves, in the central part of Sri Lanka. The pathogen from diseased leaf samples (n=20) of *Hydrangea macrophylla* was isolated in pure culture on Potato Dextrose Agar (PDA) and the identification was carried out from the colony and conidial morphology initially. The upper surface of the colony was white to pale grey and the lower surface with concentric pale grey to orange rings and the growth rate was 8.7mm/day. The conidia were long and cylindrical with slightly tapered ends and the mean length and width were 11.85µm and 2.11µm respectively. The DNA of seven isolates were extracted by the modified protocol of the Promega DNA extraction kit and was amplified by PCR using specific primers, targeting the gene regions, namely ITS, actin and histone. The PCR products were sequenced and compared with the other related sequences in GenBank (NCBI). Thus, the pathogen was identified as *Colletotrichum gloeosporioides* and Koch's postulation was performed to confirm its pathogenicity. Symptom initiation appeared 6 days after inoculation and the pathogen was re-isolated and identified as *C. gloeosporioides*, as described previously. This is the first report of anthracnose on *H. macrophylla* caused by *C. gloeosporioides* in Sri Lanka.

**Keywords:** Anthracnose, *Colletotrichum gloeosporioides*, Ornamental plants

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## Study on Different Fruit Peel on the Growth Performance and Flowering of Local Rose Varieties

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### Abstract

Rose is a popular cut flower and mainly cultivated for the export market. A pot experiment was carried out to evaluate the effect of application of banana, orange and pomegranate fruit peel powder on the growth and flowering of 'Local' rose variety. The experiment was arranged in a Completely Randomized Design with eight treatments having four replicates. Treatments were, recommended inorganic fertilizer application at basal and topdressing (T1,Control), half dose of recommended inorganic fertilizer application at basal and topdressing times with 9g of pomegranate peel powder (T2),9g of orange peel powder (T3), 9g of banana peel powder (T4), 4.5g each of pomegranate and banana peel powder (T5), 4.5g each of orange and banana peel powder (T6), 4.5g each of orange and pomegranate peel powder (T7) and 3g of each of orange, pomegranate and banana peel powder (T8). The results showed that there were significant differences ( $p < 0.05$ ) among the tested parameters. Half dose of recommended inorganic fertilizer with 3g of each of orange, pomegranate and banana peel powder (T8) increased the plant height (26.82 cm),number of leaves (23.00), number of branches (3.25), average length of shoots(11.13), leaf area(11.50 cm<sup>2</sup>) and plant biomass(13.19g) while the lowest performance was observed in plant grown with half dose of recommended inorganic fertilizer application at basal and topdressing times with 9g of pomegranate peel powder (T2). Therefore, it could be concluded that the half dose of recommended inorganic fertilizer application at basal and topdressing times with 3g each of orange, pomegranate and banana peel powders can be used to enhance the growth and flowering of Rose.

**Keywords:** Plant height, Plant biomass, Banana peel powder, Orange peel powder, Pomegranate peel powder

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## **Growth and Yield Performance of Spinach (*Spinacia oleracea* L.) Fertilized with Vermi-Compost and Rice Husk Charcoal**

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### **Abstract**

Combined applications of organic and inorganic fertilizers improve soil fertility, productivity and reduce the impact of inorganic fertilizers on the environment. A study was conducted to evaluate effectiveness of organic (Vermicompost – Rice husk and charcoal mixture) and inorganic fertilizer combinations on growth and yield of spinach. The study was designed with five treatments and four replicates. Treatments are T1- Control, Recommended amount of inorganic fertilizer by Department of Agriculture (RDOA), T2 -1/4 amount of RDOA + vermicompost- charcoal mixture, T3 - 1/2 amount of RDOA + vermicompost- charcoal mixture, T4 - 3/4 amount of RDOA + vermicompost- charcoal mixture, T5 - vermicompost-charcoal mixture. All other agronomic practices were followed based on DOA recommendations. Plant height, number of leaves, leaf area were measured in weekly intervals. Plant fresh weight and oven dry weight of cutting were measured at the time of harvesting (6 Weeks after planting). The highest average plant height, number of leaves per plant, leaf area, fresh and oven dry weight of plant cutting were observed in spinach plants fertilized with combination of 3/4 of RDOA and vermicompost – rice husk charcoal mixture. The lowest value was observed when vermicompost - rice husk charcoal mixture applied alone. Results suggested that vermicompost - rice husk charcoal mixture combined with inorganic fertilizer enhances growth and yield performance of spinach (*Spinacia oleracea* L.) in sandy regosol. Usage of vermicompost -rice husk charcoal mixture combined with inorganic fertilizer in leafy vegetable cultivation would be a way to minimize the fertilizer requirements and cost of production.

**Keywords:** Charcoal mixture, Rice husk, Spinach, Vermicompost, Yield

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## Effectiveness of a Control Package for Weedy Rice (*Oryza sativa f. spontanea*) in the Batticaloa District

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### Abstract

Rice, a staple food in Sri Lanka, is grown on about 40% of its agricultural land. Weedy rice, introduced mainly through contaminated paddy seeds, is a major issue, particularly for Batticaloa farmers. This study was done to evaluate the effectiveness of a weedy rice control package, incorporating special practices such as non-selective weedicide application, deep ploughing, and applying Sofit 2-3 days post-broadcasting. The developed control package (Treatment 1) and a usual package (Treatment 2) were tested at eight locations such as Mandoor, Aayithiyamalai, Nellikadu-Vellaveli, Thaanthamalai, Kadukamunai, Nediyaadu, Paavarkodichenai-Mandapathadi, and Arasaditheevu during 1<sup>st</sup> season. At the end of the Yala season, samples from three 1 m × 1 m plots per site were analysed for number, height, and dry weight of weedy rice. The t-test was used to analyse the data. Results showed significant reductions in weedy rice across treated plots. In Nellikadu, the most affected area, the control package reduced weedy rice density by 61.97% and dry weight by 58% compared to the control. The tallest plants in untreated plots were in Nediyaadu, where height was reduced by 33% with treatment 1. Areas such as Nediyaadu, Arasaditheevu, and Kadukamunai had lower weedy rice populations without a control package. However, preventing seed contamination from heavily infested areas is crucial to maintaining this status. The study highlights that special management strategies like non-selective weedicide application, deep ploughing, and applying Sofit 2-3 days post-broadcasting offer Batticaloa farmers effective tools for reducing weedy rice, improving yields, and promoting sustainable rice cultivation.

**Keywords:** Control Package, Rice, Usual package, Weedy Rice

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## Determination of Variation of Days to Flowering among Selected Sri Lankan Traditional Rice Accessions During 'Yala' Season 2024 in Batticaloa

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### Abstract

Screening rice varieties with desirable plant architectural traits is a crucial step in successful rice breeding. The main objective of this research was to determine variation of agronomic traits at the vegetative stage and time of flowering in selected Sri Lankan traditional rice accessions during the *Yala* season 2024 AT Faculty of Technology, Eastern University of Sri Lanka, Batticaloa, Sri Lanka. Two weeks old rice seedlings of accessions 4132, 5530, 4387, 4237, 4290, 4145, 4772, 4731, and 6412 and a new improved variety Bg 300 were planted in Completely Randomize Design with five replicates. In this pot experiment, homogeneity in conditions such as soil type and irrigation were ensured. Days to fifth leaf (DFL), Plant Height (PH), Number of leaves per plant (NL), Flag leaf length (FLL), Flag leaf width (FLW) and Number of culm (NC) at fifth leaf stage and Days to Flowering (DF) were recorded. One-way ANOVA and Principal Component Analysis (PCA) followed by hierarchical cluster Analysis (HCA) were performed through the Minitab 17 version. DFL and PH varied significantly among accessions: Accession 4145 reached the fifth leaf stage with the least number of days ( $23 \pm 1$  days) and the highest PH ( $47.4 \pm 3.1$  cm), while the DFL in Bg 300 was the highest ( $39 \pm 2$  days) and PH was shorted ( $29.5 \pm 2.4$  cm) ( $P < 0.05$ ) the NC of accession 4132, 4731, and 6412 were respectively measured to be  $1.8 \pm 0.2$ ,  $1.6 \pm 0.24$  and  $1.6 \pm 0.24$ . In contrast, accession 4145 exhibited the maximum NC, with an average value of  $3.3 \pm 0.58$ . Among the tested ten accessions, only three accessions, were flowered; 4237 ( $56 \pm 3$  days), Bg 300 ( $91 \pm 2.36$  days), and 4387 ( $121 \pm 1$  days) during the 121 days of experimental period. Principal Component Analysis (PCA) revealed that four principal components (PA) explained 95.8% of the total observed variation. Cluster Analysis revealed the presence of 5 distinct clusters. Accessions 4731 and 6412 had a significant degree of similarity in PH, NL, FLL, FLW, and CN, forming a closely linked cluster. Similarly, accessions 4132, 4387, and 5530 are clustered together and exhibit similar phenotypic characteristics that indicate sheared genetic or environmental influences. The similarities that have been noted within these clusters highlight possible directions for focused breeding initiatives that aim to improve desired features among related accessions.

**Key words:** Flowering time, Morphological Variation, Sri Lankan Traditional Rice

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## Development of a Ready to Serve Beverage from *Dimocarpus longan* (Longan) Fruit and *Daucus carota*

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### Abstract

Ready to serve (RTS) fruit drinks have higher demand in Sri Lanka due to the climatic conditions, higher availability and the consumers have awareness about their benefits. Hence the present study was conducted to develop a novel RTS drink incorporating the underutilized Longan fruits (*Dimocarpus longan*) which have beneficial effects for human. The RTS was developed by blending Carrot juice, Longan fruit pulp with sugar, water and Sodium metabisulphite, adhering to Sri Lankan standards for RTS. Three formulations were prepared using Carrot juice and Longan fruit pulp at the ratios of 60:40, 50:50 and 40:60. With the increase of Longan fruit juice percentage, the titratable acidity, ascorbic acid, total sugar and total soluble solids were increased while decreasing the pH. Microbial analysis revealed that no any microbes present in the sample for seven weeks in normal room temperature. There were significant differences in color among the samples and the colour changed during the storage time (7 weeks). Sensory analysis showed significant differences between three formulations and sample with carrot juice: longan fruit juices of 60:40 reported best sensory profile and with 0.32% titratable acidity, 4.3 mg/100g ascorbic acid, 16.9% total sugar, 16.1° Brix value and 3.12 pH. The L\*, a\*, b\* colour values of sample were 43.71, 6.69 and 16.55 respectively. Based on the study results, a RTS drink could be successfully developed with *Dimocarpus longan* (longan) fruit and *Daucus carota* (carrot) and optimum ratio of 60:40.

**Key words:** Carrot juice, Nutritional analysis, Beverages, Longan fruit.

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## Nutritional Assessment of Pre-School Children at Avissawella Area in Western Province, Sri Lanka

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### Abstract

The rising number of preschoolers, aged 3-5, who suffer from malnutrition. Due to its substantial health concerns, parents should educate their children about the problems associated with eating unhealthy foods. Therefore, the present study was conducted to assess the nutritional assessment of preschool children at the Avissawella area in the Western Province, Sri Lanka. A cross-sectional study was carried out by taking a total of 100 children according to the described formula and a random sampling technique was adopted. The parents of the students were interviewed by administering a semi-structured questionnaire. The descriptive analysis was used to study the socio-demographics and practices related to dietary habits and Pearson's chi-square was applied to assess the association between variables. According to the results, most participants were kids who were 4-5 years old and lived in joint families. A greater proportion of parents finished their A/L education. The income of the majority of the families ranged between Rs.30,000-50,000 per month. Among the children, 36% were underweight, 2% were overweight, and 2% were obese. Also, 84% of parents limit their children's intake of sugary drinks, indicating a focus on maintaining healthier dietary practices. There were no significant differences ( $p>0.05$ ) between stunting and the child's gender, type of family, education level of the mother, or household income. However, there was a significant difference ( $p<0.05$ ) between stunting and the father's education level. Similarly, no significant differences ( $p>0.05$ ) were found between wasting and the child's gender, type of family, education levels of the mother or father, or household income. For overweight/obesity, no significant differences ( $p>0.05$ ) were observed concerning the type of family, education levels of the mother, and father and household income. Moreover, a significant difference ( $p>0.05$ ) was found between overweight/obesity and the child's gender. The study highlights the need for targeted nutrition education programs and policy intervention to mitigate the adverse health effects associated with preschool children. By addressing these factors, we can promote healthier dietary habits and reduce the malnutrition of children.

**Keywords:** Avissawella, Dietary habits, Malnutrition, Nutritional status, Preschool children

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## Screening of Different *Trichoderma* Isolates for Controlling *Agroathelia rolfsii* (Sacc.) Causing Groundnut Stem Rot Disease

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### Abstract

Groundnut (*Arachis hypogaea*) is a legume grown mainly for its edible seeds, which serve as a vital protein source in the Sri Lankan diet. The pathogen *Agroathelia rolfsii*, which causes stem rot disease in groundnut, can lead to considerable economic losses for farmers due to its infection. The use of biological control agents, particularly *Trichoderma* species, presents a sustainable alternative to chemical fungicides. The research was conducted at the Regional Agriculture Research and Development Centre (RARDC) in Kilinochchi. This study evaluated the antagonistic efficacy of five *Trichoderma* isolates (*Trichoderma viride* 1, *T. viride* 2, *T. asperellum* 1, *T. asperellum* 2, and *T. harzianum*) against the target pathogen *A. rolfsii* using the dual culture technique on Potato Dextrose Agar (PDA) plates. The fungus *A. rolfsii* was isolated from the stem rot-affected groundnut plants. The five different *Trichoderma* isolates were obtained from the RARDC. Meanwhile, homai (thiophanate methyl 70 WP + thiram 30 WP) fungicide and non-treatment were laid out as the positive and negative control, respectively. The treatments were organized using a Completely Randomized Design (CRD), with each treatment replicated five times. The percentage inhibition of mycelial radial growth of the pathogen was recorded at 24, 48, 72, and 96 hours after the inoculation of the pathogen. The results indicated a significant difference ( $P < 0.05$ ) among the treatments and over time. Homai fungicide exhibited the highest level of inhibition (85%) against *A. rolfsii*, while *T. harzianum*-treated PDA plates showed the second highest inhibition (79%) at 96 hours. Hence, *T. harzianum* could serve as an effective biocontrol agent, helping to decrease reliance on chemical fungicides.

**Keywords:** *Agroathelia rolfsii*, Biocontrol agent, Homai fungicide, Stem rot, *Trichoderma*

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## Evaluation of Natural Preservatives for Enhancing the Shelf Life of Sugarcane Juice

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### Abstract

Sugarcane juice is obtained by crushing the stalks of sugarcane. Even though the juice has many nutritional benefits, it is highly perishable and start to deteriorate 3-4 hours after the extraction - due to enzymatic browning. Thus, the commercialization of sugarcane juice is limited; to improve the commercialization potential the current study investigates the effectiveness of natural preservatives in extending the shelf life of sugarcane juice. The sugarcane variety SL 96 128 was used for juice extraction after cleaning, peeling and blanching at 100°C. Treatment samples were prepared by adding 2% of lime and 2% of ginger extract, 0.5% of carboxy methyl cellulose and 0.5% of salt to 100ml of sugarcane juice and pasteurized at 70°C for 10 minutes. Juice was hot filled into pre-sterilized glass bottles, sealed and stored at both room temperature (30°C) and under refrigeration temperature (4°C). The shelf life was determined by comparing control and treatment samples, using physio-chemical, microbial and sensory characteristics. The results revealed that the brix, pH, pol % and purity of the sample stored under refrigeration condition was maintained up to 60 days with lower fluctuations. Reducing sugar of the sample stored under refrigeration was maintained at optimum for up to 30 days and thereafter increased. Titratable acidity of the sample stored under refrigeration was maintained. The Microbial count was increased with time. The sample stored under refrigeration condition ( $4.000 \pm 0.858$ ) showed better consumer acceptance than sample stored at room temperature condition ( $3.450 \pm 0.759$ ) up to 60 days.

**Keywords:** Sugarcane juice, Perishability, Enzymatic browning, SL 96 128, Natural preservatives

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## A Field Screening of Okra (*Abelmoschus esculentus* L.) Germplasms for Identifying Resistance Sources for Okra Yellow Vein Mosaic Virus in Dry Zone of Sri Lanka.

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### Abstract

Okra (*Abelmoschus esculentus* L.) is one of widely cultivated vegetable crop in Sri Lanka. Many pests' attacks and diseases significantly decrease the quality and quantity of okra production in dry zone. Okra Yellow Vein Mosaic virus (OYVMV) is the major disease affecting the okra production. Therefore, identification of germplasms with strong resistance to OYVMV has become an urgent need. As such an experiment was carried out in RARDC\*, Kilinochchi during Yala 2024. Eighteen locally popular germplasms (*Meeharak-An Bandakka*, *Thei Bandakka*, Red local (Perennial), *Athupahe bandakka*, *Katu bandakka*, *Athdala bandakka*, *Idipandam bandakka*, *Pal wendi*, *Kiri bandakka*, *Rathu bandakka*, MI-07, MI-05, Jaffna Local, Kilinochchi Local, *Haritha*, Red local (Annual), *Hean bandakka*) and advanced breeding line (TV 08) were screened with 4 control lines (OP 7, OP 10, T 09 and *Sarika* F1) (Total 24 treatments). A randomized complete block design was used with 3 replications. (60cm and 90 cm) spacing was used to accommodate plants in a plot. Disease severity was assessed and percentage disease incidence (PDI) was calculated using internationally recognized disease rating scale. Means of PDI was compared using Tukey HSD method and disease progressive curve was developed. After 6<sup>th</sup> week of observation. All control entries show "Resistance" response to OYVMV with 0% PDI. Local cultivar "*Pal wendi*" was "Susceptible" with 66.97% PDI. Other all 17 germplasms showed "Highly susceptible" disease responses with more than 70% PDIs. This experiment revealed urgent need of changing the recommended cultivars for local cultivation and producing the novel high-yielding disease resistance okra germplasms.

**Keywords** – Okra, OYVMV, Screening, PDI

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## Suitable Protocol for Establishing Nodal Explant Culture of a Seedless Indian Blackberry *Syzygium cumini*

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### Abstract

*Syzygium cumini*, generally referred to as Jamun or Indian black plum, is a tropical evergreen tree species and it holds considerable ecological and economic value; however, its low germination rate and seedlessness limit its potential for large-scale cultivation and distribution. A potential solution for the rapid and substantial production of disease-free plants is micropropagation. This study aimed to develop, optimize, and assess two refined protocols for establishing nodal explant cultures of the rare, seedless Indian blackberry. Nodal explants were chosen, and two different protocols, varied mainly in terms of sterilizing techniques, explant preparation, and medium composition were tested. Protocol A, using 50 explants, involved inoculation into Murashige and Skoog (MS) medium supplemented with 1.0 mg/L benzylaminopurine (BAP), following sterilization with ethanol, sodium hypochlorite, carbendazim and streptomycin sulfate. Conversely, Protocol B utilized a more rigorous sterilizing technique that included ethanol, sodium hypochlorite, carbendazim and streptomycin sulphate. The explants were first incubated into liquid MS medium with the same composition as the final solid MS medium for 48 hours. Twenty incubated explants were transferred to MS medium supplemented with 2.0 mg/L BAP, 100 mg/L ascorbic acid, 100 mg/L carbendazim, 50 mg/L citric acid, and 25 mg/L kanamycin sulfate. Protocol A resulted in a 6% success rate for the establishment of aseptic cultures. Numerical data were observed and analyzed. Protocol B, however, demonstrated significantly higher efficacy, achieving to 45% success rate. The results of this study indicate that protocol B is an effective technique for the establishment of nodal explant culture of *S.cumini*.

**Key words** – Micropropagation, nodal explant, seedless Indian blackberry, modified media, *Syzygium cumini*.

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## Allelopathic Effects of *Lantana camara* Leaf Extracts on Germination and Early Growth of Rice and Two Weed Species Under In-Vitro Condition

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### Abstract

Allelopathy refers to the biological phenomenon where plants release chemicals known as allelochemicals into the environment, which can influence the growth, survival, or reproduction of other organisms nearby, typically other plants. *Lantana camara* is a noxious invasive plant that invades agricultural and natural ecosystems. The objective of the research work was to evaluate the allelopathic effect and phytochemical study of the *L. camara* aqueous and ethanolic leaf extracts against different germination parameters of rice, weedy rice and *Ischaemum rugosum* weed seeds. The experiment was carried out in petri dishes with ten selected seeds were treated separately with different concentrations of plant extracts such as 250 ppm, 500 ppm, and 1000 ppm. The control treatment was treated with sterile distilled water. The germination parameters such as seed germination percentage, plumule length, and radicle length were studied. The results reveal that the germination percentage of rice seed (58%) is inhibited by 1000ppm ethanolic extract, but the germination percentage of rice showed some stimulant effect for the aqueous extract. The length of both baby shoots (P) and embryonic roots (R) of rice were inhibited (P-  $0.92 \pm 0.159$ , R-  $2.60 \pm 0.351$ ) by ethanolic (1000ppm) leaf extract, compare to control treatment (P-  $2.26 \pm 0.271$ , R-  $6.18 \pm 0.357$ ). germination percentage of weedy rice (12%) also inhibited by aqueous (1000ppm) extract and germination of *I. rugosum* inhibited by both ethanolic extracts (2%) and aqueous extract (2%). When considering each extract, ethanolic extract showed the strongest inhibition effect on seed germination and early growth than aqueous extract. The inhibitory effect was increased with the increase in extract concentration ( $p > 0.05$ ). three seeds such as rice, weedy rice, and *I. rugosum*. inhibitory effects also varied with different types of extracts (aqueous and ethanol). It is evident from the data that allelochemicals present in *L. camara* might inhibit the process of seed germination. these findings will help to develop an ecofriendly weedicide.

**Key words:** Allelopathic effect, *Lantana camera*, Aqueous extract, Ethanolic extract, Germination parameters.

## Assessment of the Use of Palmyra Treacle as a Preservative for Star Gooseberry (*Phyllanthus acidus*) Fruit

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### Abstract

Star gooseberry (*Phyllanthus acidus*) fruit which offers immense medicinal benefits is not widely consumed because of its sour taste and perishable nature whereas Palmyrah (*Borassus flabellifer* L.) treacle which is rich in antioxidants is underutilized. This research was carried out to study the feasibility of using Palmyrah treacle to preserve *P.acidus* fruit whilst making it tasty and healthier. Four treatments namely T<sub>1</sub>, T<sub>2</sub>, T<sub>3</sub> and T<sub>4</sub> were designed to make the fruit preserve, with 45, 55, 65 and 75% (w/w) of Palmyrah treacle respectively. The acceptability of the preserve was assessed through sensory evaluation, and studying the changes in pH and brix value over the course of seven weeks. Quality (pH, total soluble solids, titratable acidity, and moisture), and proximate (ascorbic acid, total sugar, reducing sugar, ash, crude fibre and antioxidants), and microbial parameters of the preserve were determined. From initial week to week three, pH and brix value increased for all four treatments and afterwards remained more or less constant. The pH (5.89±0.085a) and brix value (71.30±1.10a) of T<sub>4</sub> was significantly higher than the others. As per the results of the Turkey's Studentized Range Test, T<sub>4</sub> had the highest overall acceptability for the sensory, quality, proximate, and microbial results and T<sub>1</sub> had the least acceptability ( $p < 0.05$ ). Additionally, the preserve had greater total sugar, reducing sugar, ascorbic acid, antioxidant, and crude fibre contents ( $p < 0.05$ ) than the raw fruit. As per the results of the microbial analysis and sensory evaluation, the shelf life of T<sub>4</sub> is >8 weeks at room temperature.

**Key Words:** Healthy, Microbial count, Palmyrah treacle, Preserve, Star gooseberry fruit



## Treatment of Livestock Farm Wastewater Using Low Cost Filtration System

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### Abstract

This study was aimed to evaluate the efficiency of a low-cost filtration device using materials like sand, brick pieces, activated carbon, and coconut husk fiber to treat livestock wastewater. The filtration system's effectiveness is assessed by comparing water quality, including pH, EC, TDS, DO, turbidity, and TSS, before and after treatment. The untreated livestock wastewater initially shown a pH of 7.56, EC of 2.16 mS/cm, TDS of 1462.40 mg/L, DO of 0.24 mg/L, turbidity of 442.20 NTU, and TSS of 0.02 mg/L. After treatment with the first filter configuration, the pH increased to 8.34, EC decreased to 0.44 mS/cm, TDS dropped to 276.40 mg/L, DO increased to 4.27 mg/L, turbidity was reduced to 20.23 NTU, and TSS slightly increased to 0.03 mg/L. The second filter configuration resulted in a pH of 7.52, EC of 0.32 mS/cm, TDS of 188.40 mg/L, DO of 3.39 mg/L, turbidity of 26.33 NTU, and TSS of 0.02 mg/L. The statistical analysis confirmed that the observed improvements were statistically significant ( $p < 0.05$ ), indicating the effectiveness of the filtration system in treating the wastewater. Both filters significantly improved parameters such as electrical conductivity (EC), total dissolved solids (TDS), turbidity, and dissolved oxygen (DO). Notably, second filter demonstrated slightly better performance in reducing TDS. These findings suggest that livestock wastewater quality can be treated using a low-cost filtration system composed of stone chips, coconut husk fiber, activated carbon, resin, brick fragments, charcoal, and sand. The results indicate that such a filtration system offers a feasible and sustainable solution for treating livestock wastewater, especially in resource-constrained settings.

**Keywords:** Activated carbon, Dissolved oxygen, Filtration system, Livestock wastewater.

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## Impact of Temperature and pH Variations on the Coagulation Behavior of Coconut (*Cocos nucifera* L.) Skim Milk Protein

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### Abstract

Identifying the effective method of protein coagulation from coconut skim milk is crucial for developing vegan protein-based products such as cheese analogues, edible food wraps, protein bars, etc. This study aims to identify an effective combination of temperature and citric acid concentration to extract high-quality coconut skim milk protein from defatted desiccated coconut kernel (DDCK), which is a by-product of virgin coconut oil. Coconut skim milk was extracted by mixing DDCK with water in a 1:2 w/v ratio after soaking for one hour and the approximate composition was analysed. The extracted skim milk was subjected to three different temperatures (75<sup>0</sup>C, 80<sup>0</sup>C and 90<sup>0</sup>C) followed by adjusting the pH of the mixture by adding citric acid (0,0.5%, 0.6% and 0.7%). The treated samples were kept for 24 h at 40<sup>0</sup>C and centrifuged (4500 rpm for 30 min). The fresh and dry weight of the coagulant and protein concentration was analysed. The design of the experiment was arranged as a two-factor factorial design with three replicates. Data were analysed by Minitab 19 software. Skim milk extracted shows 2.89±0.09 % fat, 3.31±0.36 % of protein, 0.43±0.09% of ash, 6.79±0.66% of carbohydrate and 86.21±0.02 % of water. The interaction of citric acid concentration and heating temperature showed a significant effect (p<0.05) for both fresh weight and protein percentage of the coagulant. The study revealed that 0.6% citric acid composition with 90<sup>0</sup>C heating temperature was the best combination to extract the highest fresh weight (19.76±0.37%) of coagulant with a higher percentage (53.91±1.49%).

**Keywords:** Acid coagulation, Coconut skim milk, Protein, Heat coagulation

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# Climate Energy and Environment

## The Evolution and Growth of Global Renewable Energy: A Data-Driven Journey from Past to Future

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<sup>3</sup>Independent Researcher, Gold Coast, Australia. Abstract

The global evolution towards sustainable energy is rapidly accelerating. It is driven by the increasing need to fight climate change and reduce dependence on fossil fuels. Renewable energies like solar energy are emerging as a key component of this shift. This paper presents a data-driven analysis of renewable energy trends. Using a large dataset sourced from international energy agencies from the year of 1965. The methods include statistical analysis and regressive machine learning models to forecast future trends in renewable energy deployment. By visualizing historical data and forecasting future growth, the study examines the global rise of renewable energy sources, including solar, wind, and hydro, biofuel and geothermal, highlighting their contributions to decarbonization efforts. The results indicate a sudden rise in solar energy capacity which is driven by declining costs and advancements in technology. Renewable energy is having exponential growth starting in 2010. And it is expected to continue its rapid expansion, becoming a dominant force in the global energy market by 2030. The regional analysis highlights the leading contributors to solar energy growth. The challenges faced by underdeveloped regions in scaling their renewable energy infrastructure. This paper purposefully investigates the south Asian countries' developments too. This study confirms that solar energy, combined with other renewable sources, will play a crucial role in achieving global sustainability targets. The world is projected to switch to renewable sources completely by the year 2040.

**Keywords:** Data-driven analysis, Decarbonization, Forecasting, Renewable energy, Sustainable growth

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## **Morphological Changes and Coastal Dynamics of the Kalu Ganga Estuary Mouth: Kalutara Calido Beach, Sri Lanka**

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### **Abstract**

The Kalu Ganga estuary at Calido Beach in Kalutara, Sri Lanka, has undergone significant morphological changes attributed to both natural and anthropogenic factors. The coastal area is a high population due to its suitability for settlements, urban development, infrastructure growth, and thriving economic activities, particularly in the tourism sector. This study examines changes between 2017 to 2024 using primary data from published literature and secondary data from historical images obtained from Google Earth. Factors such as, seasonal monsoon fluctuations, sediment deposition, coastal hydrodynamics, river management practices, land reclamation and urbanization have influenced estuarine morphology. Based on the google images data, the estuary mouth showed significant expansions in 2018 (228m) and 2019 (377m), following the major flood event in 2017, a temporary expansion followed by a gradual narrowing 88 m. However, later measurements showed a gradual reduction in width: 159m (2020), 192m (2021), 163m (2022) and 151m (2024). These changes reflect the complex interplay of sediment transport, tidal influences and environmental stressors and highlight the need for sustainable coastal and estuarine management strategies to mitigate further morphological changes. These fluctuations are caused by a complex interplay of natural factors such as seasonal tidal flows, sediment transport and coastal hydrodynamics, as well as human interventions, including infrastructure development and changes to river channels. The findings emphasize the need for integrated coastal management strategies to address hydrodynamic and sediment transport challenges. Sustainable solutions could include beach-nourishment, mangrove restoration, and controlled dredging to balance sediment transport processes while minimizing human impacts on hydrodynamics.

**Keywords:** Coastal erosion, Estuary, Calido beach, Kalu ganga, Sedimentation

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## **Physical and Structural Changes in Nintavur Beach, Sri Lanka: Impacts of Coastal Erosion and Human Activities**

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### **Abstract**

Nintavur Beach, located in the Ampara district of Eastern Sri Lanka, has undergone significant morphological and physical changes in the last decade, transforming into an erosion-prone zone. The study area extends over a 7.5 km stretch from Vettaru in the north to the Kali-Odai River in the south. The local livelihood focuses on agriculture, fishing, and small-scale rice mills. This study aimed to analyze the coastal changes in Nintavur, focusing on the effects of seasonal erosion and natural coastal processes. Data collection included primary and secondary sources, with primary data derived from direct field observations (2023-2024) and secondary data obtained from satellite imagery from Google Earth and published research. Between 2009-2024, more than 40 meters of coastal land was eroded, with a noticeable acceleration after the construction of the Oluvil port in 2009. After 2012, the rate of erosion increased, especially on the north side of the port, due to the construction of breakwaters and river flooding. Linear Regression Rate (LRR) analysis from publications showed erosion rates of 310 m/year on the north side, while beach advances of 314.3 m/year were recorded on the south side. The study highlights the detrimental impact of anthropogenic structures on coastal dynamics and the complex interplay of natural processes with human interventions. Effective coastal management strategies are urgently needed to mitigate further erosion, restore sediment balance, and ensure the sustainability of the coastal ecosystem and livelihoods, such as Integrated Coastal Zone Management (ICZM), soft engineering solutions, natural buffers and improved design of structures.

**Keywords:** Nintavur, Sea erosion, Oluvil, Structural changes

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## **Effects of Different Proportions of Oyster Shell Powder on Potassium Retention in a Sandy Regosol.**

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### **Abstract**

Sandy regosols have a limited capacity to retain essential nutrients like potassium due to their poor water and nutrient-holding ability. This study aimed to assess the effect of different proportions of Oyster Shell Powder (OSP) on potassium retention in a sandy regosols. An indoor leaching column experiment was conducted at the Soil Science Laboratory, Eastern University, Sri Lanka, with five treatments: control (T1) and OSP amendments at 0.6% (T2), 0.7% (T3), 0.8% (T4), and 0.9% (T5) by weight. Urea, Triple Super Phosphate, and Muriate of Potash were used as fertilizers. Each treatment was replicated four times in a Completely Randomized Design. Leachates were analyzed for potassium over four leaching cycles within two months. The final soil samples were analyzed for available potassium content, and statistical analysis with mean separation was performed using Tukey's test at a 5% significance level. The results showed that higher proportions of OSP increased potassium leaching during the first three cycles compared to the control (T1), with no significant differences observed in the fourth cycle. This is likely due to the low cation exchange capacity (CEC) of sandy soils, which limits potassium retention. However, higher OSP proportions significantly enhanced the available potassium content in the soil, likely because of the improved nutrient adsorption properties of the oyster shell's porous structure and its positive impact on the soil's CEC. T5 demonstrated the highest potassium retention (14.348 mg/kg), highlighting the potential of OSP as an effective soil amendment for improving potassium levels in sandy soils.

**Keywords:** Oyster shell powder, Sandy soil, K retention

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# **Innovative Technology for Entrepreneurship**



## **National Vocational Qualification: Recognition of Prior Learning for Smallholder Farmers in Sri Lanka**

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### **Abstract**

Sri Lanka's economy is centered on agriculture and has more room to grow. The rural sector's local smallholder farmers are vital to the country's economy. Their experience in livestock and crop production are based on a lack of theoretical knowledge, which is crucial for any legitimate professional certification to generate. By evaluating both institutional trainings and non-institutional competencies acquired, Sri Lanka's National Vocational Qualification (NVQ) Framework makes it easier for the general public to offer certification. An important NVQ strategy that accesses people's competencies gained through informal, non-institutional learning techniques with less theoretical comprehensiveness is Recognition of Prior Learning (RPL). Competencies are assessed using the National Skills Standards in relation to the NVQ framework, and it is urgently necessary to use this method locally. Through RPL systems, the author examines the impact of NVQ certification on local smallholder farmers, highlighting the need for more research. A content analysis of the body of existing literature is part of the qualitative methodology that was used. The RPL is significant because it rewards past accomplishments under a familiar access system with speedy certification, directing to future studies of agro-based non-traditional smallholders, and bridges the gap to higher certifications with motivated lifetime learning. With the support of both public and private partnerships, extensive study is required to determine the efficacy and application of the RPL system as well as to establish possible educational pathways for holders of RPL certificates. Local smallholder farmers can benefit from NVQ Certification through the RPL system with exploratory research.

**Keywords:** Agriculture, Certification, Sri Lanka, Vocational Qualification

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## Application of the Fourth Order Perturbed Heisenberg Hamiltonian to Analyze BCC Structure Ferromagnetic Thin Films with Three Spin Layers

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### Abstract

Ferromagnetic films are essential in magnetic memory and microwave devices, where the easy and hard magnetization directions critically influence performance. This study investigates the magnetic properties of body-centered cubic (bcc) ferromagnetic thin films with three spin layers using the fourth-order perturbed Heisenberg Hamiltonian. Seven magnetic energy parameters were considered, including spin exchange interaction, second and fourth-order magnetic anisotropies, demagnetization factors, and stress-induced anisotropy. MATLAB was used to generate 2D and 3D graphs showing the relationships between energy, spin exchange interaction, and the azimuthal spin angle. The results demonstrate that total magnetic energy varies from  $10^{13}$  to  $10^{17}$ , with the lowest energy observed when the middle spin layer's fourth-order anisotropy constant is smaller than that of the top and bottom layers. Conversely, the highest energy occurs when the bottom spin layer's anisotropy constant is the smallest. Additionally, energy maxima and minima were identified for different values of the spin exchange interaction and azimuthal angle, with a notable major maximum at  $J/\omega = 73$ . The angle between consecutive magnetic easy and hard directions is not 90 degrees, as shown by 2D graphs. The total energy for three spin layers is significantly lower than that for two spin layers, emphasizing the effect of additional layers on the magnetic properties of ferromagnetic films. These findings offer important insights into optimizing magnetic energy parameters and spin layer configurations, which could lead to improved performance in technological applications, particularly in magnetic memory devices and other related systems.

**Keywords:** Fourth order perturbed Heisenberg Hamiltonian, Magnetic anisotropy constant, Magnetic thin films, Spin exchange interaction, Spin layers.

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## **Exploring the Trust Factor in Blockchain Technology Adoption – A Case of Agri-Food Companies in Northwestern Province, Sri Lanka**

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### **Abstract**

Supply chain management in agriculture should be given significant consideration to achieve a sustainable food system. Blockchain Technology (BCT) is an emerging technology that improves the agricultural supply chain, and it has been acknowledged as a solution to numerous issues in the agri-food supply chain, such as transparency and traceability. As a result, it can close the trust gap between producers and consumers. However, there is little study on BCT uptake in the Sri Lankan agri-food sector. The current study was conducted to explore how business owners' trust in BCT shapes its adoption in the agri-food supply chain. A qualitative research method was used for this purpose, and a purposive sampling method was employed to select ten agri-food companies which digitized their operation in the Northwestern province of Sri Lanka. Semi-structured interviews were carried out with company owners, and qualitative data analysis techniques were employed to analyze the data. The findings from the thematic analysis show that less trust towards the BCT makes the agri-food companies (half of the companies) unwilling to adopt BCT in their agri-food chains and acts as a barrier. However, other companies believe that adopting BCT can be a way to increase trustworthiness through traceability and transparency, which benefits agri-food companies that want to raise and communicate trustworthiness to their stakeholders. Therefore, the benefits of adopting BCT in agri-food supply chains must be demonstrated to agri-food company owners to build trust towards BCT.

**Keywords:** Agri-food supply chain, Blockchain technology, Traceability, Trustworthiness

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## **Improved Technology Awareness among Smallholder Rubber Farmers in Seethawaka DS Division, Colombo District**

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### **Abstract**

Rubber cultivation is a vital source of income for many smallholder farmers in Sri Lanka. It not only supports their livelihoods but also contributes to local economies. Rubber production heavily depends on the technologies employed and this study was conducted to assess smallholder rubber farmers' awareness of improved technologies in the Seethawaka Divisional Secretariate division, Colombo District. By following a random sampling procedure, 100 smallholder rubber farmers were selected, and data were gathered from questionnaire surveys. The collected data were analyzed by using the SPSS. Descriptive statistics were used to describe the study variables. The Likert scaling method was used to determine the awareness of improved rubber technologies. The results revealed that the majority (81%) of the farmers were male and between 45-55 years age category. Regarding improved technologies, none of the farmers are aware of remote sensing applications for rubber cultivation. More than half of the farmers are unaware of micropropagation and drip irrigation systems. Most have only a partial awareness of sprinkler irrigation systems, usage of tapping machines, low-intensive tapping systems and gaseous stimulation systems. The study recommends that relevant authorities take steps to raise improved technology awareness among smallholder rubber farmers.

**Keywords:** Advanced technologies, Awareness, Rubber farmers, Tapping machine

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## **Economy of Sugarcane Cultivators: A Study Based on Gal-Oya Plantation Private Limited**

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### **Abstract**

This study was broadly designed to analyze the impact of sugarcane cultivation on the income and socio-economic well-being of sugarcane farmers based on Gal-Oya Plantation (Pvt) Limited in the Ampara district, Sri Lanka. Despite Sri Lanka's long history with sugarcane cultivation, the country still depends a lot on importing sugar, meeting only 10% of its demand through local production. Sugarcane has thus become a vital crop, especially in regions like the Gal-Oya valley. This study was conducted in four major zones in Ampara district, Sri Lanka. Primary and secondary data were collected. Data were analyzed using SPSS software. Descriptive statistics outlines the socio-economic profiles of sugarcane cultivators. Results revealed that the average age of 53 years old, with average family size of 3 of the cultivators. The workforce was 95% male, mostly secondary-educated, and 60% have 10-20 years of cultivation experience. Mean income from sugarcane cultivation was Rs. 963,952.54 per hectare and a Benefit Cost Ratio of 2.06 was obtained. Chi-square test results revealed significant associations between education levels and farming engagement. Correlation analysis indicated a positive relationship ( $p < 0.01$ ) between land size and yield. To ensure sustainable development and boost the economic well-being of sugarcane farmers, systemic changes are necessary. This includes implementing fair compensation practices, providing financial education, and encouraging cost-effective farming methods to promote sustainable agricultural practices and improve rural livelihoods. Ultimately, strengthening the sugarcane industry in Sri Lanka could significantly benefit rural economies, improve livelihoods, and reduce reliance on import.

Key words: Sugarcane, Economic impact, Sugarcane cultivation, Gal-Oya Plantation

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## **Home Gardens: A Promising Approach to Improve the Livelihood of Rural Poor in Trincomalee, Sri Lanka**

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### **Abstract**

Home gardens were an integral part of local food systems in most of developing nations. This study sought to investigate the socioeconomics of home gardeners and role of home gardens in supporting household livelihoods in Trincomalee district. The study was done in four selected Divisional Secretariat divisions. Analysis of data was carried out using descriptive statistics, chi square test and correlation analysis. Results revealed that 53% had completed secondary education whereas 5% held higher education degrees. Home gardens exhibited a rich diversity of crops, contributing to household livelihood and income generation. Common vegetable crops and fruit-bearing trees such as banana, coconut, mango, lime, jackfruit, and guava are staples that offer both subsistence and income opportunities for households in the region, with a combination of short-term vegetable yields and longer-term benefits from fruit trees. The average monthly income generated from home gardens was Rs. 40,005.00. Correlation analyses revealed a strong positive relationship ( $p < 0.01$ ) between garden size and monthly income, underscoring that larger home gardens hold considerable economic potential by providing additional income through the sale of surplus produce. Conversely, a modest inverse correlation existed between income generated and the level of direct involvement in gardening activities. Chi square analysis revealed a significant association ( $p < 0.01$ ) between education and involvement in gardening. These findings highlight the importance of targeted policy interventions that can promote home gardening as a sustainable livelihood strategy. Enhancing access to resources, technical training, and market connections for home gardeners could further strengthen economic resilience in Trincomalee.

Key words: Home Garden, Food security, Economic resilience, livelihood

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## **Economic and Social Disparities among Fishermen Based on Vessel Type: A Study in Negombo Ds Division in Gampaha District**

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### **Abstract**

This study broadly designed to analyze the economic and social disparities among fishermen based on vessel type in-Negombo DS Division. The study was mainly based on primary data obtained from a sample survey in thirteen Fisheries Inspection Division in Negombo DS Division in Gampaha district. 100 number of fishermen were selected as the respondents and data were collected through a pretested questionnaire. Administrative and official management details of the fisheries were collected through the Department of Fisheries and Aquatic Resources. Results revealed that 59% of fisherman completed secondary education while 36% of fisherman had only completed elementary education. 41% of them use small, motorized fiber boats intended for one-day fishing excursions. For multi-day trips, 34% of fisherman use motorized boats and 25% of fishermen use traditional canoes. Chi-square test provides a statistically significant association ( $p < .001$ ) between the age of fisherman and the type of fishing vessel while a statistically significant association ( $p < 0.01$ ) between Amount of harvest(fish) per fishing trip and used method of preservation until selling. Correlation analysis proved significant ( $P < 0.01$ ) association between the amount of loan and monthly fishing income. The fishermen who have large scale motorized boat (Multiday), were engaged with the fish exportation. It was found to be more advantageous than local sale but it required the high standard quality according to the food security. Negombo regional market has better marketing facilities. The high fuel cost caused the low profit at the end of each fishing trip and is recommended that government should support to uplift the livelihood of fishermen.

**Key Words:** Fisheries Inspection Division, vessel type, fishermen

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## **Impact of Pineapple Cultivation on the Livelihood of Pineapple Growers in Gampaha District**

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### **Abstract**

Pineapple production is mainly concentrated in the Gampaha and Kurunagala districts. In Gampaha district, a comparatively large number of farmers are involved in pineapple cultivation for their livelihood. This study investigated the contribution of pineapple cultivation to the livelihood of farmers in the Gampaha district. A structured questionnaire was used to collect data from 100 pineapple growers in four Divisional Secretariat Divisions in the Gampaha District using the stratified random sampling method. Results revealed that most of the respondents were middle-aged and educated up to a tertiary level, had a family of four members, and owned 1–5 acres of land (63%). Most farmers have a positive attitude and sufficient knowledge of pineapple cultivation. Banana and coconut were the primary crops intercropped with pineapple to maximize land usage and economic return. The estimated average production cost was as Rs 480,062.63 per acre. The cost of labor and planting material were highly influential on the total cost of production. The education level of cultivators significantly and positively ( $p < 0.01$ ) correlated with the income of pineapple farmers. Additionally, this study highlighted the main difficulties in growing pineapples in this region. For the majority of respondents, the lack of healthy planting materials (suckers) and a shortage of labor were the challenges in pineapple farming. This study suggests that improved innovative methods for effective propagation, and sustainable production be established in addition to the development and promotion of simpler farming practices.

Key words: Pineapple Production, challenges, livelihood, Gampaha District

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## **Impact of Management Practices on Organizational Performance in the Tea Value Chain of Galle District, Sri Lanka**

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### **Abstract**

The tea value chain encompasses all stages involved in producing tea, from cultivation to consumption. The aims of study are to assess the managerial approaches applied in this value chain and the corresponding effects on organizational performance with a focus on strategies that contribute to improvement of competitiveness, resistance and sustainability. The study of mixed methodology was used to do the research design. Data was collected from 100 tea farmers and key value chain actors in Galle district of Sri Lanka through questionnaire survey and interviews. Quantitative data was analyzed using SPSS Version 24. Descriptive statistics and multiple regression analysis were conducted to analyze the data. The result of the demographic analysis showed 68% full-time contribution to tea cultivation. The largest number of respondents 45% had working experience of 11-15 years; most females account for 66%. It was observed that 47% of respondent's main source of income was tea cultivation. The regression analysis reveals that management practices significantly impact organizational performance in the Galle District's tea value chain. The model shows a strong correlation ( $R = 0.780$ ) with 60.8% of the performance variability explained ( $R^2 = 0.608$ ). Leadership Style ( $p = 0.006$ ), Resource Allocation ( $p = 0.020$ ), and Monthly Income ( $p = 0.010$ ), all of which are statistically significant. Interviews in the tea industry revealed varied management practices, with most actors using leadership and collaborative decision-making. Resource allocation, linked to better product quality, differs by person. Financial success is measured through various strategies, and while technology is valued, some struggle with adaptation. Fair government support was highlighted as crucial. Key factors enhancing tea smallholder performance in Galle District include leadership style, resource management, and government support. This study suggests that targeted intervention improves the performance of the tea value chain. This result can be used to contrast and compare with the national tea value chain.

**Keywords:** Galle District, management practices, organizational performance, Tea industry

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## **Assessing the Impact of External Interventions on Self-Organized Diverse Village Business Groups: Lessons from “Saubhagya” Anthurium Growers Group Galkadapathana in Sri Lanka.**

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### **Abstract**

Self-organized groups are emerging as critical drivers of economic empowerment and social cohesion. The role of external interventions, such as NGOs and government projects, is under-explored in the context of shaping dynamics, autonomy, and sustainability of these self-organized groups. This study examines the impact of external support on the self-organized and diverse ‘Saubhagya’ Anthurium Growers Group in Galkadapatha, Sri Lanka, which has been thriving since 2017 and is often reported as a success story. Employing a qualitative research design, this study explores the dual role of external interventions both as enablers and constraints to self-organization. Findings reveal that external interventions, such as training and providing incentives, may also inadvertently undermine the autonomy and organic decision-making process within the group. Design of interventions, alignment of external goals within the group's vision, and the adaptability of members to externally driven changes can be identified as key factors influencing these outcomes. This study highlights the need for balanced and support strategies that preserve the self-organizing essence of such groups while amplifying their resilience and sustainability. Lessons from this case study offer valuable insights for policymakers, development practitioners and researchers aiming to foster sustainable rural development through collaborative approaches.

**Keywords:** Self- Organized Groups, External Interventions, Rural business groups, Sustainability, Autonomy

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## **Impact of Entrepreneurial Abilities and Sustainable Practices on the Performance of Tea Smallholder Farmers in Matale District, Sri Lanka**

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### **Abstract**

Tea is one of Sri Lanka's major export commodities, significantly contributing to national income and providing employment to a large segment of the population. Smallholders manage 60% of the tea land and produce 70% of the tea, but their reliance on traditional methods limits productivity and sustainability. This study explores how entrepreneurial skills and sustainable practices impact the performance of tea smallholders in Matale District. Data were collected from 100 farmers using a pre-tested structured questionnaire and analyzed with SPSS version 24. Descriptive statistics and multiple regression analyses were performed. The results of the demographic analysis showed that 55% of the farmers were aged 56 and above, 69% of the respondents had at least a secondary education level, and 61% of them had been farming for more than 16 years. It was observed that 25% of respondents' main source of income is from tea cultivation, while 39% depend on other sources of income. The multiple regression model explains 50.5% of the variance in tea smallholder farmers' performance, with an adjusted R-squared of 0.436, indicating a good fit. This study shows that factors such as decision-making ability ( $p = 0.038$ ), land size ( $p = 0.003$ ), and family monthly income ( $p = 0.033$ ) positively influence the performance of smallholder tea farmers. Conversely, innovation ability ( $p = 0.012$ ) and gender ( $p = 0.017$ ) negatively influence performance. The findings indicate that improving decision-making, expand land area, and financial stability can enhance smallholder performance. Addressing innovation barriers and gender issues is crucial for better outcomes. Future interventions should target these areas to boost tea smallholder productivity.

**Keywords:** Entrepreneurial abilities, Performance, Smallholder farmers, Sustainable practices, Tea

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# Poster Presentations

## **Influence of Consumer Perception and Purchase Intention on Buying Behavior for Processed Fruit Products: A Case Study of Consumers in The Batticaloa District**

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### **Abstract**

Sri Lankan consumers generally value quality and affordability in processed fruit products, with a growing preference for health-oriented options. This research investigates consumer perception and buying behavior regarding processed fruit products in the Batticaloa district, aiming to understand the relationship among buying behavior, consumer perception, and purchase intention for these products. A structured questionnaire was distributed to a sample of 220 consumers using convenience sampling, achieving a 90% response rate. Regression analysis was conducted to analyze the data. Demographic analysis showed that the majority of respondents were aged between 19 and 35 years, with a slightly higher representation of males (55%) compared to females (45%). The study further examined various demographic factors, including age, gender, marital status, educational qualifications, occupation, monthly income, and family structure, to determine their influence on consumer behavior. Key findings from this study revealed that the most frequently purchased processed fruit product was fruit juice (43%), followed by fruit jam (24%). Purchase frequency varied, with a majority buying weekly (33.5%) and monthly (28%). Regression analysis indicates that food safety ( $p < 0.002$ ) is the most significant factor influencing buying behavior, highlighting its important role in consumer decision-making. Extrinsic factors ( $p < 0.047$ ) also significantly impacted consumer preferences. The study found notable gender differences in buying behavior ( $p < 0.032$ ), suggesting that marketing strategies should be gender-sensitive to effectively cater to the preferences of both male and female consumers. The moderating variable, purchase intention ( $p < 0.010$ ), had a significant impact on these relationships, shaping consumer decisions based on trust, value, and emotional connection. These insights can help stakeholders in the processed fruit industry develop targeted strategies to enhance product appeal and market penetration, ultimately contributing to the industry's growth and sustainability.

**Keywords:** Buying behaviour, Consumer perception, Extrinsic factors, Food safety, Processed Fruits, Purchase intention

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### Oral Presentations

S.N	Abstract ID	Title
01	ICTRI-2025-BST 02	Prevalence of Bovine Mastitis and Antibiotic Susceptibility Patterns of bacterial isolates in Jaffna District ( <b>V.Kalaivizhi</b> )
02	ICTRI-2025-BST 03	Development of Peanut Milk Drinking Yoghurt Incorporated with Flower of Hibiscus ( <i>Hibiscus rosa sinensis L.</i> ) Syrup ( <b>K.Nithusa</b> )
03	ICTRI-2025-BST 04	The Effect of Mexican Mint ( <i>Coleus amboinicus</i> ) Extract on <i>Albugo candida</i> (White Blister Fungus) ( <b>M.Dusanthani</b> )
04	ICTRI-2025-BST 05	Development of Coconut Milk-Based Ice Cream Incorporated with Soursop ( <i>Annona muricata. L</i> ) Fruit Puree ( <b>Mohamed Jamaldeen Ahila Banu</b> )
05	ICTRI-2025-BST 06	Shoot and root performances of vegetable cowpea, variety BS-1 in response to application of municipal sewage sludge with phosphorous and potassium chemical fertilizers ( <b>Kavunthini Atputhanathan</b> )
06	ICTRI-2025-BST 07	Sensory and Physico-chemical Properties of Biscuits Developed from Wheat, Finger Millet and Jackfruit Seed Composite Flour ( <b>P.Hisanithy</b> )
07	ICTRI-2025-BST 08	First report of anthracnose, caused by <i>Colletotrichum gloesporioides</i> on <i>Hydrangea macrophylla</i> leaves in Sri Lanka ( <b>Kothai K.</b> )
08	ICTRI-2025-BST 09	Study on Different Fruit Peel on the Growth Performance and Flowering of Local Rose Varieties ( <b>De Silva, S. G .P.</b> )
09	ICTRI-2025-BST 10	Growth and Yield Performance of Spinach ( <i>Spinacia Oleracea L.</i> ) Fertilized with Vermi-compost and Rice Husk Charcoal ( <b>W.D.D.N. Chandrarathne</b> )
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11	ICTRI-2025-BST 01	Determination of variation of days to flowering among selected Sri Lankan traditional rice accessions during ‘Yala’ season 2024 in Batticaloa ( <b>P.V.D.N.N.T. Kumarasena</b> )
12	ICTRI-2025-BST 11	Development of a Ready to Serve Beverage from <i>Dimocarpus longan</i> (Longan) Fruit and <i>Daucus carota</i> ( <b>A.Sathurthikka</b> )
13	ICTRI-2025-BST 12	Nutritional Assessment of Pre-School Children at Avissawella Area in Western Province, Sri Lanka ( <b>Ibrahim Mohamed Ijas</b> )
14	ICTRI-2025-BST 13	Screening of Different Trichoderma Isolates for Controlling <i>Agroathelia rolfsii</i> ( <i>Sacc.</i> ) Causing Groundnut Stem Rot Disease ( <b>R. Thibisha</b> )
15	ICTRI-2025-BST 14	Evaluation of Natural Preservatives for Enhancing the Shelf Life of Sugarcane Juice ( <b>T.Krishanthini</b> )
16	ICTRI-2025-BST 15	A Field Screening of Okra ( <i>Abelmoschus esculentus L.</i> ) Germplasms for Identifying Resistance Sources for Okra Yellow Vein Mosaic Virus in Dry Zone of Sri Lanka. ( <b>G.M.C.S.Bandara</b> )
17	ICTRI-2025-BST 17	Suitable Protocol for Establishing Nodal Explant Culture of a Seedless Indian Blackberry <i>Syzygium cumini</i> . ( <b>S.Chukirthan</b> )
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24	ICTRI-2025-CE05	Physical and Structural Changes in Nintavur Beach, Sri Lanka: Impact of Coastal Erosion and Anthropogenic Interventions <b>(G.D.G.P.P. Gamage)</b>
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