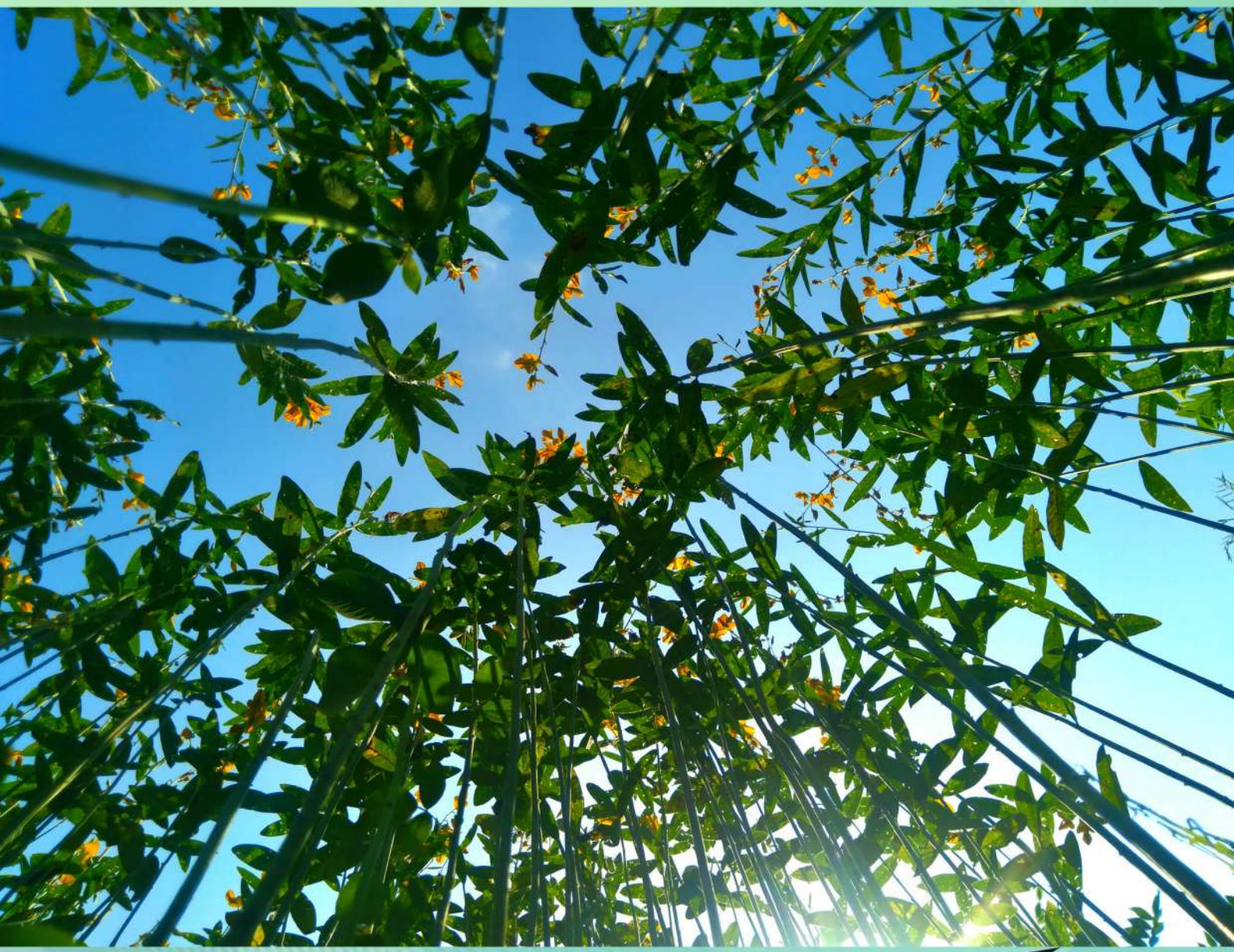
University of Peradeniya
Sri Lanka

HANTHANA BLOSSOMS

Best Research Briefs of Faculty of Agriculture undergraduate Research Symposium (FAuRS)

March 2024

Volume VII, Issue I



Faculty of Agriculture Undergraduate Research Symposium

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66. கிளிரிசிடியா இலையை கால்நடைகளுக்கான உணவாக சேர்க்கலாமா? எவ்வாறு?

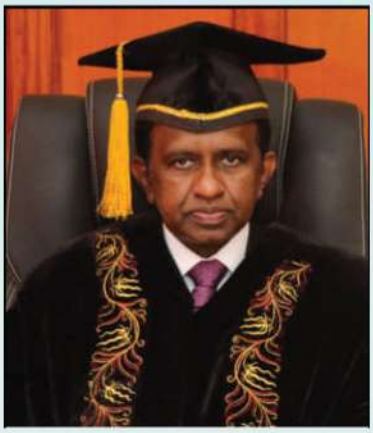
67. இலங்கையில் தேர்ந்தெடுக்கப்பட்ட முக்கிய பகுதிகளில் காணப்படும் கொக்கோ விதைகளின் பொலிபினோல்கள் (polyphenols), ஆன்டிஒக்சிடன்கள் (antioxidants) மற்றும் பார உலோகங்களின் (heavy metals) உள்ளடக்கம்

68. சூரிய ஒளியில் உலர்த்துவதற்காக நெல் சேகரிக்கும் மற்றும் பொதியிடும் இயந்திரத்தை வடிவமைத்தல், தயாரித்தல் மற்றும் செயல்திறன் மதிப்பீடு செய்தல்

69. நீரிழிவு நோயாளிகளுக்கேற்ற அரிசி வகைகள்

70. நிலத்தடி நீரை உயிரி கார்பனும் செங்கல்லும் உபயோகித்து சுத்திகரிக்க முடியுமா?

Message from the Vice Chancellor



As the Vice Chancellor of the University of Peradeniya, Sri Lanka, it is with immense pleasure that I write this message for the 7th volume of the 'Hanthana Blossoms' magazine launched on 26th March 2024, at the Faculty of Agriculture Undergraduate Research Symposium (FAuRS 2023).

The Faculty of Agriculture of the University of Peradeniya is tasked with conducting basic research in the fields to strengthen the knowledge and skills of young undergraduates in finding solutions to pressing national and global problems in agriculture and related fields. FAuRS 2023, provides a forum for final year undergraduates and the academic staff of the Faculty of Agriculture, for fruitful dialogues and dissemination of research findings to a wider audience. Accordingly, this symposium presents a valuable opportunity for young researchers to present, discuss and obtain feedback from experts in the field of agriculture.

The magazine 'Hanthana Blossoms' launched at FAuRS 2023 is a platform to disseminate research findings of the Faculty of Agriculture final year students to a general audience in a simple easy-to understand language. This is a vital component of research dissemination to develop strong linkages between researchers and ground-level stakeholders for fruitful collaborations and to further enrich research culture.

'Hanthana Blossoms' is expected to motivate undergraduates to enhance their research capacity and research communicating skills and I strongly believe that this will be contributed to enhance the quality of research and collaborations in the future.

I take this opportunity to appreciate and thank the Dean of the Faculty of Agriculture, the Coordinator, and the Organizing Committee of FAuRS 2023 for their tireless efforts to make this event a success. I congratulate the organizing committee for the successful launch of the 7th issue of 'Hanthana Blossoms' magazine.

Professor M.D. Lamawansa
Vice Chancellor
University of Peradeniya
26th March 2024

Message from the Dean

I am immensely pleased to write this message for the latest edition of the 'Hanthana Blossoms' magazine, which highlights FAuRS 2023. The Faculty of Agriculture at the University of Peradeniya has consistently been a pillar of excellence in scientific exploration. Throughout the years, we have had the honour of nurturing and guiding scientists who are not only skilled in research but also deeply committed to making significant contributions to society.

In a landmark move, the faculty introduced a mandatory research project to the undergraduate curriculum in 1975. This initiative was designed to equip our undergraduates with the necessary research skills, laying a strong foundation for their future endeavours as emerging scientists. Since its inception in 2014, the Faculty of Agriculture Undergraduate Research Symposium (FAuRS) has become a pivotal event in our academic calendar. It offers a valuable platform for final-year undergraduate students to present their research findings to our esteemed stakeholders, fostering their confidence through participation in various competitions.

The 'Hanthana Blossoms' magazine, a trilingual publication, plays a crucial role in our outreach and dissemination efforts.

By featuring select content from the Research Briefs Competition of the FAuRS, it serves as a conduit between academic research and the wider community. Through this medium, we aim to highlight the outstanding achievements of our students and raise awareness among the general public about their remarkable accomplishments.

As the Dean of the Faculty, I would like to extend my heartfelt congratulations to the coordinator and the dedicated organizing committee of FAuRS 2023. Despite facing numerous challenges, your unwavering commitment and resilience have ensured the success of this year's symposium. Additionally, the successful launch of the 7th volume of 'Hanthana Blossoms' magazine is a testament to your hard work and dedication. I encourage everyone to explore the pages of 'Hanthana Blossoms' and appreciate our students' inspiring journey of discovery and innovation. Let us continue to support and celebrate their achievements as they progress in their respective fields.

Prof. Sarath S. Kodithuwakku
Dean, Faculty of Agriculture
26th March 2024

Message from the Coordinator of FAuRs - 2023

It is with immense pleasure that I write this message for the 7th volume of Hanthana Blossoms as the Coordinator of the Faculty of Agriculture Undergraduate Research Symposium (FAuRS 2023).

FAuRS is intended for unravelling, recognizing and rewarding the multitude of talents our students possess and accordingly we organize both technical and non-technical competitions among final year undergraduates based on their research project.

Research Brief is one such open non-technical competition in which students get a valuable opportunity to disseminate their research findings to a general audience in all the three languages; English, Sinhala and Tamil. Articles submitted to Research Brief Competition are evaluated by an eminent panel of judges and the selected articles are published in the Hanthana Blossoms magazine.

I expect that the participants of this competition obtained practical experience on addressing a non-scientific audience on research in written media in native languages.

I am thankful to Prof. Sarath S. Kodithuwakku, the Dean, Faculty of Agriculture for guidance, Dr. Geeshani Somaratne, the Coordinator of Research Brief Competition, the panel of judges and the editors of Hanthana Blossom.

I wish to congratulate the winners of the competition and all the contributors.

Prof. S.A.C.N. Perera
Coordinator (FAuRS 2023)
26th March 2024

FROM FIELDS TO YIELDS: TAILORED STRATEGIES IN UREA ALLOCATION POLICY BOOST TOTAL RICE PRODUCTION!

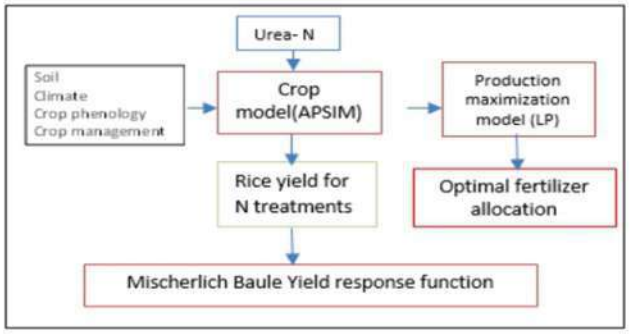
Salani Karunarathne

Sri Lanka started fertilizer subsidy program since 1962 with the introduction of high yielding varieties (HYV). Nitrogen(N) is one of the main elements needed for the growth of rice (HYV). Government allocates the highest proportion of urea for rice cultivation. However, since 1962 there were lot of changes in fertilizer subsidy policy. Present, most agricultural economists, policymakers, researchers agree that tailored strategies, targeted subsidies is the most scientifically driven updated approach. To achieve this, we must depend on yield response dynamics for N fertilizer application, which means that focus should be on climate, soil, management practices and variety.

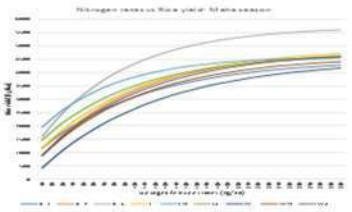
With the bad experiences of terrible economic crisis. Sri Lankans started experiencing shortages of basics. Economic downturns, can affect a country's ability to import fertilizers. However, efficient allocation of resources in production is valid at all times.

In this research, we determined which agro-climatic zones (ACZ) must be prioritized when allocating urea. There are 7ACZ. Dry zone low country (DL), Intermediate zone low, mid, up country as IL, IM, IU and Wet zone low, mid, up country as WL, WM, WU. Again DL has been divided into low, medium, high yield categories as DL1, DL2, DL3.

How did I come up with the fertilizer allocation decision?



Used the modelling approach using an integrated crop and economic model.



Y = a+ b (1-exp (k* N)

Areas that must be prioritized……

The study resulted different regions having distinct rice yield response functions for N. Urea fertilizer allocation decision must be redesigned with the changes of climate, soil, management, and crop genetics. A blanket approach to fertilizer allocation overlooks these factors and fails to maximize yields.

When allocating fertilizer the Dry zone should be prioritized. If the Government needs to take immediate actions to allocate a limited available amount of urea with the objective of having the maximum production, then priority must be done according to DL3> DL1> IM> DL2> IL> IU> WL> WM> WU. Districts in DL3 are Anuradhapura, Hambantota, Polonnaruwa, Ampara. Nuwara Eliya belongs to the WU region. But do you think this prioritization is a constant? No! If there is a drought in DZ like in 2001 then medium & low yield outcome regions in DZ show less response, districts like Mulativ, Jaffna. Then IM, Badulla like areas must be prioritized next, DL3> IM> DL1> IL> DL2> IU> WL> WM> WU. It shows that climate predictions

The decision regarding the wet zone can be altered with the intervention of management to reduce N losses. Liming the soil can raise the pH level, making it less acidic and incorporating organic matter makes it more conducive to uptake of Nitrogen. Dolomitic liming like materials can be used for pH adjustment of the soil. Thereby, increasing the marginal product. As an example, if a wet zone rice field can maintain about a pH of 6.6 and has 0.6% organic matter, previously allocated urea amount can be decreased by 5%.

Way forward……

- Setting the initial fertilizer allocation can proceed with precision agriculturists and extension services to optimize ground-level distribution of urea.
- Studying how this model can be changed with fertilizer technological intervention, like introducing slow releasing fertilizer like coated urea, urea inhibitors and nano fertilizer is worthwhile to do.
- Genetic improvements for better response to rice.

This is a non-technical summary of the project report titled "Optimizing Nitrogen Fertilizer Allocation across Diverse Agro-climatic Zones for Enhanced Total Rice Production: An analysis using an integrated crop and economic mode" supervised by Prof. Jeevika Weerahewa*, Department of Agricultural Economics and Business Management, Faculty of Agriculture, University of Peradeniya. *jeevika.weerahewa@agri.pdn.ac.lk

CAN PLANTS GET CROSS-PROTECTION FROM FUNGI THROUGH PATHOGEN-DERIVED IMMUNITY ACTIVATORS?

Malsha Gothami Pathirana

What are pathogen-derived immunity activators?

Pathogen-derived immunity activators are molecules or components that originate from a pathogen and can activate the immune system in a host plant.

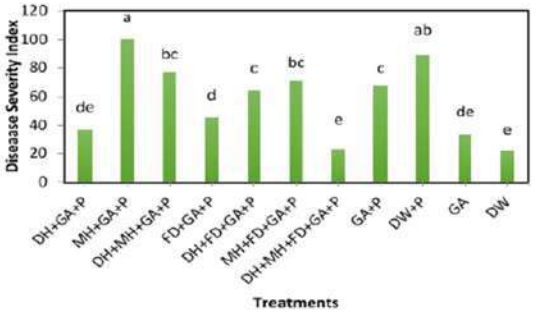
What is cross-protection?

Cross-protection is a phenomenon where immunity developed against one pathogen provides some level of protection against other, often different, but related pathogens.

The growing world applies a lot of chemicals to control plant diseases which is associate with numerous problems including environmental pollution. Also, infections can occur even after chemical application. Therefore, inducing plant immunity through pathogen-derived immunity activators/ elicitors is one of the sustainable crop protection methods. This study aims to determine the Cross-protection potential of a pathogen-derived immunity activators (i.e *Sclerotium rolfsii*) against two other soil borne pathogens, *Fusarium* and *Pythium* spp., when applied as a seed treatment. The experiment was done for chilli (var. MI-2).

Immunity activators derived from *S. rolfsii* were non-viable mycelia and fragmented DNA. Mycelial viability was removed by dry heating at 60 °C for 48 h and moist heating at 80 °C for 45 minutes.

The risk of disease development in treated plants can be neglected when applying those immunity activators due to their non-viable and non-cellular nature. Chilli seeds were coated using Gum Arabic (selected suitable binding agent) with different combinations of dry heated (DH) and moist heated (MH) mycelia and fragmented DNA (FD). The treatment codes were DH, MH, DH+MH, FD, FD+DH, FD+MH, FD+DH+MH. Germination percentage (GP), seedling vigour (SV), plant defence enzyme (i.e peroxidase) activity (PEA) and disease severity index (DSI) were assessed to evaluate the treatment effect.



This figure shows the DSI of chilli seedlings when inoculated with the pathogen. A significant reduction of DSI due to *Fusarium* sp. and *Pythium* sp. infections was achieved by the combined immunity activators, namely dry heated mycelia, moist heated mycelia, and fragmented DNA of *S. rolfsii* as well as single treatments of fragmented DNA and dry heated mycelia of *S. rolfsii* when applied as a seed coating. Therefore, above immunity activators derived from *S. rolfsii* are effective in developing cross-protection against soil borne pathogens such as *Fusarium* sp. and *Pythium* sp.

This is a non-technical summary of the project report titled "Cross protection ability of *Sclerotium rolfsii* derived immunity activators for the management of soil borne plant pathogens" supervised by Prof. D. M. De. Costa*, Department of Agricultural Biology, Faculty of Agriculture, University of Peradeniya. *dmdcosta@agri.pdn.ac.lk

FOOD SECURITY, DIETARY DIVERSITY, AND NUTRITIONAL STATUS OF UNDERGRADUATE STUDENTS RESIDING ON CAMPUS AT THE UNIVERSITY OF PERADENIYA, SRI LANKA

H. R. V. Senanayake

Food Insecurity

Food insecurity emerges as a pervasive health concern affecting university undergraduates on a global scale. Due to the persistent socio-economic challenges in Sri Lanka, state university undergraduates may face heightened susceptibility to food insecurity. This study assessed food insecurity prevalence and explored predictors, as well as dietary and nutritional factors linked with food insecurity among the undergraduates residing on campus at the University of Peradeniya.

Study Group

A total of 600 undergraduate students, representing the nine faculties, residing on campus at the University of Peradeniya, Sri Lanka from 2023 to 2024 were used as the study sample.

Study Measures

The participants' socio-demographic data such as the faculty they are studying at, gender (male or female), age, and ethnicity (Sinhala, Tamil, Muslim, Other) were collected through a range of structured questions in the questionnaire. Additionally, the food security status and dietary diversity of participants were assessed using the 8-item Food Insecurity Experience Scale Survey Module (FIES-SM, score range 0-8) developed by FAO and a dietary diversity questionnaire developed by FAO/Nutrition and Consumer Protection Division, respectively. Height and weight measurements were obtained through calibrated scales to calculate BMI, and body fat percentage was assessed using a bioelectrical impedance analyzer.

Results and Discussion

The prevalence of food insecurity was 44.1%, with 29.8% experiencing moderate food insecurity and 14.3% facing severe food insecurity. The mean food insecurity score of the sample was 3.23 (± 2.58). The sample mean dietary diversity score was 7.07 (± 1.71). Approximately 47.7% of the sample had normal BMI values (mean = 20.92 ± 3.7).

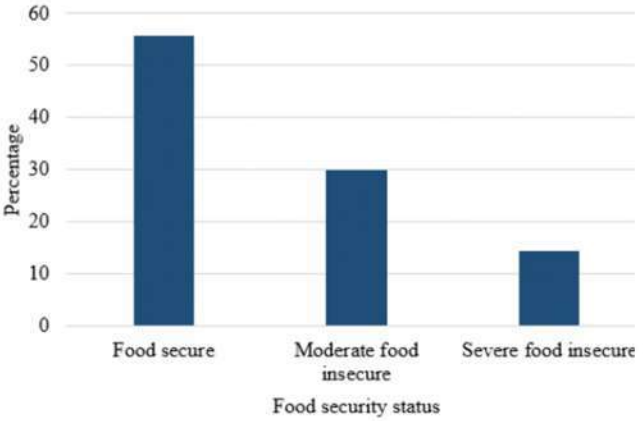


Figure 1: The distribution of food secure, moderate food insecure, and severe food insecure undergraduates in the sample

Factors such as faculty, ethnicity, frequency of home visits, and alcohol consumption were identified as significant ($p<0.05$) predictors of food insecurity.

The analysis showed a significant negative correlation ($p<0.001$) between food insecurity and participants' dietary diversity. Hence, eating a variety of foods may help undergraduates obtain essential nutrients, promoting an active, healthy lifestyle, and reducing the risk of food insecurity.

There was a significant negative correlation ($p=0.030$) between food insecurity and participants' BMI. Therefore, a low BMI may indicate insufficient intake of nutritious food, leading to issues such as wasting or underweight. Conversely, a higher BMI suggests adequate nutrition, supporting an active, healthy lifestyle, and greater food security. However, there was no significant association between food security and the fat percentages of undergraduates.

Recommendations

The food security status of undergraduates should be enhanced through nutrition literacy, health monitoring, the establishment of diverse, affordable food outlets on university premises, provision of free nutritious meals, quality control in hostel canteens, granting scholarships, and creating income opportunities.

This is a non-technical summary of the project report titled "Food security, dietary diversity, and nutritional status of undergraduate students residing on campus at the university of Peradeniya, Sri Lanka: a case study" supervised by Dr. D.M.S.S. Daundasekara*, Department of Food Science and Technology, Faculty of Agriculture, University of Peradeniya. *saumalid@agri.pdn.ac.lk

UNLOCKING THE NUTRITIONAL POTENTIAL OF SRI LANKAN LEGUMES: A COMPREHENSIVE ANALYSIS OF AMINO ACID PROFILES AND *IN VITRO* PROTEIN DIGESTIBILITY

M. H. M. D. Nimalasiri

Background

Legumes (or pulses) belong to the *Fabaceae* family, and they have been known for centuries for their good nutritional properties. Legumes, as the main non-cereal staple foods around the globe, are comparatively cheap and easily available. They are usually consumed after processing, enhancing food palatability and nutrient bioavailability through the inactivation of growth and trypsin inhibitors. Legume seeds are rich in macro and micronutrients; consisting of starch, protein including polypeptides and amino acids, dietary fiber, and a significant number of vitamins and minerals. They have a high protein content and a good amino acid profile, with adequate levels of lysine; sulfurous amino acids and tryptophan are usually the limiting amino acids of this family.

Developing countries face many issues such as poverty, low levels of agriculture, rapid degradation of natural resources, increasing population pressure, etc. It is expected that developing countries do not have access to nutritious food sufficient for the daily needs of all people. Food insecurity will be a major issue. The main sources of energy and protein in developing countries are legumes, rice, cereals, and starchy roots. Currently, due to widespread food insecurity, the focus is on the use of lesser-known and non-traditional plant species.

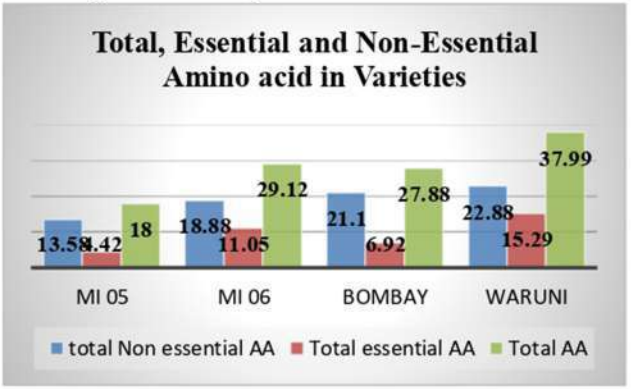
Why is it necessary to study the comparative analysis of amino acid profiles and digestibility?

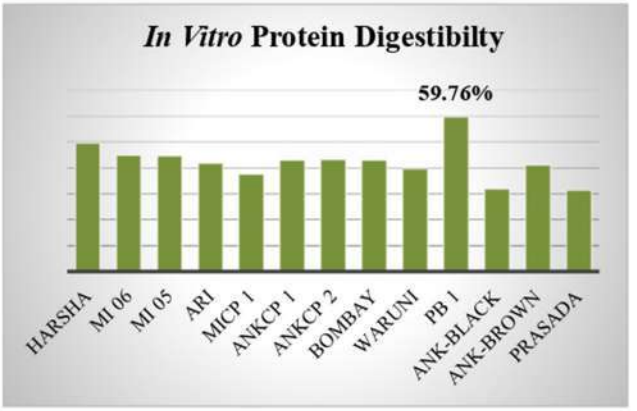
The nutritional status of the population in Sri Lanka faces significant challenges, including protein deficiency and related malnutrition. Legumes are a traditional and vital source of protein in the Sri Lankan diet, but there is a lack of comprehensive data on the amino acid profile and *in vitro* protein digestibility of the various legume varieties grown in the country. This knowledge gap hampers efforts to optimize dietary practices and address nutritional deficiencies effectively. Therefore, the research focused on assessing the amino acid profile and in vitro protein digestibility of selected locally grown legume varieties (Mung bean- *Vigna radiate* L, Cowpea-*Vigna unguiculate* L, Soybean -*Glycine max* L, Horse gram - *Macrotyloma uniflorum* and Peajon pea- *Cajanus cajan* L. Millsp) to screen the better varieties for processing in future use.

How was the study conducted?

Mature seeds of legume crops were collected from the Grain Legumes and Oil Crops Research and Development Centre, Angunakolapelessa for this study. The total amino acid profile and *In Vitro* protein digestibility were analyzed in thirteen varieties and identified best varieties for processing in the future.

Finding of the study……





Waruni emerges as the standout performer among the four analyzed legume varieties in terms of total amino acid profile. This implies that Waruni possesses a more comprehensive and balanced composition of essential and non-essential amino acids crucial for human nutrition. The PB 01 variety demonstrates notably higher *in vitro* protein digestibility compared to other locally grown legume varieties tested. This finding indicates that PB 01 possesses characteristics that facilitate the easier breakdown of protein molecules into absorbable amino acids during digestion. Waruni and PB 01 varieties can be recommended to the higher protein quality varieties for the processing in future.

This is a non-technical summary of the project report titled "A comparative study on total amino acid profile and *in vitro* protein digestibility in selected legume Varieties grown in Sri Lanka" supervised by Prof. R.P.N.P. Rajapakse*, Department of Food Science and Technology, Faculty of Agriculture, University of Peradeniya. *niranjanp@agri.pdn.ac.lk

DEVELOPMENT OF A PINEAPPLE FLAVORED SOFT DRINK INCORPORATED WITH CURCUMIN AND PIPERINE

Chethya Hansani Mendis Rajakaruna

Soft drinks…

Soft drinks are non-alcoholic beverages, typically carbonated but not always. Currently available soft drinks in the Sri Lankan market contain several artificial additives that may result in adverse effects on human health such as obesity and metabolic disorders. In recent years, there has been a growing trend towards incorporating natural bioactive compounds into foods and beverages to enhance their health benefits.

What about curcumin?

Curcumin is the main bioactive compound present in turmeric which is having a wide range of health benefits. It is scientifically proven that curcumin is good for liver health, heart diseases, lung injuries as well as for tumors. The main focus of this study was the ability of curcumin to protect people from liver damages. However, when consuming curcumin alone, only 60% of the dosage will absorb to the body. Therefore, the absorptivity of curcumin should be enhanced to get the maximum benefit of it.

Solution?

Piperine is the main active compound present in black pepper. The combination of curcumin and piperine in 100:1 ratio can surprisingly enhance the absorption of curcumin. Therefore, this research study, aims to develop a curcumin and piperine-incorporated soft drink in order to obtain a liver protection while determining the formulation strategies, sensory attributes and stability of the developed product.

Potential to incorporate curcumin and piperine

Curcumin and piperine were extracted from turmeric and black pepper, respectively, and mixed in three different formulations while maintaining the curcumin to piperine ratio as 100:1. The effect of the amounts of curcumin and piperine on the sensory properties and stability was evaluated and the most preferred formulation was identified through sensory evaluations. Then the preferred sugar level for the soft drink was determined through another sensory evaluation, and the physical, chemical, and microbiological quality of the final product were evaluated.

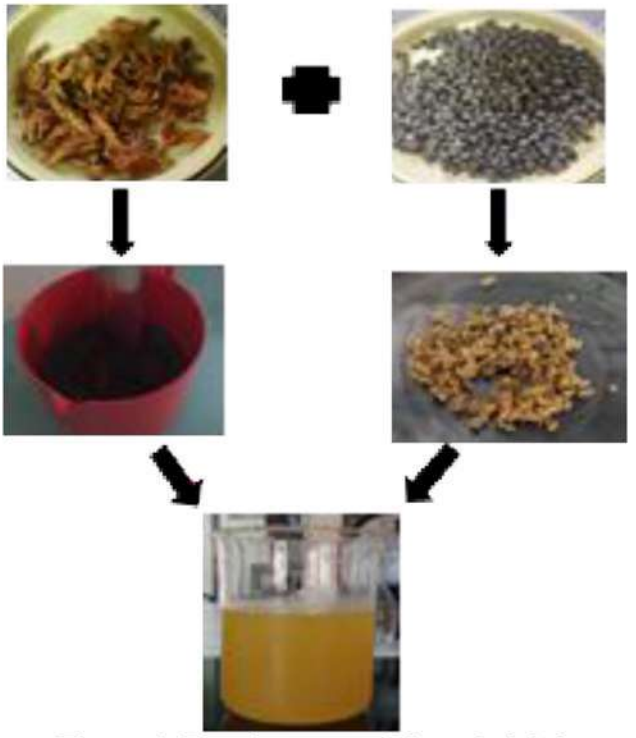


Figure 1: Development of the soft drink

Is it successful?

Yes, the pineapple flavored soft drink incorporated with curcumin and piperine was successfully developed. Total soluble solid content, pH, curcumin content and total phenolic content of the developed product was 12%, 4.24, 99.7 ppm and 511.13 ppm respectively. Any crust formation or precipitations were not observed and a clear beverage was obtained with optimum sensory properties. The curcumin content and total phenolic content may reduce with time if the product is exposed to light. Therefore, it is recommended to use amber-colored bottles as packaging materials to mitigate this issue.

Future directions…

The nutritional composition, shelf life, and the ability of the beverage to reduce liver damages should be determined in further studies.

This is a non-technical summary of the project report titled "Development of a pineapple flavored soft drink incorporated with curcumin and piperine" supervised by Dr. D.M.M.S. Daundasekara*, Department of Food Science and Technology, Faculty of Agriculture, University of Peradeniya. *saumalid@agri.pdn.ac.lk

POTENTIAL OF REMOVING PHOSPHOLIPID FROM COCONUT OIL USING COAL AND COCONUT SHELL-BASED ACTIVATED CARBON

H.M.I. Sanjeewa

Edible oils such as olive, sunflower, palm, canola, and coconut are highly consumed worldwide for their unique property of supplying fat to the human body. From them, coconut oil is highly produced in tropical countries. More than 40% of the fatty acid in coconut oil is lauric acid while it has 1% of minor components like phospholipids, pigments, and antioxidants.

Phospholipid

Phospholipids are cell substances that work as cellular membranes of coconut. Phospholipids are hazard-free and generally recommended as safe to eat. However, it acts as a gum-like substance and shows undesirable sediment formation with long-term storage.

Those undesirable sediments reduce the economic value of coconut oil which directly affects to coconut oil industry. Environment safe, economically feasible, simple methods need to address the problem.

Chemical and physical methods were developed for refining oil. Specifically degumming, ceramic filtration, and ultrafiltration can be used but cost and environmental damage are high in many methods.
This study aimed to identify the best feasible method to reduce phospholipid content in coconut oil in small to large-scale oil production settings.

1. **Modifying the bleaching step in the refining process**: Coconut oil was heated to 80°C with coconut shell-based activated carbon and with coal for 20 min. Then centrifuged and filtered again. The phospholipid amount was tested.
2. **Oil filtration**: Coconut oil is filtered by using coconut shell-based activated carbon and coal at 27°C (room temperature), 80°C, 110°C temperature with 1 bar and 2 bar pressures.

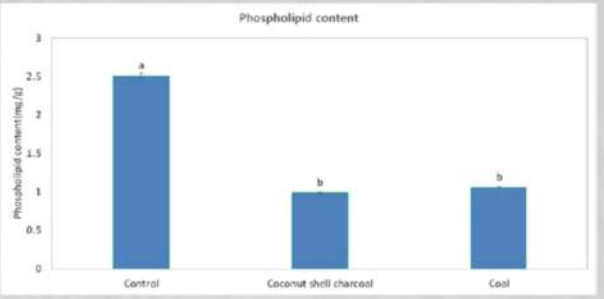


Figure 1: Considerable amounts of phospholipids were reduced by the bleaching process. Coal shows the highest reduction of phospholipids from coconut oil.

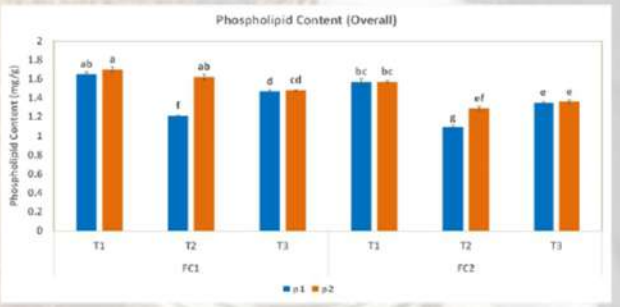


Figure 2: Filtration successfully removed phospholipids from coconut oil considerably. Results show better reduction can be achieved at 80 °C with 1 bar pressure.

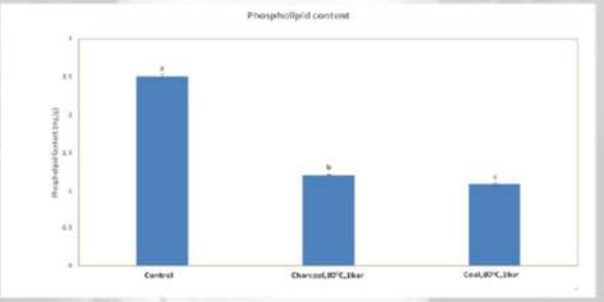


Figure 3: This shows a comparative phospholipid reduction in the treatment of 80 °C and 1 bar pressure in coconut shell-based activated carbon and coal infiltration of oil.

Results were promising as charcoal can be used to reduce phospholipid content in oil and it is environmentally friendly as well as cost-effective in small scale to large scale productions.

This is a non-technical summary of the project report titled "Study on the potential of removing phospholipid from coconut oil using coal and coconut shell-based activated carbon" supervised by Dr. D.M.M.S. Daundasekara*, Department of Food Science and Technology, Faculty of Agriculture, University of Peradeniya. *saumalid@agri.pdn.ac.lk

BANISHING SOUR TASTE IN FRUIT YOGHURT DRINK: MITIGATE POST ACIDIFICATION, WITHOUT TOXIC PRESERVATIVES

Isurangi Bandara

Have you ever experienced a sour taste in yoghurt drink after few days from the manufacture date or they are nearing the end of their shelf life?

This sourness is due to post acidification, an undesired flavour, aroma and taste generated by the ongoing metabolic activity of the microorganisms.

The challenge is how to overcome this issue without resorting to chemical preservatives, which are highly using in the dairy industry neither health-friendly nor cost-effective.

Fruit incorporation into yoghurt drink is highly nutritious and add good taste, the presence of sourness tends to increase over time in these fruit yoghurts.

The aim of this study to find effective solution to reduce post-acidification in yoghurt drink especially in fruit variations

How can reduce the sour taste in yoghurt drink without chemical preservatives or other high cost techniques?

The answer lies in a simple and safe solution – sodium bicarbonate. This cost-effective acidity regulator (food additive used to change or maintain pH) is not a toxic chemical preservative, combined with a careful adjustment of incubation time and a quick cooling process.

Here's the method?

Wood apple yoghurt drink preparation with modification

(Keep the yoghurt drink mixture in the incubator until the pH reaches 5.21, instead of common practice of stopping at a pH of 5)

⬇

Rapid cooling: Place in the freezer with ice cube bath until the temperature reaches 8˚C, instead of 12-hour refrigerator cooling

⬇

Sodium bicarbonate treatment to wood apple fruit pulp (0.6995~0.7 g per 100g of wood apple pulp)

⬇

Mix 135g wood apple into 1L of plain yoghurt drink

In this research study, sodium bicarbonate treatment aligned with reduced incubation time and rapid cooling method showed lower acidity level in the drinking yoghurt compared to the control group without treatment.

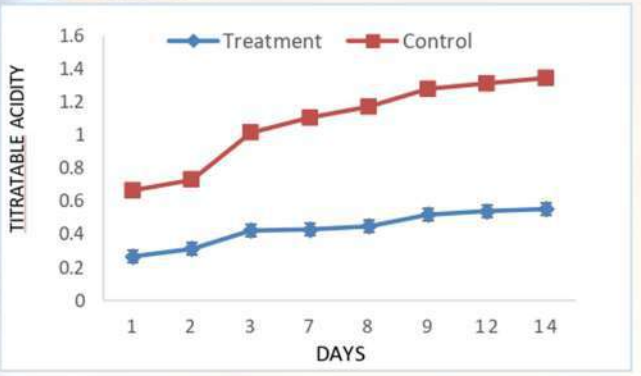


Figure 1: Changes of Acidity during the storage time

No longer do we need to depend on toxic chemical preservatives!!

Preliminary trials were conducted to select best acidity regulator and best level of sodium bicarbonate to incorporate. The incorporation of 0.7% sodium bicarbonate was found as best level. and finally give good taste without sourness.

The reason for this lies in sodium bicarbonate's react ion with the main acids present in yoghurt drink and wood apple, respectively lactic acid and citric acid. It neutralizes them, overcoming high acidity and reduce sour taste. Sodium bicarbonate, combined with changes in incubation time and the implementation of rapid cooling, emerges as a successful treatment strategy for mitigating post-acidification in yoghurt drink enriched with fruits

This is a non-technical summary of the project report titled "Strategic acidity regulation techniques to mitigate post acidification in wood apple fruit (*Limonia acidissima*) drinking yogurt" supervised by Prof. P.H.P. Prasanna*, Department of Animal Science, Faculty of Agriculture, University of Peradeniya. *phpprasanna@agri.pdn.ac.lk

OPTIMIZING PRODUCT SYNTHESIS OF *Gyrinops walla* BY USING SHOOT CULTURE TECHNIQUES

Visvanathan Devika

Introduction

Gyrinops walla locally known as *walla patta,* can produce a resinous compound known as 'Agarwood'. Agarwood is a fragrant resinous wood, which is produced as a self-defense mechanism. Agarwood is used to make expensive non-alcoholic perfumes. The ability to produce fragrance compounds by *G. walla* could be a major source of earning foreign income. It took more than ten years to produce agarwood inside the stem of the tree under natural conditions. Therefore, it is important to promote an alternative technique for agarwood resin production. Seed propagation is a reliable method, but it couldn't be applicable on a commercial scale, due to low seed production, low germination, and low seed viability. Therefore, plant tissue culture is a practicable as well as commercially feasible method for propagation as well as product synthesis without damaging the natural environment. Generally, more secondary metabolites can be synthesized from plantlets which are produced by tissue culture. Agarwood production is stimulated artificially. *G. walla* shoots can be elicited by using Salicylic acid.

What is elicitation? Plants produce some phytochemicals for their survival against biotic and abiotic stresses which process is known as 'elicitation". Factors that are responsible for the elicitation process are known as elicitors. Salicylic acid is used as an exogenous elicitor that controls several physiological processes, systemic defense signaling against biotic and abiotic stresses.

How was the study conducted? Initially, *G. walla* shoots were established in MS liquid culture medium and placed in an orbital shaker. On the 5th, 7th, 8^{th,} and 9th weeks, Salicylic Acid was incorporated with MS medium. Control samples also were established without adding Salicylic Acid. After the 10th week, all Salicylic Acid treated and control samples were harvested and freeze-dried.

Then freeze-dried samples were extracted by using ethyl acetate. Finally, Thin thin-layer chromatography was performed with extracts by using 15%methanol: chloroform as an eluting solvent.

What did the study find? The number of bands that are present in the TLC plate and the thickness of those bands show the number of chemicals and concentration of the chemicals present in the ethyl acetate extracts. The highest number of thicker bands visible on the 7th-week application of SA. Following that, thicker bands can be observed on the 5th week and 8th week application of SA. Furthermore, a considerable number of bands with medium thickness is slightly visible on the 9th-week application of SA. Less number of bands were slightly visible on control treatment. Some bands are visible in agarwood extract which are similar, and present on SA-treated samples. So, the elicitor, time of application, and time of harvesting play an important role in the elicitation process. Bands that are common to all the extracts, indicating it can be used as a common compound for identifying agarwood products. Micro-shoots without SA treatment produce a smaller number of compounds. Results indicate sufficient time is required for product synthesis. Finally, it was found that SA affects the product synthesis of G. walla shoot culture. The most correct time for application of SA is – the 7th week. The tissue culture technique has a possibility on product synthesis of *G. walla*.

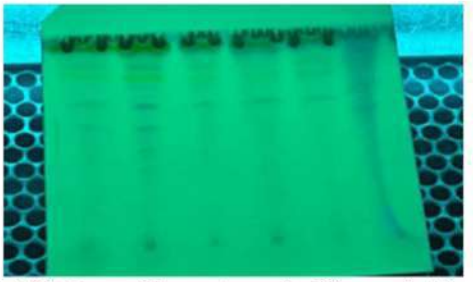


Figure 1: Thin Layer Chromatography Fingerprint Profile

Reference: Selvaskanthan, S., Kaushalya, D. B. R., Pushpakumara, D. K. N. G., Jayasinghe, L., & Eeswara, J. P. (2020b). A Comparison of Chemical Profiles of Callus, Plant, and Agarwood Extracts of Gyrinops walla using Layer **Chromatography.** ***Tropical Agricultural Research*, *31*(2), 97.** https://doi.org/10.4038/tar.v31i2.8371

This is a non-technical summary of the project report titled "Enhancement of Product Synthesis of *Gyrinops wala* Shoot Culture by Elicitation with Salicylic Acid Under a Liquid Culture System" supervised by Prof. J.P. Eeswara*, Department of Crop Science, Faculty of Agriculture, University of Peradeniya. * jpeeswara@agri.pdn.ac.lk

A part of your plate for YAMS…

Shimani Umesha Attygalle

Sri Lanka was a nation with a rich food culture that was augmented with high food diversification. Over the past years dietary patterns of Sri Lankans changed immensely, distancing nutritious natural foods. This has led to various circumstances such as food insecurity and health related problems. Therefore, it is a timely need to explore the potential of these food items and reinstate them in our diet.

Yams (*Wel ala*) belonging to *Dioscorea* spp. is one such valuable underutilized food group that needs to be explored. Being able to contribute highly in the carbohydrate requirement of the people immensely enhance their significance as a replacement for the conventional staples. This is complemented with high mineral and Vitamin C contents as well as appreciable fat levels present in these yams. They are also a rich source of valuable phytochemicals which can be linked with their utilization in therapeutic purposes in the past. Furthermore, low glycemic index of these yams make them appropriate to be consumed by diabetic patients as well. The loss of phytochemicals in yams upon preparation by boiling is also limited to approximately 50% loss.

Nutritious properties of yams

Underutilized yams in Sri Lanka belong to a wide spectrum among which 41 types of yams have been preserved in a germplasm located at Field Crops Research and Development Institute, Mahailluppallama. Their properties had not been extensively studied through scientific research, hence this study was conducted aiming to confirm their potential to provide a viable solution to the issues aforementioned. Total carbohydrate values of these yams were ranked at a high level, especially emphasizing the superior qualities of *Raja ala*, *Hingurala*, and *Dam ala*. Carbohydrate contents of yams also contributes to their acceptable flavor. Apart from that, Inulin which is a compound that supports a healthy gut microbiome was abundant in these yams with a significantly high value for *Udala*. Fat levels of the yams varied within a healthy range indicating higher fat content in purple yams. Protein content of the yams are relatively low when compared with other food items, hence their consumption needs to be supplemented with protein rich sources. It is also interesting to note that adding these yams to your diet can help to meet the daily requirement of minerals such as phosphorous, calcium, and potassium. *Raja ala* exhibited superior properties in terms of the mineral content. Recording considerable Vitamin C levels in these yams was another captivating finding of the study.

Therapeutic potential of yams

Extending the utilization of yams beyond dietary purposes, they were incorporated into traditional and Ayurvedic medicinal treatments in the past. Historical medical texts and community knowledge indicate the usage of these yams to treat digestive system related problems, skin infection, worm infections, infertility and many more disease conditions. Anticancer properties recorded for *Udala* are also notable. High contents of bioactive compounds such as phenolic compounds, anthocyanin, and flavonoid contents were recorded for these yams, confirming their therapeutic potential.

Processing attributes of yams

The most popular processing method for yams among Sri Lankans is boiling. Assessing the effect of boiling on the chemical constituents of the yams, indicated that a considerable amount of these compounds remained in the boiled yam. Diversifying the consumption of these yams, several food applications were identified based on the beneficial properties of them. Fufu, a new kind of breakfast; an instant soup powder, healthy fries from yams, yam pudding as a dessert, and a natural food colourant constituted the flavorful product portfolio which was inspired by the goodness of yams.

Way Forward

This extensive collection of scientific information leads us to believe in the potential of these yams. *Raja ala, Hingurala, Kukulala, Dam ala, Kiri kondola, Udala, Kahata ala, Java ala, Jaffna dam,* and *Kidala* can be recommended for dietary and therapeutic usage based on their prime properties. Promoting these yams will facilitate a sustainable transition in our food systems. Thus, adding these yams to your home garden, and to your next grocery list will be an invaluable step towards healthier life.

This is a non-technical summary of the project report titled "Exploring underutilized yams in Sri Lanka: An integrative assessment of nutritional, bioactive and processing attributes of *Dioscorea* species and prospective food applications" supervised by Prof. B.E.P. Mendis*, Department of Food Science and Technology, Faculty of Agriculture, University of Peradeniya. *ereshamendis@agri.pdn.ac.lk

DID YOU KNOW THAT THERE ARE DIFFERENT TYPES OF SHRIMP SPECIES IN THE MARKET?

Udari Kalpani Rupasingha

Importance of shrimps

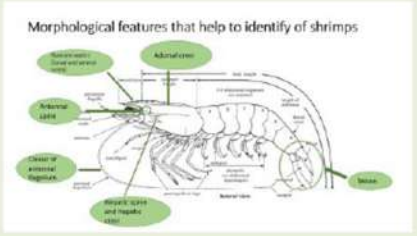
The shrimp farming industry earns high income in Sri Lanka as well as in the world. It contributes to earning foreign exchange in the country by exporting shrimp from Sri Lanka.

Shrimp identification is essential for economically as well as ecologically. It helps to the understand distribution of shrimps, sustainable harvesting practices, separated shrimps are classified according to type, which can increase consumers' preferences in the marketplace and accurate identification is essential for the management of a fishery.

Therefore, morphological methods and molecular methods are used to identify shrimp species. Morphological features of shrimps are observed by using microscopic and hand lenses.

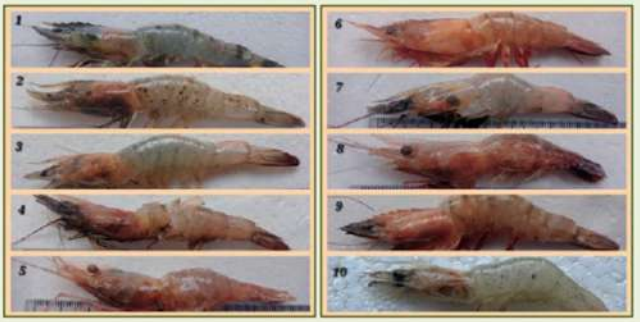
Morphological identification of Shrimps

The following characteristics are used to identify shrimp externally,



Ten types of shrimp were identified morphologically. Those are,

1) ***Penaeus monodon 2) Penaeus marginatus 3) Penaeus indicus 4) Metapenaeus monoceros 5) Macrobrachium rude 6) Parapenaeopsis coromendelica 7) Penaeus vannamei 8) Macrobrachium rude 9) Penaeus semisulcatus 10) Metapenaeus moyebi***



Molecular Identification of shrimps

The identification of shrimps using morphological features is very often difficult as features are very ambiguous. Therefore, molecular methods could be used together with morphological methods to confirm shrimp species identifications. The DNA of the shrimp was analyzed for molecular identification. It helps to provide information on the evaluation of genetic variability. Shrimp taken from the western coast of Sri Lanka were used for identification.

Studying DNA thus consists of 4 main parts. Those are DNA extraction, DNA amplification, gel electrophoresis and sequencing. Let's simple explain what are these four steps. DNA extraction is the separation of DNA from shrimps. DNA amplification is increasing number of DNA copies because there is less DNA. Then gel electrophoresis is done to see if DNA is present. Finally sequencing is done to find the DNA base sequence. Sequencing is a complex process and let's look at it in simply. Let us suppose that DNA is a string of beads made with the help of 4 colours. Finding the sequence of these beads is done in sequencing. When DNA is made up of A, T, G and C are considered as the four colours, the order is found here. Thus, base sequence of both ***P. coromendelica*** and ***M. rude*** were found.

The data of species that have been found all over the world are included in the National center for Biotechnology Information (NCBI) database. The species can be identified by entering the found sequence into the database. There *P. coromendelica* is the same type and *M. rude* is identified as ***Macrobrachium lar***. This shows the importance of combining molecular identification with morphological identification when confirming the identity of species. These two types are also included in the database and you can also look. *M.lar* is important for culturing. In countries like Indonesia, this shrimp is used for special culture and can be practiced in Sri Lanka as well.

This is a non-technical summary of the project report titled "Morphological and molecular identification of some economical important shrimp species in Western coast of Sri Lanka" supervised by Prof. A.R.S.B. Athauda*, Department of Animal Science, Faculty of Agriculture, University of Peradeniya. *sbathauda@agri.pdn.ac.lk

EVALUATE THE FRYING PROPERTIES OF COCONUT OIL THROUGH THE INCORPORATION OF TESTA EXTRACT AND VITAMIN E

W.H.P. Fernando

Consumers food preferences are varied with age. Presently fried and ready-to-eat foods are demanded by the consumers irrespective of the age limit. Street foods are mostly cooked in deep-frying oil. Although different edible oils are used for frying food, coconut oil is widely used in Sri Lanka.

Deep-frying using coconut oil

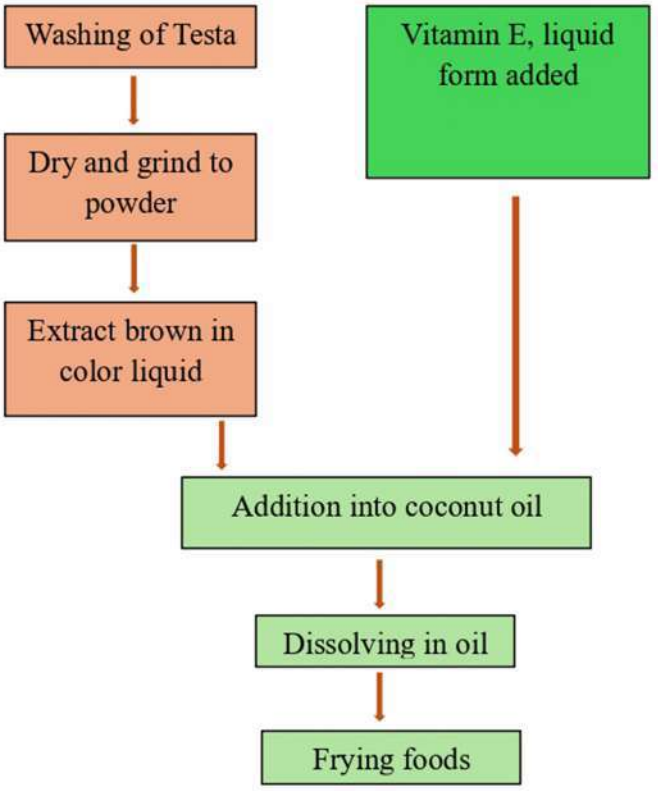
The deep-frying process, where oil is heated to 150–160°C, results in various chemical reactions in coconut oil due to the high temperature, oxygen in the air, and release water from frying food. During frying, various chemical reactions occur such as thermal oxidation, polymerization, and hydrolysis. The resulted insoluble and nonvolatile matter ae causing changes in oil viscosity and color, increases oil foaming, and decreases the smoking point.

Antioxidants activity in oil,

Chemical substances known as antioxidants can be used to enhance the oxidative stability of fats and oils by preventing the autoxidation process's free-radical mechanism. Antioxidants are added to oils and fatty foods as additives, which helps extend their shelf-life.

The thin brown layer that covers the kernel is known as coconut testa, which is produced as waste in the coconut industry and used as an ingredient in animal feed. It is a rich source of phenolic compounds, which have high antioxidant potential. Vitamin E, also known as tocopherol, carries potential antioxidant capacity, which can be used to reduce the changes that occur during the deep-frying of oil.

How can we incorporate Testa extract and vitamin E to coconut oil?



According to my research findings, it is suitable to use testa extract and vitamin E in oil to reduce oxidation, the formation of free radicals, and the degradation of oil. This will add value to testa, which is considered waste. The overall acceptability of sensory evaluation of fish, fried using testa extract-added oil is higher than normal oil and vitamin-E-added oil. Instead of vitamin E, testa extract can be used as a natural antioxidant.

Cutting the waste of coconut Testa is a way to save money, improve the quality of frying food while protecting human health

This is a non-technical summary of the project report titled "Evaluate frying properties of coconut oil through the incorporation of testa extract and vitamin E" supervised by Mr. P.C. Arampath*, Department of Food Science and Technology, Faculty of Agriculture, University of Peradeniya. * arampath@agri.pdn.ac.lk

CLIMATE CHANGE POSES THREATS TO THE COASTAL FISHERIES SECTOR IN SRI LANKA

B.H.K. MADUWANTHI

Climate Change?

Over the past few decades, climate change has emerged as a major issue within the global community. Climate change is the result of long-term changes in the weather on earth, such as rainfall patterns, temperature changes, and atmospheric changes. The effects of climate change are changing weather patterns, affecting ecosystems, influencing sea level rises, and influencing human activities.

Sri Lanka is highly vulnerable to climate change and is placed among the top 10 countries at risk of extreme weather events (Global Climate Risk Index, 2021). In Sri Lanka some specific vulnerable sectors are greatly negative impact on climate change. The Sri Lanka fisheries industry is vulnerable to climate change effects with uneven rainfall, high temperatures, and an increase in sea level.

Fisheries industry in Sri Lanka

The fishing industry is one of the major industries, and it has a significant impact on annual income in Sri Lanka. Fisheries play a key role in the nation's economy and food security. Fish provides over 50 % of the animal protein consumed in Sri Lanka.

Sri Lankan fisheries sector can be divided into two categories: marine fishing and inland fishing. Marine fishing plays a major role in improving the economic status of inland fisheries. Offshore and coastal fisheries are the two sectors in the marine fisheries industry.

Climate change poses threats to the fisheries sector, threats to marine habitats, threats to coastal communities, and threats to coastal tourism. And it has been noticed that the fish catch will decline by around 20% by 2050.

This study is focused on examining the perception of fishermen on climate change and adaptation strategies that they held to mitigate the vulnerability of their livelihoods to the Impacts of climate change.

Findings

All coastal fishermen were experienced changes in their fishing practices within last 5 years. Majority of respondents were indicated that the reason for this fishing industry change is weather changes. Most of them believe climate change is happening due to natural causes and cannot do anything to stop climate change. All respondents perceived an increased extreme weather event, poor harvest of fish. Almost all respondents perceived decreased fish species diversity. There are some adaptation practices to mitigate the negative impact of climate change. But Galle district coastal fishermen's adaptation level is low. Change the fishing ground is the one of adaptation practice that the most fishermen are used. Less number of fishermen are changed their boat structure or design, change fishing time, use another fishing gears and diversification of economic activities.

A modified boat designed to withstand climate change

More of fishermen not satisfied about available information sources to obtaining climate change. Coastal fishermen do not used more safety precautions. Most of them used only jackets.

There are some constraints for fishermen to practice adaptation practices. There are financial issues, economic crisis in the country, lack of intervention from relevant institutions to address them about what to do withstand this climate change, Lack of security for their landing sites. Lack of governmental support and involvement of the insurance companies are also low. Majority of respondents said there were no any institutions, organizations had worked to address the effect of climate change.

Conclusion

Fishermen are need to more aware about adaptation strategies to overcome climate change impact for their fishing practices and need to provide guidance. Because fishing practices, fish harvest, and fish production mainly depend on the weather condition.

This is a non-technical summary of the project report titled "Adaptation to Climate Change by Coastal Fishermen in Galle District, Sri Lanka" supervised by Dr. Kumudu P. P. Kopiyawattage*, Department of Agricultural Extension, Faculty of Agriculture, University of Peradeniya. *kumuduk@agri.pdn.ac.lk

CONVENIENT AND NUTRITIOUS SNACK FOR BUSY PEOPLE

G. U. Kalpani

Jerky…. Have you heard about Jerky? In Sri Lanka, it's somewhat strange for us. Nevertheless, in developed countries Jerky is a very popular snack commonly made from beef. Jerky is a dried ready-to-eat snack that can be stored at room temperature. It has a high demand in the world because of its easy preparation method, its lightweight, and its high nutrient content.

Problem?

A lot of people are not consuming an adequate diet due to the practice of skipping diet with the busy lifestyle and scarcity of nutritious foods. Also, economic downturns of the country have further limited the affordability for nutritious and healthy foods. However, many people are used to consume junk and unhealthy snacks such as "bite mixtures".

Solution

The introduction of a high quality protein rich nutritious and healthy snack like Jerky at low cost would be an effective solution for this situation. Also, this product will expand the range of innovative products offered by the meat industry at a low cost and provide a new food experience to the consumer.

Beef vs Chicken gizzard

Beef is expensive and it is not very popular in Sri Lanka. Chicken gizzard is a by-product from broiler meat processing and comparatively low in price. Similar to beef, gizzard meat is red in color. In addition, chicken gizzard is rich in high quality protein, iron, vitamin A and vitamin B complexes as well as a half of the fat found chicken meat is composed of beneficial monounsaturated fats, while only one-third consists of less healthy saturated fats. It also provides essential polyunsaturated fatty acids (PUFAs), such as omega 3 fatty acids, and does not provide trans fats which cause coronary heart disease. Therefore, chicken gizzard-based Jerky which is comparable to pork or beef Jerky was developed.

Methodology

Mincing of gizzard and drumstick meat separately

↓

Mixing of gizzard and drumstick at 1:1 ratio with the marinade

↓

Spreading of the mixture uniformly on oil paper at thickness 0.5 cm

↓

Cutting into 4cm width stripes carefully alone with the oil paper

↓

Arranging of raw Jerky stripes on trays and freezing for 15 hours

↓

Drying of raw Jerky stripes in an oven for 10-12 hours at 55°C

↓

Jerky

Jerky with garlic flavored marinade was selected as the most desirable flavor attribute than the sweet and chili flavors. Jerky produced from a 50:50 gizzards to drumstick meat ratio was selected as the most desirable textured attribute than 100% gizzard, 75% gizzard:25% drumstick, and 50% Gizzard:50% drumstick Juries. These flavor and texture attribute were selected from two distinct sensory evaluations. According to my research findings,50% gizzard meat and 50% drumstick meat and garlic flavor marinade with an extended period of mixing period can be used to develop Jerky with highly comparable sensory attributes and high-quality attributes. It can be used as a snack that not only stimulate your taste buds but also provide you high protein content.

This is a non-technical summary of the project report titled "Characterization of physicochemical, sensory and microbial properties of Jerky processed from chicken gizzard and drumstick meat" supervised by Prof. S. M. C. Himali*, Department of Animal Science, Faculty of Agriculture, University of Peradeniya. *smchimali@agri.pdn.ac.lk

Salicylic Acid: To Supercharge Your Salads!

H.M.K.C. Nawarathna

Picture this: A world where vegetables are not just food, but power packs of nutrition! Plants have various bioactive compounds like polyphenols, alkaloids, terpenoids, and vitamins. **Ever considered this?** When plants face adversities, they activate their superhero skills, producing these bioactive compounds to defend themselves for their survival. However, the most important part of these compounds is not only they provide benefits to plants; they also offer a plethora of health benefits to mankind.

Salicylic acid (SA): Yes, the same active ingredient in aspirin! **Fear not;** it is a natural plant hormone whose external application acts as a gentle tickle to plants, promoting them to activate their nutritional power. Additionally, this translates to sturdier growth, long-lasting freshness, and enhancement of beneficial compounds that your body needs. Thus, we **investigated the possibility of enhancing bioactive compounds** with the help of SA. Lettuce seeds were grown in nursery trays and moved into nutrient-rich pots under plant house conditions. There, we ensured adequate sunlight, water, and plant nutrition to maintain Lettuce healthier. Then **we exited the lettuce** plants by applying 100 ppm SA to the leaves of the lettuce at three distinct stages of growth (the 35th, 42nd, and 49th day after germination).

By assessing parameters like total polyphenol compounds, vitamin C content, and antioxidant activity using standard methods under laboratory conditions, **we uncovered promising results**. The results were observed immediately at harvest and after seven days of storage at refrigerated (4°C) and room temperature conditions. Notably, our findings suggested that carotenoids present in green lettuce exhibited greater stability at refrigerated (4°C) conditions compared to storage at room temperature. Vitamin C content in two storage conditions was significantly higher ($P<0.05$) in plants treated with SA on the 49th day, and showed a lesser decrease during both storage conditions, indicating an enhanced stability of vitamin C in treated lettuce.

Total polyphenol content was also higher on the 49th day of application in all stages, while the increment of antioxidant activity was identified in all three treatments. Interestingly, it highlighted a notable correlation between polyphenols and antioxidant activity at harvest. In conclusion, the application of SA on the 49th day activated the bioactive compounds in lettuce ensuring their stability.

With these findings, **I'm certain!** applying SA will become a promising preharvest practice that will enhance the economic value of freshly harvested lettuce, directly addressing the key health and well-being concerns.

This is a non-technical summary of the project report titled "The effect of Salicylic Acid on growth, shelf life, and bioactive compounds present in lettuce (*Lactuca sativa* L.)" supervised by Prof. J.P. Eeswara*, Department of Crop Science, Faculty of Agriculture, University of Peradeniya. *jpeeswara@agri.pdn.ac.lk

A VACCINE FOR "BEAN YELLOWING DISEASE"

Lakshani Thilakarathne

Do you know????
Immature yellow colored bean leaves a thread to a high yield……..

There is a viral disease known as Bean yellowing disease in bean cultivation caused by Horsegram yellow mosaic virus. Among viral diseases, bean yellowing disease is one of the major threats in bean cultivation and causing severe yield reduction. It starts with the gentle yellowing of immature leaves, taken after by advancing mosaic design, which appears as irregular mottling scattered with greenish regions. With the time these mottles create and turn into expansive patches. Eventually the leaves end up smaller and the pod length and size are reduced. Commonly, the plant gets to be stunted.

Figure1: Symptoms of bean yellowing disease

DNA as a Vaccine…

Plant immunity is triggered by the recognition of exogenous molecules. DNA can be used as an exogenous molecule to induce immunity in bean plants. Since controlling plant virus diseases is impossible, exploration of alternative strategies to minimize the damage is of greater interest among scientific community. One such strategy is application of genomic fragments (DNA or RNA) to suppress the virus and thereby to attain a considerable level of protection from the virus. Topical application (application to the plant surface) of DNA fragments as immune activators is an effective method as well as practically applicable, in terms of inducing the immunity of plants, hence developing resistance towards viral diseases.

Is topical application of DNA possible?

The stability of topically applied nucleotide fragments and long-lasting protection given by them is a main problem.

What can we do?

Nano-technological strategies as remedial measures to protect plants from different pathogens arising and is a new strategy. Nano-clay is a one such material that can be easily employed and possess a number of advantages such as preventing DNA from degrading from various biotic and abiotic factors, hence giving a long-lasting protection from the pathogens. By mixing DNA, nano-clay and water; water based formulations can be prepared. Those formulations can be sprayed to plants.

As future directions of research findings,

Developing a field trial to evaluate the effect of nano-clay encapsulated genomic fragments (DNA) to reduce Bean yellowing disease infections need to be done. After that, developing a product that can be practically used in small, middle and large scale can be done.

Figure 2: Nano-clay

This is a non-technical summary of the project report titled "Application of nano-clay encapsulated coat protein fragments as immune activators against common bean yellowing disease caused by Horsegram yellow mosaic virus" supervised by Mr. Ryan Rienzie*, Department of Agricultural Biology, Faculty of Agriculture, University of Peradeniya. *ryanrienzie@agri.pdn.ac.lk

Local Traditional Rice Variety, *Rathuheenati* as a Source Against BPH Problem

N.S. Wijewardhana

BPH: major biotic stress oof rice?

Brown Planthopper (BPH) is a sap feeding insect pest which is considered as the most devastating rice pest. It primarily causes the 'hopper burn' symptom where plants turn to brown color and wilted, ultimately resulting death of plants. Furthermore, this pest indirectly damage rice yield as a virus vector.

Hopper burns affected paddy field

Why is it not controlled successfully?

This pest is highly adaptive for different conditions. Long term stability of available resistant rice varieties has reduced due to new emerging biotypes of the pest. Pest management approaches including chemical and biological methods could not cope with the scale of BPH damage.

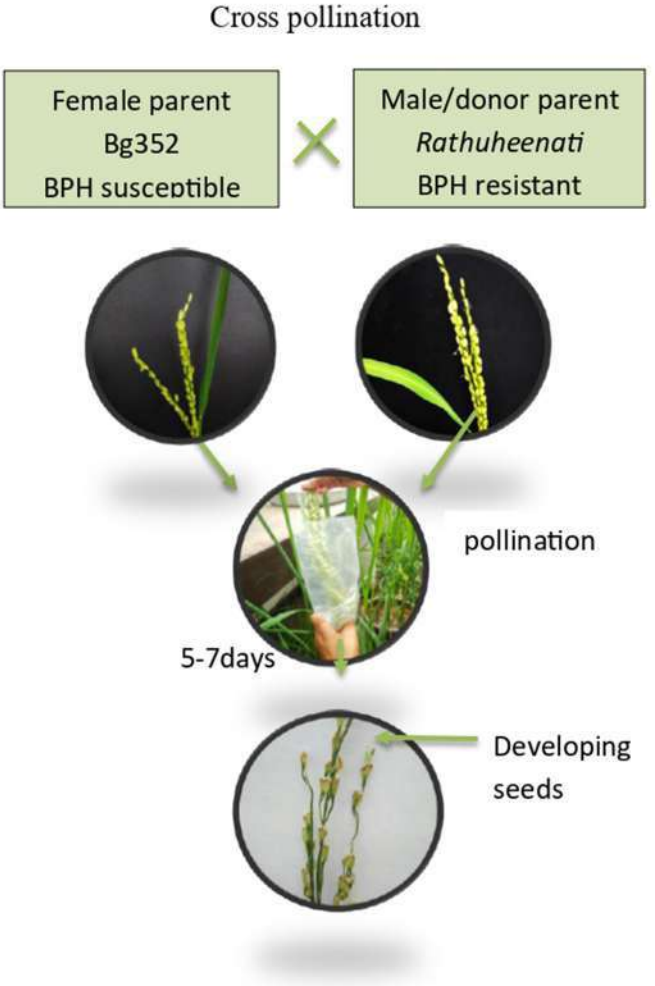
Host plant resistance as a sustainable and ecofriendly method of control

BPH resistance is a quantitative trait and controlled by multiple Quantitative Trait Loci (QTL). Around 40 BPH resistant rice genes have been identified which mediate defense mechanisms in the plant.

Rathuheenati as a resistance source?

Bph3 is durable and broad-spectrum resistance QTL initially identified from the Sri Lankan traditional rice variety *Rathuheenati*. This is a valuable resistance source that can be utilized for varietal development to overcome yield damage due to BPH.

How resistance in *Rathuheenati* is effectively incorporated to a susceptible rice variety?



By using resistant variety *Rathuheenati* as the pollen donor, BPH resistance is incorporated to the susceptible popular rice variety Bg352. Success rate of 10-12% was observed through developing seeds.

What is the future of new progeny?

Hybrid progenies obtained from the cross pollination should be screened both phenotypically and genotypically to assess the level of resistance acquired. Furthermore, several back crosses will ensure high level of resistance in the hybrid variety developed from this study.

This is a non-technical summary of the project report titled "A Detailed Analysis of selected BPH resistance QTLs in Rathuheenati and local mega rice varieties" supervised by Dr. L.H.M.Y.K. Somaratne*, Department of Agricultural Biology, Faculty of Agriculture, University of Peradeniya. *yamunas@agri.pdn.ac.lk

DID YOU AWARE ABOUT MIRACLES OF KING COCONUT IN SRI LANKA'S EXPORT MARKET?

Sridhurga Neduncheliyan

King coconut is a coconut type, which is native to Sri Lanka. It is one of the most important plant in export market. It has many important values as beverages, medicine, therapeutics etc. Also, the health hazards caused by artificial drinks shift the demand towards king coconut as a beverage. King Coconut contributed Rs. 110 million worth of foreign exchange in the year 2022 in Sri Lanka.

But the less planting programs, pest attacks make the need for securing the existing different types of King coconut plants and do improvements in existing plant characters for better future of King Coconut industry in Sri Lankan Export market. The knowledge about different types and characters of king coconut is essential for the improvement and conservation of king coconut. Even though there was less researches were done regarding King Coconut characters and differentiation in Sri Lanka. Therefore, by this research, the characters and variety of King Coconut types in North western province were investigated in morphological and molecular base.

In this study, the leaf samples were collected from different locations of North western province. Then the King Coconut palms were examined by morphological and Molecular analysis. In morphological characterization the leaf, stem, and nut parameters were analyzed through Minitab software. The molecular characterization done through the series of activities, which were DNA extraction, PCR amplification and Polyacrylamide gel Electrophoresis. The characterization of King Coconut reveal the degree of differentiation among King Coconut population in North western province of Sri Lanka.

The score plot shows three different groupings. One group consists of the tall type palms. The second group mainly consists of dwarf varieties. Most of the King coconut palms are grouped except some palms, which show intermediate characteristics to the tall and dwarf with moderate morphological variations.

The summary statistics and hierarchical clustering of molecular data show that two sub-populatiosns of King Coconut in North western province with less genetic diversity. The king coconut has less gene diversity and heterozygosity because the King Coconuts are naturally self-pollinated crops. The self-pollination reduce the chance of variation in King Coconut populations. But there is very less chance to occurrence of cross pollination and have variations within King Coconut population.

The degree of variation aid in collection and conservation of king coconuts. If a population have less genetic diversity we don't need to collect many palms for conservation. It will reduce the cost for the conservation. The presence of higher diversity will useful in coconut improvements programs regarding beverages.

The research findings elucidate moderate morphological diversity, while the cluster analysis and hierarchical clustering show two subpopulations of King Coconut palms within the northwestern province. Therefore the degree of conservation is less in north western province. Also the descriptive values will be use full in future beverage related improvement. Then Sri Lanka Will be a king of King Coconut producer in world market. It will lead to best future for Sri Lankan coconut production. So this is the time to become King of beverage industry in world.

This is a non-technical summary of the project report titled "Morphological and Molecular Diversity of King Coconut Genetic Resources in Northwestern Province" supervised by Prof. S.A.C.N. Perera*, Department of Agricultural Biology, Faculty of Agriculture, University of Peradeniya. *chandrikaperera@agri.pdn.ac.lk

ANTAGONISTIC POTENTIAL OF ENDOPHYTIC MICROORGANISMS IN RUBBER LEAVES TO CONTROL CIRCULAR LEAF SPOT DISEASE

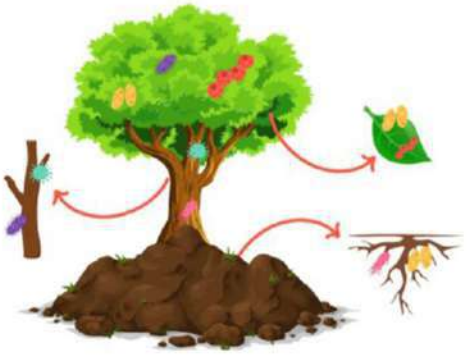
M.H.N.C.Weerasinghe

What is Circular Leaf Spot Disease?

Circular Leaf Spot Disease (CLSD) is a new addition to the list of economically important diseases in rubber. Even though this was first reported in Sri Lanka in 2019, by now it considered as a devastated disease in rubber since more than 30% of newly developed leaves have fallen by 3-4 months after infection. Two fungal pathogens (*Pestalotiopsis* sp. and *Colletotrichum* sp.) were reported as causal organisms of this disease.

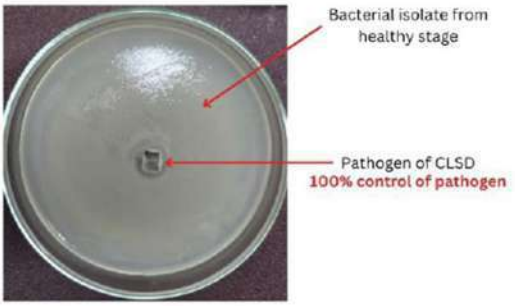
Who are Endophytes?

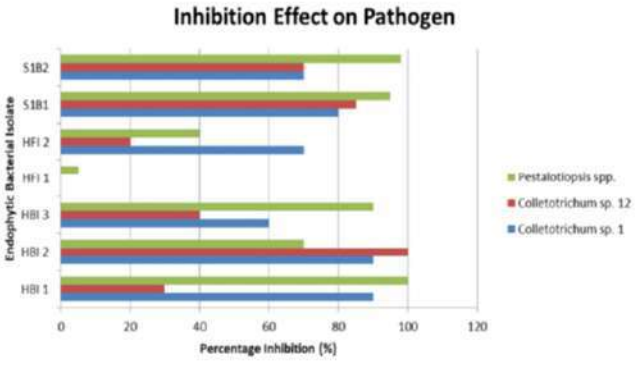
Endophytes are the microorganisms naturally live within plants by carrying out various beneficial functions including plant growth promotion, enhance nutrient uptake, biotic and abiotic stress tolerance, disease suppression, etc.



This study focused on the disease suppression nature of these microbes to screen the potential of natural microbiome within plants to control Circular Leaf Spot Disease.

From healthy rubber leaves five different bacterial endophytes and two different fungal endophytes were selected. From those seven endophytes six have shown 20- 100% inhibition against pathogens of CLSD (i.e., *Pestalotiopsis* sp. and *Colletotrichum* sp.)





This study can be further improved to make formulations by these selected endophytic microbes to apply as a biopesticide to control CLSD and for other diseases caused by *Colletotrichum* sp. and *Pestalotiopsis* sp.

This is a non-technical summary of the project report titled "Determination of the diversity of Culturable Endophytic Microbial Population in the leaves of healthy and Circular Leaf Spot Disease Infected Rubber Plants" supervised by Prof. D.M. De Costa*, Department of Agricultural Biology, Faculty of Agriculture, University of Peradeniya. *dmdcosta@agri.pdn.ac.lk

From Garden to Wellness: Determination of Bioactivity Potential of Selected Medicinal Plants in Sri Lanka

M.A.K.H. Mallawa Arachchi

Did you know that non-communicable diseases (NCDs) are the major cause of death worldwide? Poor diet is a significant contributor to this trend. Hence, there's an urgent need for innovative functional foods to prevent these conditions. The power of medicinal plants has been recognized for centuries in various cultures around the world. In Sri Lanka, there are 1,430 medicinal plant species. From treating common ailments to combating life-threatening diseases, these wonder herbs have proven to be extremely effective. In this research, we will explore the bioactive potential of these plants for the prevention of NCDs.

Why Medicinal Plants as Functional Food Ingredients? Medicinal plants offer several advantages, being natural and easily accessible. They grow abundantly, even in home gardens or on windowsills, making them available to anyone. Unlike conventional medicines with side effects and high costs, incorporating medicinal plants into your diet is empowering, enabling you to enhance your well-being with nature's bounty.

What are the medicinal plants we explore in this research? In this study, the focus is on six medicinal plants with numerous Ayurvedic applications, but scientific validation of their potential is necessary. These medicinal plants include *Heen Bovitiya, Heeressa, Heen Araththa, Ankenda, Nika, and Lunuwila*. Leaves serve as the plant material for this investigation. **Exploring the bioactive potential of these plants** First, it's essential to know what bioactive potential is. Bioactive potential refers to the possibility that a substance derived from a living organism (plant, animal, or microbe) can have a beneficial effect on human health. Bioassays are simple tools used to evaluate the bioactive potential of these herbs. The first step of this study is to evaluate the total phenolic (TPC) and flavonoid (TFC) content of these plants. Because the content of these compounds gives valuable insight into the bioactive potential of these plants. The plants exhibit varying levels of TPC and TFC. Heen Bovitiya shows the highest TPC and TFC content.

Table 1: TPC and TFC Content of Selected Plants

Plant	TFC (mg of CE/ g of extract)	TPC (mg of GAE/ g of extract)
Ankenda	0.00	69.07
Heen araththa	0.84	51.97
Heen bovitiya	2.48	291.69
Heerassa	0.77	43.42
Lunuwila	1.40	51.33
Nika	1.46	64.63

The next step is to evaluate the antioxidative, anti-hyperglycemic and anti-obesity properties. Antioxidant properties help prevent heart disease, cancer, and neurological disorders. All plants in the study exhibited antioxidant properties, with Heen Bovitiya showing the highest levels. Anti-hyperglycemic and anti-obesity properties are evaluated through assays measuring α-amylase, α-glucosidase, and lipase inhibitory activity. Only Ankenda and Heen Bovitiya exhibited significant α-amylase inhibition, with Heen Bovitiya also demonstrating notable α-glucosidase inhibitory activity. Additionally, all plants except Lunuwila exhibited α-glucosidase inhibitory activity, while four plants, excluding Heerassa and Nika, showed low lipase inhibitory activity.

Is there any toxicity in these plants?
One might be concerned about the safety of consuming these plants as a food ingredient. The brine shrimp lethality assay, a simple test for plant extract toxicity, revealed none of the extracts were as toxic as atropine, a standard reference point for this assay. However, incorporating these plants into functional foods requires determining safe and effective proportions.

The study concluded that the extracts of selected medicinal plants have a bioactive potential that claims various pharmacological properties and can be used as ingredients in functional food development for managing non-communicable diseases.

This is a non-technical summary of the project report titled "Determination of Bioactivity Potential of Selected Medicinal Plants in Sri Lanka" supervised by Prof. B.E.P. Mendis*, Department of Food Science and Technology, Faculty of Agriculture, University of Peradeniya. *ereshamendis@agri.pdn.ac.lk

DEVELOPMENT OF FROZEN GINGER PUREE CUBES AND REDUCTION OF ITS POST QUALITY DETRIORATION

R.N. Fransis

A Tale of Frozen Ginger Puree Cubes

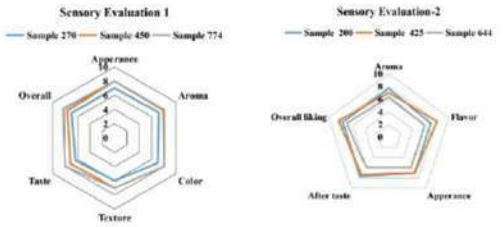
Crafting the ideal frozen ginger puree cube is a culinary art in which science meets creativity to produce a harmonic balance of flavor, fragrance, and texture. The product is a jewel-like cube encapsulating the essence of ginger, ready to add its distinct and bright taste to a range of recipes.

Ice Spice and everything nice

The journey of making frozen ginger cubes begins with a thorough selection of excellent ginger rhizomes. These rhizomes are carefully peeled, chopped, and blended into a velvety puree, capturing the flavor of ginger in its purest form. To improve the smoothness and stability of the puree, a specific amount of water is added, ensuring that each cube freezes into a perfect form. To reduce stickiness and improve the entire experience, xanthan gum is masterfully blended. What was the result? A product that is not only convenient and delicious, but also keeps the fiery, fragrant character that has made ginger a popular cooking ingredient. Each cube is a gourmet pleasure, ready to enhance any meal with its bright flavors and scent.

Embark on a scientific journey into the creation of the perfect frozen ginger puree cube

Through meticulous experimentation, the ideal ginger-to-water ratios were unveiled as 70G:30W, 80G:20W, and 90G:10W. These ratios were chosen based on thorough analysis of thawing rates and visual assessments, ensuring optimal texture and shape. To combat stickiness and enhance texture, the chosen ratios underwent a transformation with the strategic addition of xanthan gum. This not only reduced stickiness but also improved overall quality. Physicochemical parameters such as viscosity, pH, moisture, and color were closely monitored, ensuring that the cubes met stringent quality and safety standards while maintaining consumer acceptance. Sensory evaluations crowned the 90G:10W ratio as the champion, ensuring that each cube delivers a burst of ginger goodness. Comparisons with dried ginger powder and fresh ginger provided further insights into the cube's appeal. The quest for perfection didn't stop there. Shelf-life studies were conducted, with Total Plate Count (TPC), yeast, mold, *E. coli,* and Coliform tests revealing that the cubes remained within acceptable limits for three weeks, ensuring that each cube is not just a culinary delight but also safe for consumption.



How Frozen Puree Cubes Are Transforming Culinary Creativity and Sustainability"

Provision of consistent flavor and aroma ensuring every dish and beverage flavorful at its best, while retaining its nutritional value is the main advantage. Furthermore, extending the shelf life of ginger reduce the amount of ending up in the trash. Not only that, ensuring every part of the ginger to be used during food preparation also a greater remark. Therefore, frozen ginger puree cubes are more than simply frozen cubes; they are a culinary invention that has changed how we think about ginger in the kitchen.

This is a non-technical summary of the project report titled "Development of frozen ginger cube and reduction of its post quality deterioration" supervised by Prof. W.M.T. Madujith*, Department of Food Science and Technology, Faculty of Agriculture, University of Peradeniya. *tmadhujith@agri.pdn.ac.lk

APSIM MODEL TO ENHANCING NITROGEN FERTILIZER EFFICIENCY FOR Bg 300 IN DRY AND INTERMEDIATE ZONES OF SRI LANKA AND PREDICTING FUTURE CLIMATE TRENDS

Kajanithy Mylvakanam

Introduction

Rice cultivation is a vital part of agriculture, particularly in regions like Sri Lanka where it's a dietary staple.

It's really important to manage how much nitrogen fertilizer we use responsibly. Doing experiments in fields over many seasons and locations costs a lot of time and money. Instead, use a model called APSIM. With APSIM, can try out lots of different ways of managing nitrogen without having to do so many expensive field trials. APSIM can also help us predict how different climates might affect our crops in the future.

This study focused on improving rice cultivation practices, specifically regarding the use of nitrogen fertilizer for the Bg 300 variety in Sri Lanka. Currently, fertilizer recommendations don't consider the varying climate conditions, which can lead to lower yields and environmental issues. To address this, used APSIM model to figure out the best nitrogen fertilizer rates for dry and intermediate zones and future climate scenarios.

How was the study conducted?

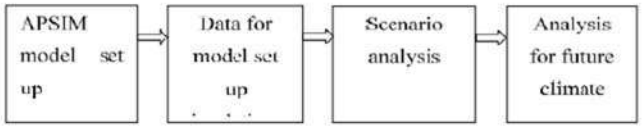


Figure: Study's analysis procedure

APSIM- Oryza model version 7.9 was used for the scenario analysis. All crop management practices- DOA recommendation except for Nitrogen (for which different 625 scenarios will be used). Run APSIM simulations with different N management scenarios with 30 years of past weather data andpredicted grain yield and N leaching for BG300 rice variety (separately for dry and intermediate zones). Determined the optimum N management regime based on the yield maximization and N leaching minimization for the present situation, and futurescenarios 2050 and 2100.

Results and Discussion

Simulations showed that in dry zones, the Bg 300 rice variety could produce around 4305.2 kg/ha yield during the Maha season with 200kg/ha of nitrogen fertilizer. Looking ahead, found that using slightly less fertilizer (150kg/ha) could still increase yields to 4529.1 kg/ha by 2050 and 2100, but this might lead to more nitrogen leaching into the environment.

Figure: Optimum Urea for dry zone

In intermediate zones, the study revealed that using 175 kg/ha of nitrogen fertilizer could yield about 4407.1 kg/ha of rice yield. Future projections suggested that this could increase to 4591.2 kg/ha with the same fertilizer rate, but again, there could be more nitrogen leaching.

Figure: Optimum Urea for intermediate zone

Conclusion

The findings suggest that adjusting Nitrogen fertilizer to optimal rates can help achieve a more sustainable approach, balancing higher crop yields with reduced environmental impact.

This is a non-technical summary of the project report titled "Modeling Approach to Optimize the Nitrogen Fertilizer Rates for Bg 300 in Dry and Intermediate Zones of Sri Lanka and Projecting Fertilizer Rates for Future Climate Scenarios" supervised by Dr. W.M.T.P. Ariyarathne*, Department of Crop Science, Faculty of Agriculture, University of Peradeniya. *mojith@agri.pdn.ac.lk

UTILIZING BASMATI RICE FLOUR AS A LOW-GLYCEMIC FOOD INGREDIENT AGAINST DIABETES

Ishara Darshana Weerarathna

Rice is the staple food in Sri Lanka. Rice flour, a versatile substitute for wheat flour, is the main ingredient in many food products, such as string hoppers, hoppers, noodles, pittu, etc. additionally, it has been used as an ingredient in many cereal-based products, such as biscuits, snacks, breakfast cereals, fortified food products, etc. basically, glycemic index (GI) is how quickly the blood glucose level is increased by the carbohydrate in food. According to studies, overconsumption of high-GI rice is strongly associated with non-communicable diseases especially type 2 diabetes.

Diabetes is a chronic metabolic illness defined by high amounts of glucose in the blood, and it presents considerable health challenges worldwide. Managing diabetes relies heavily on lifestyle treatments, including dietary alterations, with a strong emphasis on consuming low GI foods. These foods gradually release glucose into the system, which helps prevent sudden increases in blood sugar levels and supports the control of diabetes. Then long grain rice varieties like basmati normally contain lower GI.

Our study investigates the feasibility of utilizing basmati rice flour, known for its low-GI properties, as a potential ingredient in food products targeted for diabetes management. For the study three basmati type varieties were used: CIC Red Fragrance (CIC-RF), CIC Sticky basmati (CIC-SB) and CIC White basmati (CIC-WB). Then using rice flour from these rice varieties string hoppers were made for the study as the base product.

Thirteen healthy individuals aged 18-25 with normal BMI were recruited for the study. They were non-diabetic, not on medication, and non-smokers. The GI test was conducted according to procedures recommended by the World Health Organization (WHO). Participants consumed a standardized portion of cooked string hoppers containing 50 g of carbohydrate along with 250 ml of water. Blood glucose levels were monitored at corresponding intervals. The GI was calculated according to the standard method proposed by WHO. According to the results, CIC-RF and CIC-WB were determined to have low GI, and CIC-RF had a GI value of 50 while CIC-WB had a GI value of 54. On the other hand, CIC-SB can be classified as medium GI category as it is having the GI value of 64.

The results indicate that products derived from CIC-RF and CIC-WB rice flour could be viable choices for those controlling diabetes, in accordance with the recommendations of the WHO. The implication of the study is that the use of basmati rice flour in the manufacture of food products shows potential for effectively managing diabetes. By incorporating low-GI ingredients like CIC-RF and CIC-WB rice flour, food manufacturers can produce diabetic-friendly products that promote stable blood sugar levels. This innovation not only enhances dietary diversity but also provides practical solutions for individuals seeking healthier food choices against rising diabetes prevalence.

This is a non-technical summary of the project report titled "Evaluating the Feasibility of Long Grain Rice Flour for Developing Food Products Having Low Glycemic Index" supervised by Mr. N.Y. Jayanath*, Department of Food Science & Technology, Faculty of Agriculture, University of Peradeniya. *jayanathny@agri.pdn.ac.lk

EXPLORING HEAT MOISTURE TREATMENT EFFECTS ON STARCHES FROM KIRI ALA, HULANKEERIYA AND BUTHSARANA

D.R.Kaduruwana

Introduction:

Starch is an abundant carbohydrate of plants. The properties of starch depend on several parameters including botanical origin. Native starch consists with several limitations for the application of industry, including insolubility in cold water, less solubility, thickening ability after cooking, etc. During gelatinization of starch, there is a loss of ordered structure followed by retrogradation. As a result, syneresis or water separation can be seen in starchy food systems. Starches from many of the root and tuber crops are not widely used in food industry because of their poor functional properties.

Therefore, this research is aimed to evaluate the effect of heat moisture treatment (HMT) on physicochemical properties and granular morphology of three starch types: *kiri ala, hulankeeriya, buthsarana.*

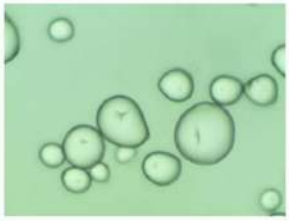
Methodology:

Starch extraction was done using a wet milling method and further purification was done using NaOH. For the heat moisture treatment, specific moisture content, temperature and time period for the heat treatment is required to select. Therefore,

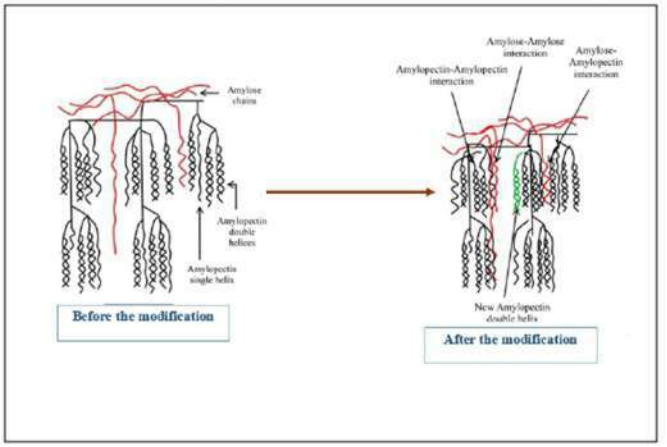
Moisture contents → 18%, 24%
Temperature → 100 °C, 120 °C
Time → 4 hours, 6 hours

After the modification, morphology and physicochemical properties were evaluated.

Results and Discussion:



Light microscopy and Scanning electron microscopy of modified *hulankeeriya* starch



- Starch granule size and shape were not changed after the modification.
- HMT has resulted in a decrease in bulk density than the native starches. *Kiri ala* starch exhibited the lowest bulk density among three starch types. *Hulankeeriya* and *buthsarana* have exhibited nearly similar results.
- Water Holding Capacity has increased in all modified starches than their native starch types except 24%, 4h, 100 °C and 24%, 6h, 100 °C treatments in *kiri ala.*
- Oil Holding Capacity has increased in *hulankeeriya and buthsarana* but, decreased in *kiri ala* after the modification.
- Swelling power increased with increasing temperature, and at temperatures of 80 and 90 °C it often showed an increase compared to other temperatures. At higher temperatures, especially at 80 °C, the swelling power capacity of native starch is higher than that of modified starch.
- Modified starches of *kiri ala* and *hulankeeriya* showed increased transparency values compared to their native starches, indicating lower turbidity or lower retrogradation in modified starch.

HMT could be an alternative for chemical modification methods altering the properties of root and tuber starches. Further study is applicable for those treatments which are selected showing better results. And also, those treatment combinations can be used for actual food applications and examined the effectiveness.

This is a non-technical summary of the project report titled "Effect of effect of heat moisture treatment on morphology and physicochemical properties of starches extracted from three selected root and tuber crops" supervised by Dr. E.R.J. Samarakoon*, Department of Food Science and Technology, Faculty of Agriculture, University of Peradeniya. *rasanjalis@agri.pdn.ac.lk

ESTABLISHMENT OF A TRAINED SENSORY PANEL AND EVALUATION OF THE PERFORMANCE

R.G.D. Randula

Introduction

Sensory evaluation is a significant method in food product development, formation and food quality evaluation. Establishment of a trained sensory panel was one of the main requirements for the expansion of quality evaluation through subjective method. HJS Condiments Ltd processes a diverse range of products. However adequate subjective evaluation method should be improved in order to differentiate slight change in sensory attributes that leads loss of customers and consumers demand and satisfaction.

Establishment of a trained sensory panel

Establishment of sensory panel involves recruiting and training individuals to evaluate products using their senses. Steps include orientation, basic sensory education, prescreening questionnaire, screening tests, trainings, scale tests and validation.

The pre-screening questionnaire encompasses basic personal information, such as name, age, and contact details. Sensory abilities are health, and dietary habits, participants' taste, smell, and texture discernment, along with any food allergies or sensitivities. availability, commitment, and scheduling constraints are assessed regularly. Preferences regarding product types and personal interests in participating are also solicited. Lastly, consent is obtained for participation in the pre-screening process.

The basic sensory taste test conducted with sugar, salt, citric acid and caffeine. Matching test with lower number of substances to identify the thresholds. Randomly presented the samples. After that the persons who were correctly identified ones selected for future tests.

A basic odor test done with samples of cinnamon, vanilla flavor, lemon flavor, almond flavor, and acetic 2% drops absorbed into separate cotton wools and placed inside of the capsulated bottles and its prior to the 30 minutes from the test.

Taste ranking test was conducted using sugar concentration, salt concentration and citric acid concentration series.

Color ranking test was done with the blackcurrant Squash. The texture descriptive test was conducted using marshmallow, creamy toffee, jackfruit, salad cucumber and oranges. The texture preference was measured.

The paired comparison test with 0.5%, salted and 1% salted jackfruit was used. Duo-trio odour test was conducted with using artificial vinegar and coconut vinegar. Not only that Duo-trio taste test was conducted with 0% salted jackfruit and 1% salted jackfruit using.

Three scale tests were conduct and interval scale was done with 10%, 50% and 100% artificial vinegar samples as an odour test.

Category scale done for evaluating texture of fresh gherkins, 100 ^{0}C and 3 minutes treated, and 100 ^{0}C and 10-minute treated gherkins.

Ratio scale done with citric solutions of citric acid concentrations of 0.35 moll^{-1}, 0.7 moll^{-1} and 1.5 moll^{-1}.

Evaluation was done with performance analyzing using three jackfruit products of HJS condiments Ltd.

They were 0% salted sterilized tender jackfruit can, 0.8% salted pasteurized tender jackfruit pouch and 1.5% salted pasteurized tender jackfruit pouch. Same tests were conducted three times for replicate the results.

Success of the trained panelists.

After conducting a rigorous pre-screening process followed by basic screening sensory tests, 33 panelists were selected initially. However, only 18 panelists passed the odor test, while 16 passed the ranking test. Following further evaluation, 15 panelists were selected from the texture test. Duo trio tests and paired comparison tests were correctly answered by the panelists. Scale tests and performance evaluation tests were shown that there wasn't a significant difference among the panelist ($p>0.05$) There was no significant difference among the selected panelist of the established in-house sensory panel ($p>0.05$).

This is a non-technical summary of the project report titled "Establishment of a trained sensory panel and evaluation of the performance" supervised by Mr.P.C.Arampath*, Department of Food Science and Technology, Faculty of Agriculture, University of Peradeniya. *arampath@agri.pdn.ac.lk

FUELING CHAMPIONS: ASSESSING NUTRITIONAL STATUS, LITERACY, AND NUTRIENT INTAKE AMONG UNIVERSITY OF PERADENIYA UNDERGRADUATES IN SELECTED SPORTS

K.S.K.U.N. Gunawardana

What are Sports?

Why are They Important to Undergraduates?

Sports can be defined as human activities that encompass precise management, coordination, and a historical context of regulations that outline the purpose and restrict the manner of human conduct. There is a great help from sports for undergraduates not only for the development of their health but also for facing day-today challenges such as unfavorable conditions, problems, conflicts and negative emotions such as depression etc.

What is the Importance of Nutrition in Sports?

Nutrition is the process of obtaining and utilizing food for growth, energy, and health. It involves consuming essential nutrients like carbohydrates, proteins, fats, vitamins, minerals, and water, and the utilization of these nutrients in the body through digestion, absorption, and metabolism. Nutrition plays a major role in optimizing performance of athletes and it is a critical component of success for individuals participating in sports and physical activities.

Nutritional Status, Nutritional Literacy and Nutrient Intake???

These three are main factors of nutrition. To get the maximum benefit from sports, athletes should have better understand about nutritional status, nutritional literacy and nutrient intake.

Nutritional status: The overall health and well-being of an individual regarding their diet and nutritional intake. It includes factors such as body weight, body composition, and the presence of any nutrient deficiencies or excesses.

Nutritional literacy: An individuals understand and knowledge on nutrition-related information. It involves being able to interpret food labels, make intelligent dietary choices, and understand the importance of different nutrients in maintaining health.

Nutrient intake: The amount and quality of nutrients consumed through the diet. Sufficient intake of essential nutrients such as carbohydrates, proteins, fats, vitamins, minerals, and water are important for supporting bodily functions, growth, and overall health.

Nutritional Status, Nutritional Literacy and Nutrient Intake of Undergraduate Athletes at University of Peradeniya.

The level of nutritional status, nutritional literacy and nutrient intake were measured by using methods mentioned below.

Nutritional status: Measuring Body Mass Index (BMI) and Body Fat percentage (BF %).

Nutritional literacy: NSKQ questionnaire

Nutrient intake: Three-day food record

The findings of the study indicated that the overall nutritional status and nutritional literacy of the undergraduate athletes in the study sample were very poor. According to the BMI, most of the undergraduates (76.8%) fell within the normal range of the Asia-Pacific BMI classification. However, in terms of their body fat percentage (BF %), the majority of them (63.4%) were within the overweight range. Therefore, the fat mass of the athletes is considerably higher. As well as only 2.5% of the study sample had an adequate level of nutritional literacy regarding factors such as macronutrients, micronutrients, sports nutrition, and supplementations etc. Nutrient intake was also found to be insufficient. Only zinc and vitamin K intake seemed to be at a better level compared to the Recommended Dietary Allowances published by the Medical Research Institute, Sri Lanka

How can We Change This Condition?

1. Organizing nutritional education programs for undergraduate sportsmen and sportswomen.
2. Provide individualized nutritional counseling and guidance to have better understand about dietary needs and to make appropriate food choices.
3. Ensuring that dining facilities at university and sports training facilities provide a variety of nutritious food options that are accessible to athletes.
4. Establishing support services to enhance nutritional health.
5. Regular monitoring and evaluation of above factors of athletes, tracking the progress and identifying the areas related nutrition that should be improved.

This is a non-technical summary of the project report titled "Determination of nutritional status, nutritional literacy and nutrient intake of undergraduates engaging in selected sports at University of Peradeniya" supervised by Prof. R.P.N.P. Rajapakshe*, Department of Food Science and Technology, Faculty of Agriculture, University of Peradeniya. *niranjanp@agri.pdn.ac.lk

EXPLORING FLAVOR AND FUNCTIONS IN SRI LANKA'S CURRY LEAF BASED ON THEIR GROWING ENVIRONMENT

W.M.N. Wijesundara

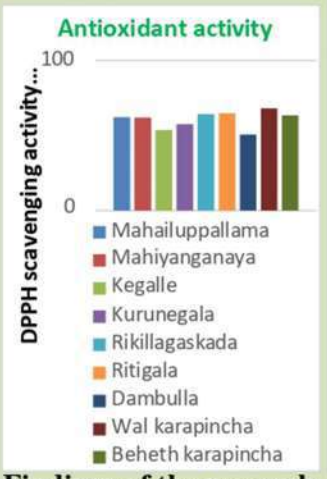
Curry leaf plant is a native plant to Sri Lanka, thrives naturally across various regions in Sri Lanka. Curry leaf plant is highly valued for its leaves due to their distinct flavor and aroma. These small, shiny leaves impart a distinctive citrusy, nutty flavor to dishes and are prized for their culinary versatility. Not only do they add a unique taste to curries, soups and fries etc., but they offer valuable health benefits due to presence of bioactive compounds which are known as phytochemicals.

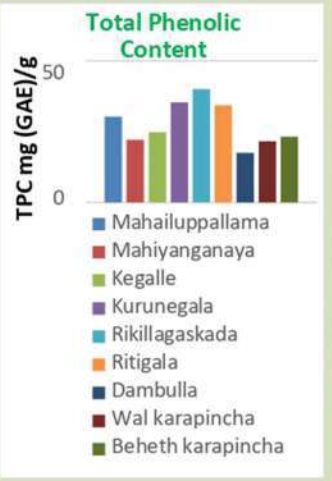
An **ecotype** is a group of population which is adapted to a specific environmental condition or a habitat. Several ecotypes of curry leaf plants can be found in nature which exhibits distinct features.

There are three varieties of curry leaves called *karapincha, wal karapincha* and *mee-gon karapincha. Beheth karapincha, dam karapincha* and *malu karapincha* are the three species of curry leaves. Usually curry leaf plant is cultivated in home garden. But there are naturally grown curry leaf ecotypes in forest area which have not been paid attention earlier. Hence, this study aims to explore the potential variations among curry leaf ecotypes collected from Mahiyanganaya, Mahailuppallama, Kegalle, Kurunegala, Ritigala, Dambulla and Rikillagaskada along with a variety and a species of curry leaf in terms of their functional properties and sensory characteristics (color, aroma, taste, astringency, after taste and overall preference).

Investigation of the ecotype having the highest number of bioactive compounds among these ecotypes, species and varieties as well as investigation of the ecotype which has the highest capacity to activate against free radicals (antioxidant capacity) which cause damages to biomolecules such as proteins, nucleic acids, lipids as well as cell injury, cell death leading to aging and various diseases such as cancer, arthritis etc. Determination of physical properties such as moisture content, density, ability of powder particles to retain water, to dissolve in water and to swell by absorbing water is important to find out the potential for the development of a tea using the best ecotype in terms of functional properties as well as sensory characteristics.

Curry leaf powder which was prepared by drying at 55 °C in a drying oven followed by sieving through a 250 µ sieve was used for determination of physical properties which were mentioned earlier. The aqueous extract which was prepared by boiling the curry leaf powder in deionized water followed by filtration was used for analysis of antioxidant capacity, total phenolic content and to check the presence or absence of several phytochemicals known as phenol, flavonoids, tannins and glycosides. A tea prepared from curry leaf powder was used for sensory evaluation.





Findings of the research

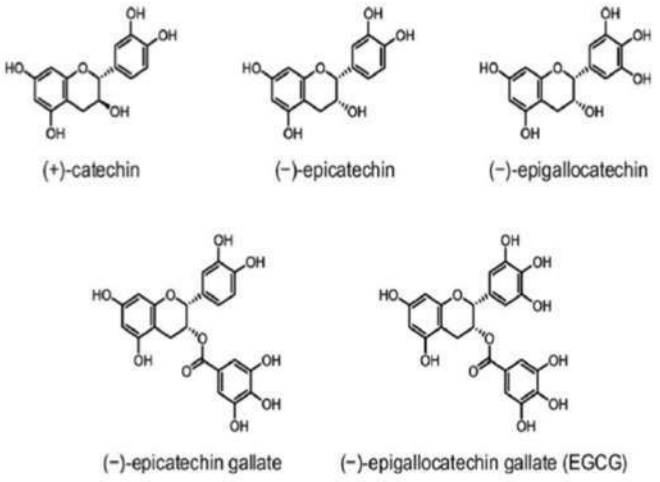
Based on the analysis of phytochemicals, physical properties, total phenolic content and antioxidant capacity and sensory evaluation, it can be concluded that Rikillagaskada and Kurunegala ecotypes exhibit promising qualities in terms of antioxidant potential, sensory attributes, and physical characteristics. In contrast, Dambulla ecotype has the lowest capacity in terms of these properties. The analyzed curry leaf ecotypes exhibit diverse attributes compared to species and varieties of curry leaves in terms of total phenolic content and sensory preference. In particular, "Beheth karapincha" also shows a notable capacity of antioxidant activity suggesting its potential health benefits. These findings highlight the potential for utilizing specific ecotypes and species with enhanced chemical and sensory profiles for various applications in culinary and medicinal contexts.

This is a non-technical summary of the project report titled "Evaluation of functional and sensory properties of selected curry leaf (*Bergera koenigii*) ecotypes grown in Sri Lanka" supervised by Dr. E.R.J. Samarakoon*, Department of Food Science & Technology, Faculty of Agriculture, University of Peradeniya. *rasanjalis@agri.pdn.ac.lk

UNVEILING GREEN TEA'S POTENCY: VERIFICATION OF HPLC FOR TOTAL CATECHIN QUANTIFICATION AND EXPLORING GEOGRAPHICAL DIVERSITY

H. B. C. Meedum

Tea, second only to water in global consumption, boasts a rich history dating back thousands of years, particularly in China, where *Camellia sinensis* leaves are utilized to create a variety of teas. Among these, green tea stands out for its abundant catechin content, which provides significant health benefits such as antioxidants, anticancer, and antibacterial properties. The global market for green tea has expanded to meet consumer demand for its nutraceutical and pharmaceutical products.



Ensuring the accurate quantification of catechins, particularly in green tea, is crucial. Currently, the Tea Board of Sri Lanka lacks a method to test for catechins. ISO 14502-2 offers a method for assessing the content of catechins in green tea. The adoption and verification of standardized testing methods, such as the one mentioned above, are essential for ensuring the quality and composition of tea products. Therefore, it is important to verify the reliability of a method called High-Performance Liquid Chromatography (HPLC) for measuring catechins at the Sri Lanka Tea Board before implementation. This study aimed to verify the HPLC method for measuring catechins in green tea and to explore potential differences in catechin levels among green teas from regions such as Nuwara Eliya and Uva in Sri Lanka.

The HPLC machine was carefully set up to ensure accurate measurements. Various factors such as the speed of liquid flow, the composition of liquids used, and the wavelength for detection were adjusted. Additionally, the method's performance through parameters like linearity, which identifies the instrument's linear working range; accuracy, which determines proximity to true values; limit of detection (LOD) and limit of quantification (LOQ), which gauge sensitivity to detecting minute amounts of catechins; and selectivity, which measures the method's ability to isolate and detect the target compound without interference from other substances in the sample were assessed. Then, two additional performance parameters, repeatability, and reproducibility, under precision were evaluated to ensure consistency over short and long time periods respectively.

The results indicated that the HPLC method performed effectively, accurately measuring catechins in green tea within a specific range. We observed that green tea from higher elevations contained higher catechin levels compared to tea from mid-elevations. Furthermore, the types of catechins followed a consistent pattern across elevations, with some types more prevalent than others like, catechin< epicatechin gallate< epicatechin< epigallocatechin gallate< epigallocatechin. Epigallocatechin was the most abundant, while catechin was the least abundant, regardless of elevation. In conclusion, we confirmed the reliability of the HPLC method for measuring catechins in green tea. Additionally, we noted that green tea from higher elevations typically exhibits higher catechin levels.

This is a non-technical summary of the project report titled "Verification of a HPLC Method for Quantification of Total Catechins in Green Tea and Assessing Geographical Variations in Total Catechin Content" supervised by Mr. N.Y. Jayanath*, Department of Food Science and Technology, Faculty of Agriculture, University of Peradeniya. *jayanathny@agri.pdn.ac.lk

ARTIFICIAL INTELLIGENCE FOR INDUSTRIAL SORTING OF BIG ONION

H.A.S.V. Attanayake

Onion is known as the "queen of kitchen" due to its wide use in most of the cuisines in the world. In Sri Lankan context, only 23.71% of the country's onion requirement is grown within the country. Rest of the onion requirement is imported from countries like India, Pakistan and Holland. Depending on the curing quality and the pungency of the onions "Pusa Red" Indian variety is the most preferred onion variety of Sri Lankans. When consumers are buying onions, they always go for the unrotten, well cured onions with good outer skin or peel. But supermarket chains like Cargills, sort onions using labourers to provide onions with premium quality to customers. According to the data obtained from Cargills Fruit and Vegetable Collection at Wattala, the rate of sorting onions is 156 kg/person/hour. Therefore, a more efficient way was needed to sort onions for their quality.

With the fast development of Artificial Intelligence (AI) in the world, image processing techniques of machine learning (ML) are used in agriculture.

Figure 2: Manual sorting of big onions

In ML Python programming language is one of the most preferred programming languages. There are many developed Python libraries for image processing purposes. OpenCV and Tensorflow are two such Python libraries. For this project these two libraries were used. First task of an image processing procedure is data collection, which means the capturing of the images. For onions, which are magenta in colour, a controlled lighting environment was needed to capture photos. Therefore, a white colour walled cardboard box was created and it was illuminated using WS2811 LED strips. The colour of the light used for illuminating the onions were RGB 200,255,200 colour combination.

For image capturing, a Pi Camera module connected to a Raspberry Pi Single Board Computer was used.

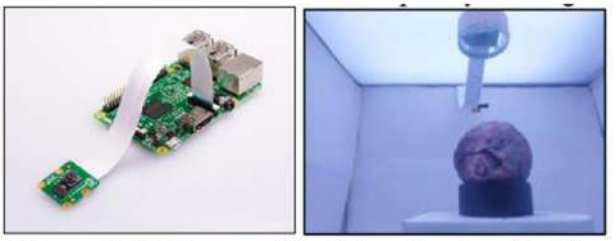


Figure 1: Pi Camera Modele attached to the lightbox(left) Raspberry Pi 3 with the Pi Camera Module (right)

Onions were captured to classify into four different classes as good onions, rotten onions, double bulbs and sprouted onions. Therefore, the captured images were annotated according to these for classes. After this, training of the model was done. Training of an AI model is similar to teaching something to a child. If the child is learning that thing for the first time, it's hard to teach it. This is similar to supervised learning in image processing. Just like the neural network in human brain, the model builds a Convolutional Neural Network (CNN) which can identify the objects latterly when trained. But in ML there are previously built models, which have the pre-built CNN. In building this onion sorting AI model, the onion data set was retrained to one of these prebuilt models, SSD MobileNet V2. This is called transfer learning. TensorFlow and OpeCV libraries were used for this transfer learning process.

After that the model was downloaded and ran in real-time to get the accuracy and capacity of sorting. Testing with 60 onions, 15 from each category gave the following values for evaluating an object detection model. The Accuracy%, precision% and recall% were 91.62%, 83.90%, 82.92% respectively. F1 Score and mean Average Precision (mAP) which gives an idea of the accuracy of model were 0.83 and 77.94% respectively. It shows the capability of the model in applying this model for sorting onions in industrial conditions.

This is a non-technical summary of the project report titled "Development of an Artificial Intelligence Based Image Processing System for Industrial Sorting of Big Onion" supervised by Prof. K.S.P. Amaratunga*, Department of Agricultural Engineering, University of Peradeniya.
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EFFECT OF SYNTHETIC ANDROGENS (17-α METHYL TESTOSTERONE) FOR THE MASCULINIZATION RATE OF GUPPY FRY

Inuri Avindie Wijesuriya

In the present context, many people are restricted to work for hours daily. They seek a sense of refreshment for their minds and bodies. Having an aquarium at home is a therapy that can be received free of charge. Aquarium fish are well-known for their magnificent colors and morphology. In the world of aquarium fish, the million fish or guppy fish is one of the most popular fish species. Sri Lanka is among the top exporters of guppy to the international market. Brilliant color shades, lively behavior, and ease of rearing even at the beginner levels have made them more popular among other aquarium fish. Typically, in guppy fish, male guppy consists of more stunning color shades and distinct fin patterns. Female guppy consists of dull-colored bodies and shorter fins. Therefore, more demand exists for male guppies compared to female guppies.

In the commercial production, more guppy females are produced. When considering about sex ratio, which is male to female ratio, typically 1:3 resulted. When estimated as a percentage, approximately 33% of males are produced. Hence, the production of more male guppy is favored commercially. Androgens, which are the hormones responsible for maintaining masculine characteristics in reproductive tissues could be used to change the sex of guppy. Synthetic androgens could be used to alter the sex guppy when used during their labile period. The labile period is the time duration before birth until they grow out before reaching sexual maturity. 17-α methyl testosterone is a synthetic androgen that could be used to alter the sex of fish hatchlings. This synthetic androgen has been widely used even in altering the sex of other different fish species such as Gourami, Angels, and Tilapia. Properties such as easy absorption, less accumulation in fish bodies, and prompt excretion have facilitated the use of 17-α methyl testosterone in altering the sex.

In this study, day 1 fish hatchlings were collected and were treated with 17-α methyl testosterone using two different treatments, dipping treatment and 17-α methyl testosterone incorporated feed treatment. In hormone-incorporated feed treatment, the hormone was dissolved in ethanol, was sprayed over nursery feed which is high in protein (57%) and was mixed vigorously for a couple of minutes. The mixed feed was provided for fish for 21 days. In dipping treatment, 17-α methyl testosterone was dissolved in an ethanol solution and left for 8 hours, and eventually, 2/3 of the water was removed. This was repeated for 4 days for 21 days.

The results indicated that 85%, 87%, and 88% of male guppies were present in hormone-incorporated feed treatment while 77%, 81%, and 86% of male guppies were present in dipping treatment. Hence, it can be considered that there is an evident positive effect of 17-α methyl testosterone towards the masculinization rate of guppy. When the cost per the number of male guppies was estimated hormone incorporated feed treatment could be considered as more cost-effective. Thereby, 17-α methyl testosterone could be used in guppy production to increase the number of male guppies effectively. The survival rate could be maintained at a higher level when the hormone is applied in moderate concentration. 17-α methyl testosterone treatment could be practiced in the ornamental fish industry to produce guppy of much higher export potential.

This is a non-technical summary of the project report titled "Effect of 17-α Methyl Testosterone for the Masculinization Rate of Guppy Fry" supervised by Dr. E.T.S. Madhubhashini*, Department of Animal Science, Faculty of Agriculture, University of Peradeniya. *thushanis@pdn.ac.lk

INNOVATION IN HYDRATION: DEVELOPING A NATURAL CARBOHYDRATE-ELECTROLYTE DRINK FROM SWEET ORANGE JUICE AND KING COCONUT WATER

K. H. M. L. S. Ketakumbura

What is Carbohydrate-Electrolytes Drinks?

Carbohydrate-electrolyte drinks (CEDs) are formulated as suitable for rapidly replacing fluid, carbohydrates, electrolytes, and minerals when an individual is engaging in physical activities for a long time.

Why is it important to drink carbohydrate-electrolyte drinks?

Engaging in active physical activities disrupts the body's water and electrolyte balance, leading to dehydration symptoms, fatigue, and diminished performance. Properly formulated CEDs have the capability to reinstate the aforementioned conditions by optimizing hydration, blood glucose levels, and energy production.

How are they formulated to obtain the optimum effectiveness?

The optimum effectiveness of a CED is achieved by formulating them by adhering to the recommended levels of carbohydrates and electrolytes as described in international standards. The amount of carbohydrates and electrolytes in terms of sodium to be added to a CED should be within the range of 50-100 g/L and 230-690 mg/L respectively. Otherwise, negative physiological impacts such as gastrointestinal discomfort, diarrhea, feeling of satiety, and loss of palatability can be experienced.

Are carbohydrate-electrolyte drinks available in the local market?

Currently, a variety of CEDs are accessible in the local market. However, it's worth noting that all of these options are artificially colored and flavored. Therefore, the objective of the study was to explore the feasibility of a natural alternative to enhance performance and rehydration by investigating its physicochemical and sensory properties.

An innovative approach to CED development by harnessing the power of natural fruit components….

According to research findings,

- fruit juices diluted at 50% are as effective as commercial CEDs, offering a similar amount of carbohydrates and additional nutrients.
- The orange flavour remains a global demand, as evidenced by its significant share in the beverage market.
- King coconut water has an ideal chemical composition for making CEDs.

Therefore, natural, nutritious, and commercially viable CED was developed by **blending sweet orange juice and king coconut water**.

First, preliminary trials were conducted to select the percentages of ingredients to be added to obtain a CED complying with the international recommendations. Likewise, the formulation consisting of reverse osmosis water, king coconut water mixture, sweet orange juice, ginger, and salt with percentages of 25, 35, 40, 0.2, and 0.2%, respectively was found as the best formulation in terms of both physicochemical and sensory properties.

Physicochemical properties

Total sugar content	91.47 ± 2.08 g/L
Sodium content	446.33 ± 7.51 mg/L
Energy value	26.4 kcal/100 ml
pH	3.64±0.01
Total soluble solids	6.50±0.00%
Titratable acidity	0.60±0.04%
Ascorbic acid	161.77±6.37 mg/100 ml

References:

Rao, T., Zimmerman, B., Ford, A., and Denvsschen, C. A. (2014). The physiological effects of gatorade® versus diluted fruit juice during exercise: a preliminary study. Journal of Food and Nutrition.

Standard 2.6.2 Non-alcoholic Beverages and Brewed Soft Drinks (https://www.legislation.gov.au/Details/F2017C00721. Accessed on 06/01/2024)

This is a non-technical summary of the project report titled "Development of a Fruit Based Carbohydrate Electrolyte Drink and Investigation of its Physicochemical Properties" supervised by Dr. E.R.J. Samarakoon*, Department of Food Science and Technology, Faculty of Agriculture, University of Peradeniya. *rasanjalis@agri.pdn.ac.lk

EXPLORING THE DRIVERS FOR RESPONSIBLE TOURISM DEMAND: A COMPREHENSIVE ANALYSIS OF UDAWALAWE WILDLIFE DESTINATION

W.P.R.M. Dharmasekara

What is Responsible Tourism?

Responsible Tourism is a travel approach that aims to reduce tourism's negative impacts on the environment, culture, and local populations while maximizing its benefits. It entails making ethical decisions to promote conservation, support local communities, and build cultural understanding. Responsible Tourism seeks to provide a pleasant experience to both travelers and the destinations they visit while ensuring long-term sustainability and the preservation of natural and cultural assets for future generations. This method encourages travelers to be aware of their impact, make educated decisions, and contribute to the well-being of the destinations.

Why should we assess the determinants driving demand for Responsible Tourism?

Assessing the determinants driving demand for responsible tourism is crucial for promoting sustainable practices, improving visitor experiences, and maximizing economic benefits. Understanding why tourists choose responsible tourism helps destinations adjust services, boost local economies, and engage with communities. This knowledge influences marketing strategies, conservation efforts, and policymakers' rules. It also encourages destinations to capitalize on global sustainability trends, giving them a competitive advantage in the tourism industry.

Udawalawe Wildlife Destination

Udawalwe Wildlife Destination is an ideal setting for a study on responsible tourism because of its high biodiversity, particularly its renowned elephant population, making it a popular destination for various tourists. The dedication to wildlife conservation aligns with the concept of responsible tourism, allowing for an examination of how sustainable practices might help to maintain natural ecosystems and species.

Figure 2 Udawalawe National Park

How was the study conducted?

This study employed a structured questionnaire to obtain data from 302 foreign tourists who visited Udawalawe Wildlife Destination. Ethical issues were highlighted, including gaining approval from the Ethical Clearance Committee, guaranteeing participant well-being, and informed consent, and maintaining confidentiality.

Figure 1 Data Collection from tourists

Key Findings and Implications

This study on responsible tourism at Udawalawe Wildlife Destination uncovered some significant findings. Around 58% of those surveyed had a better awareness of responsible tourism concepts. The study also discovered that tourists frequently use travel websites, travel guidebooks and social media to find information about responsible tourism destinations. This suggests that these platforms can be used to promote responsible tourism. Interestingly, while tourists appreciated many aspects of the destination, waste disposal received the lowest rating, suggesting an area for improvement.

Only a few tourists got guidelines on responsible tourist behavior, highlighting the importance of leaders and decision- makers providing clear rules for responsible behavior. And a study revealed that the primary barrier to practice responsible tourism is lack of awareness of these practices. To make tourism more responsible, should focus on campaigns to raise awareness and provide tourists with better information. Such efforts may contribute to ensuring the sustainable development of Udawalawe Wildlife Destination and other similar locations.

This is a non-technical summary of the project report titled "Exploring the Drivers for Responsible Tourism Demand: A Comprehensive Analysis of Udawalawe Wildlife Destination" supervised by Dr. W.E.M.L.J. Ekanayake*, Department of Animal Science, Faculty of Agriculture, University of Peradeniya. *jayampathiekn@gmail.com

HOW TO FEED YOUR CATTLE WITH GOOD QUALITY, CHEAP SOURCES OF PROTEIN?

G.D.N.M. Gammanpila

Protein is a vital nutrient in ruminant diets for maximal growth and activity of ruminal microorganisms. Coconut poonac, sesame meal, soybean meal, and palm kernel meal are the traditional protein supplements used in Sri Lanka. These protein supplements are both expensive and limited in availability. Therefore, there is a deficiency in protein and energy requirements for feeding ruminants. As a result of malnutrition, improved crossbred dairy cows, particularly at the post-partum transition stage, are susceptible to negative energy balance. Consequently, the exploration of alternative plant-based protein sources becomes imperative.

Calliandra and Ipil-Ipil

Calliandra and Ipil-Ipil both are legume trees. Ipil-Ipil and Calliandra are naturally grown in the low-country dry zone and up-country wet zone. Their leaves are rich sources of proteins. The use of Calliandra and Ipil-Ipil leaves for ruminant feeding is limited in Sri Lanka.

Ipil-Ipil

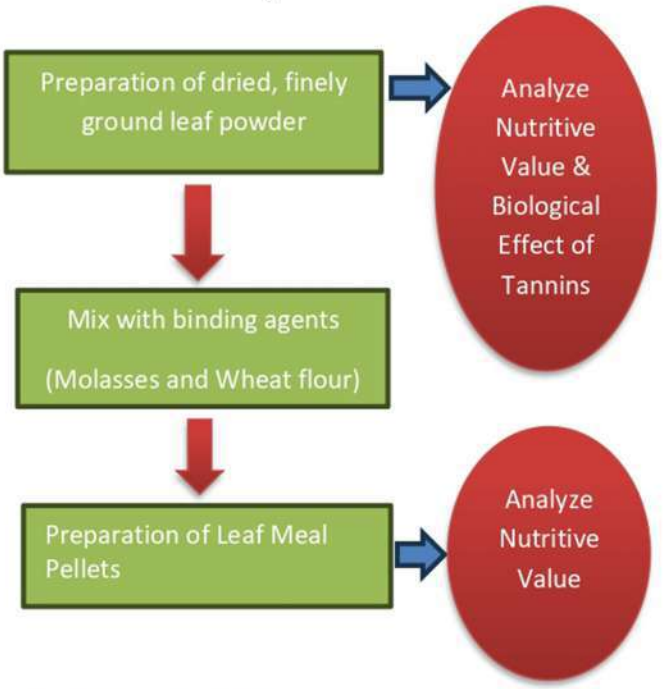
Calliandra

The presence of anti-nutritive factors limits the nutritive value of legume leaves. The presence of high levels of anti-nutritive factors such as polyphenolic compounds, including tannins may have negative effects on palatability and digestibility. These compounds can bind protein, making it unavailable to the animal.

How to Improve the Quality of Calliandra and Ipil-Ipil Leaves?

It may be possible to increase the nutritive value of tannin-rich leaves by incorporating with polyethylene glycol (PEG), which preferentially binds the tannins, making plant proteins more available for digestion. Thus, PEG is expensive, the best alternative is to make pellets with the inclusion of Calliandra and Ipil-Ipil leaf powder.

Production and Analysis of Leaf Meal Pellets



According to the study, the best quality Calliandra and Ipil-Ipil leaf meal pellets with highest Organic Matter Digestibility (OMD) and Metabolizable Energy (ME) were achieved with 76% inclusion of their dried leaf meal powder. Enhancement in OMD and ME in the presence of PEG is a confirmation of biological effect of tannins in Calliandra leaves. This study reveals the Ipil-Ipil and Calliandra leaf meal pellets produced are nutritious, easily handled, and cheap sources of protein supplements for dairy cattle rations.

This is a non-technical summary of the project report titled "Biological Value of Ipil-Ipil and Calliandra Leaf Meal Pellets for Supplementing Ruminant Rations" supervised by Dr. M.B.P. Kumara Mahipala*, Department of Animal Science, Faculty of Agriculture, University of Peradeniya. *pmahi@agri.pdn.ac.lk

TRANSFORMING SRI LANKA'S BREAKFAST CULTURE: A DELICIOUS SOLUTION TO FOOD INSECURITY

W.M.L.I. Wijesuriya

Are you tired of rushing through your mornings and grabbing whatever quick bite you can find? Do you wish for a healthier, more satisfying breakfast option that doesn't compromise on taste or convenience? Well, say hello to the newest breakfast sensation sweeping across Sri Lanka; nutritious instant porridge mix.

In a country where over 6.3 million people face food insecurity daily, finding affordable, nutritious meals can be a challenge. About 5.3 million of them are either eating less or skipping meals altogether. This lack of food isn't just about having less to eat, but it's also about not having access to nutritious and tasty food easily.

But thanks to innovative research and development, a nutritious, convenient solution has been provided. Imagin a steaming bowl of creamy, aromatic porridge that not only fills your belly but nourishes your body from within. This isn't your ordinary porridge. It's packed with the goodness of legumes, protein-rich fish powder, and a dash of cinnamon for that extra flavor kick. It is a 'dietary fiber- and protein-rich instant porridge mix'. According to the Food (labelling and advertising) Regulation – 2022, Sri Lanka, product is rich in dietary fiber and protein where protein is generally considered the most satiating macronutrient, and dietary fiber activates stretch receptors and can slow the dispersion of digestive enzymes and nutrient absorption.

Let's look what makes this instant porridge mix so special?

The Power of Legumes: Legumes like mung beans and Bengal gram dal are not just humble ingredients, they're rich in protein, fiber, and essential nutrients, and provide sustained energy to kickstart your day.

Protein-Packed Fish Powder: Dehydrated fish powder not only boosts the protein content of your porridge but also adds a unique flavor that'll leave your taste buds tingling.

Cinnamon: Who knew a sprinkle of cinnamon could make such a difference? Besides adding warmth and depth to the porridge, cinnamon is packed with antioxidants. Having antioxidants in your diet is like giving your body a shield against sickness and disease.

Convenience at Your Fingertips: In today's fast-paced world, convenience is key. With this instant porridge mix, all you need to do is add hot water and stir. A wholesome breakfast is ready in minutes, perfect for those hectic mornings when time is of the essence.

A Solution to Food Insecurity: But it's not just about convenience. It's about making nutritious meals accessible to all. By providing an affordable, convenient breakfast option that doesn't compromise on quality, this instant porridge mix aims to tackle food insecurity ensuring that every Sri Lankan has access to a healthy meal to start their day right. So, whether you're a busy professional rushing to work or a homemaker juggling multiple tasks, make the switch to nutritious instant porridge mix and join the movement towards a healthier, happier Sri Lanka. After all, good nutrition shouldn't be a luxury, it should be a right for everyone.

This is a non-technical summary of the project report titled "Development and Characterization of Dietary Fiber- and Protein-Rich Instant Porridge Mix for Adults" supervised by Prof. B.E.P. Mendis*, Department of Food Science & Technology, Faculty of Agriculture, University of Peradeniya. *ereshamendis@agri.pdn.ac.lk

WANNA ADD A BIT OF ESSENCE FROM UNDERUTILIZED TUBERS IN SRI LANKA TO YOUR FAVORITE BUBBLE TEA CUP?

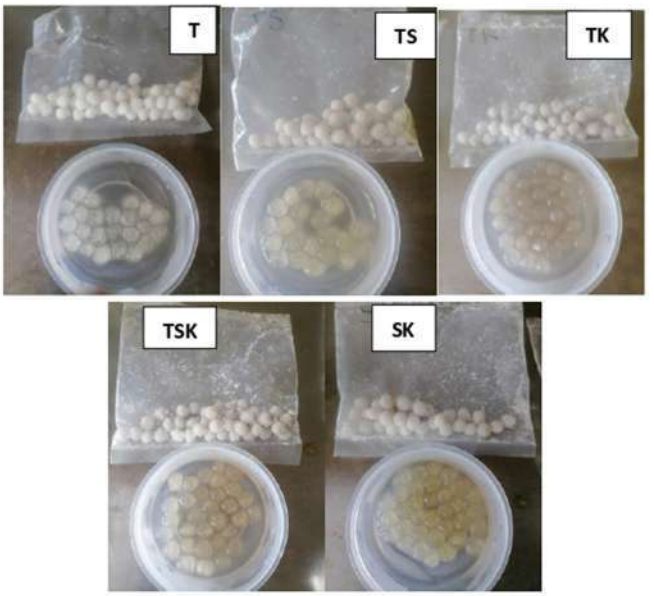
H. Kanishka Chathurani

"Bubble Tea" which is also known as "Boba Milk Tea" or "Pearl Tea" has gained tremendous attraction towards it, across all generations irrespective of the age and status because of the ability of this beverage to provide a unique sensation of "addiction" and "pleasure" while consuming a boba pearl by consumers. The delicacy, enhanced palatability and consumer acceptance of this beverage mainly raised from it's unique and essential ingredient known as boba pearls. These pearls are originally made from cassava starch.

However, utilization of cassava starch in product developments raised concern due to its elevated cyanide content, perishability, and higher glycemic index. With this scenario, this study mainly focused on assessing the potential of utilizing the sweet potato (*Ipomoea batatas*) and Kiri ala (*Colocasia esculenta*) for the development of boba pearls due to their higher abundance, higher starch yield and enhanced nutritional properties. sweet potatoes which contain colored flesh are a good source of bioactive compounds which aid in improving human health. Kiri ala is a good source of minerals like potassium, but it contains reduced levels of vitamin C and vitamin A.

Formulation of composite starch combinations

Starches from sweet potato and Kiri ala were first extracted using wet method. Then starch from native tapioca, sweet potato and Kiri ala were combined according to five formulations (including control) for further assessment and development of boba pearls. The suggested formulations were T (control – 100% tapioca), TS (35% tapioca + 65% sweet potato), TK (35% tapioca + 65% Kiri ala), TSK (35% tapioca + 35% sweet potato + 30% Kiri ala), and SK (55% sweet potato + 45% Kiri ala). Boba pearls from each starch combination were prepared according to a method found after several trials which mainly focused on preparing pearls after gelatinization of starch. The following images are depicting the boba pearls made from each starch mixture.



Analysis of starch mixtures: Native starches and starch mixtures were evaluated in terms of amylose content, color, pH, morphology and functional properties. "Native tapioca starch was recorded to have the whitest color among the others, while the pH of all the starches manifested slightly acidic conditions. TS starch mixture exhibited moderate Water Holding Capacity solubility, and swelling power, with values reported as 1.61 ± 0.12 g H_2O g^{-1} starch, $0.71 \pm 0.35\%$, and 2.12 ± 0.10 g/g, respectively. The produced pearls underwent assessment based on their cooking performance, sensory attributes, and texture profile analysis. The boba pearls produced from TS treatment were selected as the best formulation as it exhibited consumer acceptance comparable to that of the control boba sample, with no statistically significant difference observed in any assessed attributes ($p>0.05$) in hedonic test. It demonstrated superior cooking performance of boba pearls in terms of cooking time, cooking loss and water absorption percentage (1.37 min, 3.56%, and 53.99% respectively) and textural properties (profoundly less chewiness) compared to the control sample. The present investigation yielded the conclusion that sweet potato starch proves to be efficaciously employed in the production of boba pearls.

This is a non-technical summary of the project report titled "Development of composite starch blends for the production of boba pearls and assessment of their physicochemical properties" supervised by Dr. E.R.J. Samarakoon*, Department of Food Science & Technology, Faculty of Agriculture, University of Peradeniya. *rasanjalis@agri.pdn.ac.lk

A NOVEL APPROACH TO STRENGTHEN HEALTH USING MULTI-FRUIT JUICES AND HERBAL JUICES

W.L.D. Jayasooriya

The modern lifestyle along with other factors such as industrialization and globalization has changed the dietary patterns of the population. Fast food consumption is increased due to the busy lifestyles of people. Because of these factors, non-communicable diseases have increased considerably in recent years. Therefore, development of a highly nutritious, and natural food product for the market is essential. Fruits and herbs have a potential to strengthen health of individuals owing to the presence of higher nutrients content and antioxidants properties. Beverages are convenient food products that have potential to combine various nutrients of fruits and herbs together in one product.

This study was aimed to develop a fruit based healthy beverage from the combination of multi-fruit juices and herbal juices and to evaluate its physicochemical and antioxidant properties. Green grapes (*Vitis vinifera*), pomegranate (*Punica granatum*), sweet orange (*Citrus sinensis*), ginger (*Zingiber officinale*), turmeric (*Curcuma longa*) and black pepper (*Piper nigrum*) were used as ingredients. Nutritional composition and antioxidant properties, and medicinal properties of ingredients were considered when selecting ingredients for the fruit based healthy beverage.

How was the study conducted?

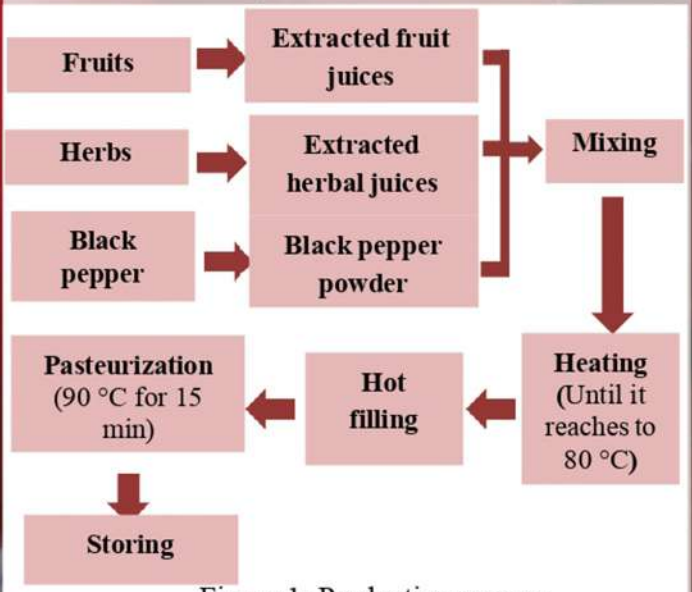


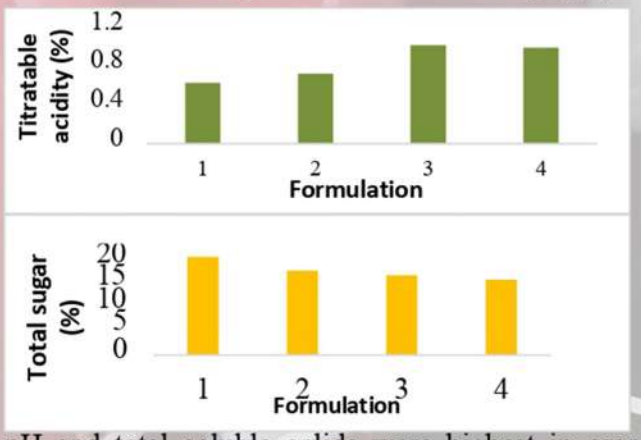
Figure 1: Production process

Trial samples were prepared by changing percentages of fruit juices while keeping other ingredients stable. Four formulations were selected based on trials and error method. Two of them were grape juice-based formulations and other two formulations were sweet orange-based formulations. They were subjected to some studies including,

- Physicochemical properties (pH, total soluble solid, titratable acidity, reducing sugar, and total sugar) assay
- Antioxidant properties (vitamin C, Total phenolic content, and antioxidant activity) assay
- Sensory evaluation
- Microbiological quality assay

What did the study find?

Some results are given in the following graphs.



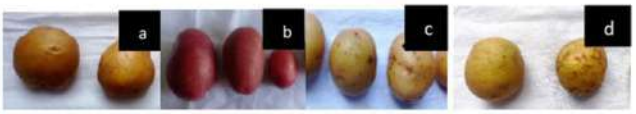
pH and total soluble solids were highest in grape based formulations. Titratable acidity was highest in sweet orange based formulations. Sugar content and sweetness level were highest in grape based formulations. Grape based beverages were better than sweet orange-based beverages according to physicochemical properties. Vitamin C content and antioxidant activity were lowest in a sweet orange-based formulation (F3) than other formulations. Formulation. Most preferred formulation contained 56% of green grape juice, 35% of pomegranate juice and 5% of sweet orange juice. No tested microbes were not detected in best formulation. The results of this study indicated that formulated fruit-based beverage was a potential source of antioxidants and microbiologically safe for consumption.

This is a non-technical summary of the project report titled "Development of a Fruit Based Healthy Beverage and Evaluation of Its Physicochemical and Antioxidant Properties" supervised by Dr. E.R.J. Samarakoon*, Department of Food Science & Technology, Faculty of Agriculture, University of Peradeniya. *rasanjalis@agri.pdn.ac.lk

UNVEILING THE POTATO PARADOX: HOW NITROGEN FERTILIZERS SHAPE THE QUALITY OF YOUR FAVORITE SPUDS

P.K. Nagasinghe

Potato and Nitrogen Fertilizers: Potato is the world's most important and widely grown tuber crop that ranks third in terms of human consumption. These are excellent sources of carbohydrates mainly starch and contain high-quality protein. In addition, it is rich in vitamins including vitamin C and contains a variety of minerals. Since potatoes has a shallow and poorly developed root system, it requires nitrogen fertilizers in larger quantities. Therefore, farmers tend to add fertilizer more than the recommended levels by the Department of Agriculture. Agriculture largely contributes to nitrogen pollution worldwide, primarily due nitrogen waste as a result of over-fertilization. In a region where various crucial steps have been taken to mitigate nitrogen waste and its associated consequences, such as soil degradation, water pollution, and air pollution, it is important to explore measures to reduce over-fertilization without compromising tuber yield and quality. Tuber yield is known to be enhanced by increased levels of nitrogen fertilizers. But what happens to its nutritional quality? How do these fertilizers influence the way potatoes behave as food? This is an attempt to find out how the quality of different potato varieties is affected by nitrogen fertilization. **A Sneak Peek into the Study.** In order to find out how different potato varieties get affected from nitrogen ferilizers, four potato varieties including Granola, Topaz, Briana and Triplo which were grown under two fertilizer treatments were tested. And to study deeper on how a specific variety get affected, six nitrogen fertilizer treatments were applied to potato variety Granola, the variety which is grown widely in Sri Lanka. These potatoes were tested for several attributes including starch content, protein content, vitamin C content, mineral (Calcium and Potassium) content, antioxidant activity, solubility and swelling power.



a: variety Granola, b: variety Topaz, c: variety Briana, d: variety Triplo

The current research revealed that the starch content, potassium and calcium contents for all tested varieties are not influenced by the nitrogen fertilizers applied.

In contrast, the crude protein content of all varieties considerably increased when farmyard manure + Department of agriculture recommended urea was added for cultivation compared to farmyard manure alone itself. In variety Granola, compared to potatoes grown without urea or farmyard manure, potatoes grown under potato fertilizer mixture + farmyard manure showed a 75.5% increase in crude protein content. In a context where protein energy malnutrition becoming a huge issue, this information can be a useful tool in making decisions. Since vitamin C is not synthesized in the human body, potatoes count as a good dietary source of vitamin C considering its consumption as a staple. As for vitamin C, the contents increased by 16.9 % when farmyard manure + Department of Agriculture recommended urea was used for cultivation compared to farmyard manure.

Potato flour is incorporated into several products to improve flavor, toasting qualities, and as a thickener. The current study reveals that solubility and the swelling power of the four varieties are not influenced by the fertilizer treatment applied. This means potato flour from these varieties will behave in the same way as a food ingredient in terms of solubility and swelling power.

The antioxidant activity was negatively affected by the nitrogen fertilizers. The antioxidant activities of potatoes decreased by 53.2% when they were grown under farmyard manure + Department of Agriculture recommended urea compared to potatoes grown under farmyard manure. When considering all, it is obvious that the nitrogen fertilizer levels applied to potatoes have a considerable effect on potato quality. Thus the fertilizer treatments can be applied according to the requirements of the consumers to meet the demands of the conscious consumers.

This is a non-technical summary of the project report titled "Effect of Nitrogen Fertilization on Potato (*Solanum tuberosum* L.) Tuber Quality; Composition, Physico-chemical Properties and Functional Properties" supervised by Prof. B.E.P. Mendis*, Department of Food Science & Technology, Faculty of Agriculture, University of Peradeniya. *ereshamendis@agri.pdn.ac.lk

Instant Soup Mix: A Flavorful Protein Powerhouse for Vegan Diets

T.A.S.V.Thunmuduna

Introduction

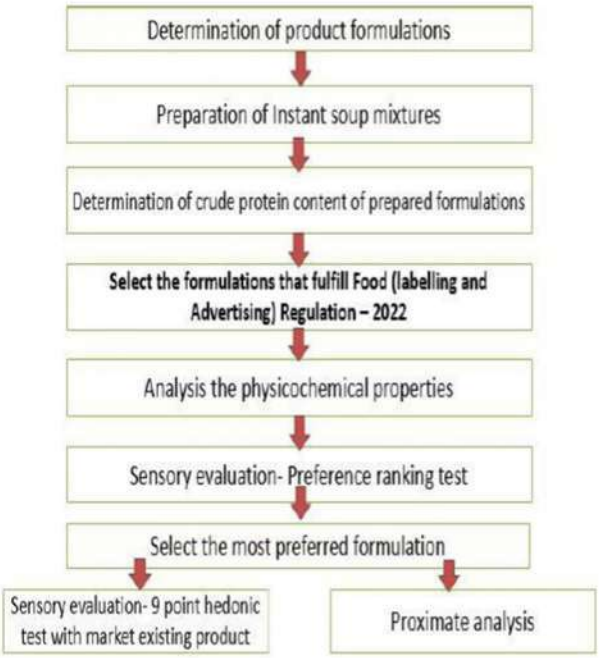
Instant soups are a convenient meal option, but they often lack nutrition and may contain high sodium, preservatives, and additives, increasing health risks. This study aimed to develop a more flavorful and convenient vegan instant soup mix as an alternative protein source.

Why is protein important in vegan diets?

Protein is essential for the human body as it plays a crucial role in various bodily functions, including building and repairing tissues, supporting immune function, and producing enzymes and hormones. In vegan diets, which exclude animal products, it's important to ensure an adequate intake of protein because many plant-based proteins sources may not provide all the essential amino acids in sufficient amounts.

What ingredients were used to achieve this objective?

The objective of the study was to develop a vegan instant soup mix using Oyster mushrooms (*Pleurotus ostreatus*) and chickpeas (*Cicer arietinum L.)* as alternative protein sources. Oyster mushrooms were chosen for their meaty texture and rich umami flavor, as well as their nutritional value, including protein, fiber, vitamins, and minerals. Chickpeas were selected for their high protein and fiber content, making them suitable for vegan diets.



How was the study conducted?

Three instant soup formulations were developed, each containing different ratios of oyster mushroom flour and chickpea flour (60% mushroom-12% chickpea; 48% mushroom-24% chickpea; 36% mushroom-36% chickpea). These formulations were compared to a commercially available mushroom soup mix to evaluate their physicochemical, microbiological, sensory, and proximate properties.

What were the key findings?

The physicochemical analysis included measurements of pH, total soluble solids, water absorption capacity, and oil absorption capacity. The study found that the formulated soups and the commercial mix had similar physicochemical properties, indicating that the formulations were able to retain water and oil effectively. Microbiological analysis showed that all formulations were microbiologically safe for consumption. Sensory evaluation favored the formulation containing 48% oyster mushroom flour and 24% chickpea flour for its balanced flavor and umami taste. Proximate analysis revealed that this formulation had the highest protein (27%), ash (2%), and fat (18%) content, along with higher antioxidant activity (52%) compared to other formulations and the commercial mix.

What is the significance of the study's findings?

The study's findings suggest that incorporating oyster mushrooms and chickpeas into vegan instant soups can enhance their nutritional value, flavor, and overall acceptability. The formulation containing 48% oyster mushroom flour and 24% chickpea flour showed the most promising results in terms of physicochemical properties, microbiological safety, sensory acceptability, and nutritional content.

This is a non-technical summary of the project report titled "The Potential of Oyster Mushroom (Pleurotus ostreatus) and Chickpea (Cicer arietinum L.) as Protein Source in Vegan Instant Soup Mixes" supervised by Prof. B.D. Rohitha Prasantha*, Department of Food Science & Technology, Faculty of Agriculture, University of Peradeniya. *bdrp@pdn.ac.lk

REDUCTION OF UREA AND TRIPLE SUPER PHOSPHATE FERTILIZER APPLICATION ON INITIAL GROWTH OF SORGHUM IN MAIZE-STYLOSANTHES MIX-STAND FORAGE CROP

Perinpanayakam Vijitha

Forage

Forages are considered as the cheapest major nutritional component in the diets of ruminants. Forage crops are grasses (Poaceae) or herbaceous legumes.

Forage Quality

Forage quality can be defined as the extent to which forage has the potential to produce a desired animal response. Forage quality encompasses factors such as palatability, intake, digestibility, nutrient content, and the presence of anti-quality factors, all of which collectively influence animal performance.

Palatability: Will the animals eat the forage? **Intake:** How much will they eat? **Digestibility:** How much of the forage will be digested? **Nutrient Content:** Once digested, will the forage provide an adequate level of nutrients? **Anti-Quality Factors:** Various compounds may be present in forages that can lower animal performance, cause sickness, or even result in death. **Animal Performance:** The overall health, growth, and productivity of animals consuming the forage.

Maize

Zea mays L, commonly known as Maize, Maize is an important cereal and multifunctional crop. Maize is an energy-rich feed for ruminant livestock.

Stylosanthes

Stylosanthes is a perennial legume. Legumes generally produces higher quality forage than grasses

Maize- Stylosanthes Mix- Stand

long-term improvement in soil fertility with legume intercropping. Both the maize and legume dry matter (DM) yields were greater as monocultures than in the mixture. Improvement of soil fertility through the addition of nitrogen by fixation and excretion from the component legume.

Fertilizer Application

Mineral fertilization (Inorganic fertilization) is a major agrotechnical factor for increasing yield and its stability, improving the quality of agricultural crops and for sustainable economic growth of agricultural holdings.

N, P, and K are the three most widely used elements for improving maize yield. The application of fertilizers in appropriate quantities can increase crop yield and improve crop quality, but excess fertilization will damage the environment, increase production costs, and reduce grain quality.

Nitrogen is playing critical roles in photosynthetic activity, and agricultural productivity. Nitrogen availability can influence maize plant growth and grain yield. Phosphorus is vital for root development in maize plants. Adequate phosphorus levels promote strong and healthy root systems, which improve nutrient uptake and overall plant vigor.

Fertilizer Treatment

Eight fertilizer treatments, varying urea and TSP rates in combination with the recommended MOP level, were tested using a complete randomized design. The recommended rate of urea-TSP-MOP (425:100:50 kg/ha) for maize served as the control.

Treatment	1	2	3	4	5	6	7	8
Basal Application								
Urea%	100	90	80	70	0	90	80	100
TSP%	100	80	100	100	100	90	80	0
MOP%	100	100	100	100	100	100	100	100
Top dressing								
Urea%	100	90	80	70	0	90	80	100

In Sri Lanka ….

The fertilizer rate for hybrid fodder maize is yet to be recommended. (Blanket recommendations are adopted) and High fertilizer costs.
Maize – Stylosanthes mix crop may have the potential to produce high-quality forage at a low fertilizer rate

Results and Discussion: A 10% reduction in urea and TSP fertilizer application from the recommended rate will not hinder the initial growth of hybrid fodder maize in maize-stylosanthes mix-stand forage culture.

This is a non-technical summary of the project report titled "Reduction of Urea and Triple Super Phosphate Fertilizer Application on Initial Growth of Sorghum in Maize- Stylosanthes Mix-Stand Forage Crop." supervised by Dr. M.B.P. Kumara Mahipala*, Department of Animal Science, Faculty of Agriculture, University of Peradeniya. *pmahi@agri.pdn.ac.lk

OMEGA-BUGS: PRODUCTION OF OMEGA-3 ENRICHED BLACK SOLDIER FLY LARVAE USING SEAWEED

H.W.S.S. Subhasinghe

Have you ever considered bugs as a sustainable source of omega-3 fatty acids?

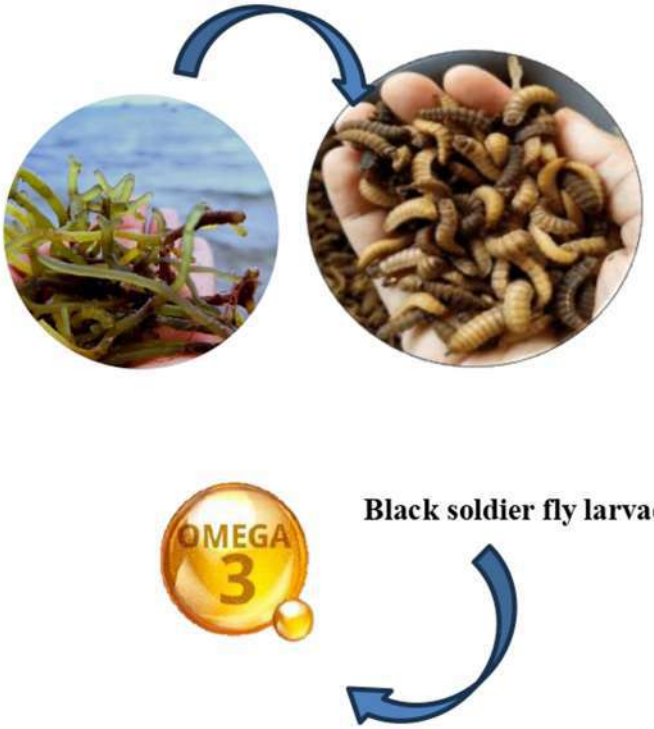
As a groundbreaking development for the animal feed industry, researchers have discovered the potential of black soldier fly larvae as a sustainable feed ingredient. They are rich in protein (35-40%) and fat (30%). However, a missing piece in their nutritional profile is omega-3 fatty acids.

Researchers are tapping into the local wonders of seaweed to upgrade fatty acid profile of larvae. Local seaweed is an underutilized and sustainable source of omega-3. Incorporating seaweed into the substrate of larvae has the potential to elevate the omega-3 content significantly. Yet, a challenge arises as this enhancement appears to hinder the growth of the larvae.

In our study, we have tackled this issue through the pre-treatment of seaweed to optimize its nutrient availability.

Seaweed was pre-treated by fermentation with yeast (*Saccharomyces cerevisiae*), microwave, and enzyme digestion prior to feeding to larvae.

Feeding pre-treated seaweed instead of untreated seaweed not only elevated the omega-3 content in larvae but also caused no growth reductions, creating a more nutritious feed ingredients for animals.



This is a non-technical summary of the project report titled "Fatty Acid Profile and Growth Performance of Black Soldier Fly Larvae *(Hermetia Illucens)* Grown on Pre-Treated Seaweed (*Kappaphycus alvarezii*)." supervised by Dr. P. Weththasinghe*, Department of Animal Science, Faculty of Agriculture, University of Peradeniya. *pabodhaw@agri.pdn.ac.lk

DEVELOPMENT OF A WEB TOOL FOR ISO 22000:2018 FOR THE CAKE INDUSTRY

J.A.D.K.H. Jayasinghe

Role of Food Safety Management Systems (FSMS) in a competitive business environment

In the competitive landscape of the food industry, certifications play a crucial role in establishing trust, ensuring safety, and demonstrating compliance with industry standards. Certifications such as ISO 22000 (Food Safety Management Systems) and Hazard Analysis and Critical Control Points) signal to consumers that a company prioritizes safety and quality in its food production processes. This develops confidence in consumers, leading to increased trust and loyalty towards the brand. Obtaining certifications can open doors to new markets and partnerships, enhancing a company's competitiveness and expanding its reach.

ISO 22000:2018 standard

ISO 22000:2018 is an international standard that outlines requirements for food safety management systems. It focuses on several key aspects to ensure the safety of food products throughout the entire food supply chain such as Hazard Analysis and Risk Assessment, Prerequisite Programs (sanitation, pest control, and personnel hygiene), Management Commitment, Communication, Emergency Preparedness and Response, Traceability and Recall, Validation, Verification, and Monitoring, along with Continuous Improvement.

Common challenges in FSMS implementation

However, the operational and organizational level implementation processes are not that easy and they can present various challenges for organizations. Understanding requirements, higher charges of consulting firms, integration with existing systems, resistance to cultural changes, documentation and record-keeping, training and competence, supply chain management, and, continuous improvement are some of the prominent challenges. Addressing these challenges requires careful planning, strong leadership, effective communication, and a commitment to achieving and maintaining food safety excellence throughout the organization. If your organization is not fully aware of these factors, you are in trouble. You will need an assistant who guides and leads you accurately and cost effectively throughout the whole implementation process.

A web tool: Your ISO assistant

In order to gain efficient standard implementation with minimum cost to the industry, a web tool was developed equipped with following features. It provides easy access to information and guidance on ISO 22000 implementation anytime, anywhere ensuring that industries, regardless of their location or time constraints, can access the necessary resources to understand and implement ISO 22000 effectively. Compared to traditional methods such as in-person training sessions or hiring consultants, this web tool is often more cost-effective. It reduces expenses associated with travel, accommodation, and consultant fees, making ISO 22000 implementation more feasible. Web tool can incorporate multimedia elements such as videos, interactive quizzes, and tutorials, providing industries with an engaging and dynamic learning experience. Also, it can offer ongoing support through FAQs, forums, or help desks, ensuring that industries have access to assistance whenever they encounter challenges during the implementation process.

The overall performance and effectiveness of the developed tool was tested with the cake industry and the results were positive. Further upgrades are there to be included such as traceability systems and product recall systems. Ultimately this web tool will be the next step of high quality standard implementing procedures.

This is a non-technical summary of the project report titled "Development of a Web Tool for ISO 22000:2018 For the Cake Industry" supervised by Prof. W.M.T. Madhujith*, Department of Food Science & Technology, Faculty of Agriculture, University of Peradeniya. *madhujith@agri.pdn.ac.lk

Unlocking the Hidden Treasure of Sri Lankan *Terminalia catappa* L. (Kottamba)

M.M.P.M. Marasinghe

Terminalia catappa L. (TC) also known as wild almonds, is a hidden treasure in Sri Lanka that awaits the opportunity for the world to benefit from its nutritional goodness. In Sri Lanka, there are two cultivars of TC; Purple and Yellow. This study aims to fill the current research gap by exploring new edible oils to reduce the reliance on traditional oils, and to do value addition on defatted residue, which is a by-product of oil extraction.

The oil from the kernels can be extracted by feeding them into the machine, "Miro-screw extractor", which will give out the oil and the defatted residue separately. The oil has a nice golden color and the defatted residue is brown, and sand-like with a nutty aroma.

Obtaining oil and defatted residue through micro-screw

The oil was found to have a higher percentage of unsaturated fatty acids. The most abundant fatty acid in both cultivars was, palmitic acid, followed by oleic acid and linoleic acid. Other than this the oil contained omega-3 fatty acids, namely EPA (Eicosapentaenoic Acid) and DHA (Docosahexaenoic Acid). Omega-3 fatty acids offer many health benefits including reducing the risk of cardiovascular disease, lowering blood pressure, decreasing cholesterol levels, combating inflammation *etc.*

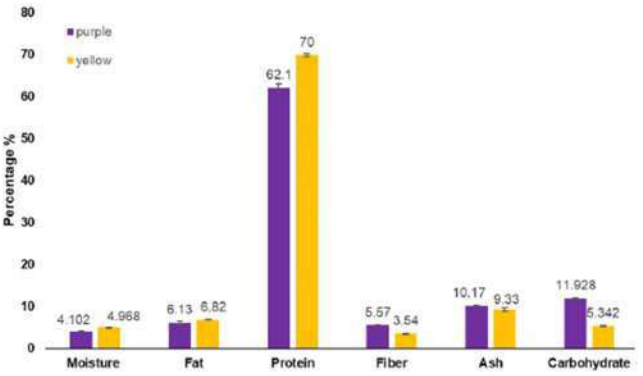
The by-product of oil extraction, the defatted residue also found to contain a high protein percentage which was 62% for the purple cultivar and 70% for the yellow cultivar, and low amounts of carbohydrate (yellow - 5% and purple - 11%).

This composition makes the TC defatted residue a good option for individuals looking for high-protein, low-carbohydrate dietary options (eg - athletes, fitness enthusiasts), or for those who are following specific diets (ketogenic or low-carb diets)

This composition makes the TC defatted residue a good option for individuals looking for high-protein, low-carbohydrate dietary options (eg - athletes, fitness enthusiasts), or for those who are following specific diets (ketogenic or low-carb diets)

The defatted residue remained after oil recovery underwent extraction with three solvents of different polarities (Hexane, Dichloromethane, and Methanol) to extract the bioactive compounds. These extracts were then assessed for total phenolic content, total flavonoid content, and antioxidant activity, measuring DPPH radical scavenging and ferric reducing power. Phenolics, a class of natural compounds found in plants, contribute to the color, flavor, and quality of foods. Flavonoids (a subset of phenolics) has also been reported to exhibit good antioxidant properties and are of significance also because they contribute to the aromatic characteristics of plant-derived foods

Proximate composition analysis of TC defatted residue



The experimental results indicated that methanol extracts from both cultivars had the highest phenolic contents, particularly the yellow variety, while the purple variety's hexane extract was rich in flavonoids. Antioxidant activity is like a battle between good and evil in our bodies. Methanol extracts of the yellow cultivar showed the highest DPPH radical scavenging activity, while methanol extracts of the purple cultivar showed the highest ferric-reducing antioxidant power. However, the antioxidant activity in defatted residues of both cultivars was lower than ascorbic acid, which is known to have a high antioxidant activity. Overall, the characteristic features of oil from TC provide insights into its potential use as a healthy oil and defatted residue for diverse dietary applications in developing functional foods.

This is a non-technical summary of the report titles "Micro-Screw Press Extraction of *Terminalia catappa* L. Fruit's Kernel: Analysis of Oil and the Defatted Residue" supervised by Prof. B.E.P. Mendis*, Department of Food Science & Technology, Faculty of Agriculture, University of Peradeniya. *ereshamendis@agri.pdn.ac.lk

THE INFLUENCE OF VARYING NITROGEN AND WATER SUPPLY ON THE YIELD OF TWO RICE VARIETIES WITH DIFFERENT SEED SIZE

L.H.N. Sawbhagya

Rice as a staple food to maintain the food security

Rice (*Oryza sativa*) is the most common cereal crop that belongs to the family Poaceae. It serves as the stable food for over half of the global population in the world. The grain is a good source of carbohydrates and proteins. Fiber and fat is also contain in little amount. In Sri Lanka rice is the main protein component in the human diet. Therefore, rice is an important component in the food security that ensures the zero hunger.

Impact of climate change on the production of rice crop

In developing countries, rice has been found to be the food crop with the greatest economic significance. Nonetheless, declining rice yields have been noted globally in the majority of regions because of factors like inadequate input usage, biotic and abiotic stresses, lack of quality irrigation water, and certain socioeconomic constraints. In order to meet the demands of the growing population, the research and development sector is therefore focused on figuring out how to use integrated management systems in along with eco-friendly agronomic practices, modeling, and research to achieve sustainable and profitable yield production.
Hence, to find an ultimate solution, this research was carried out.

How the establishment is done?

The purpose of this study is to determine how different nitrogen and water supply combinations affect yield components including grain yield, grain number, and individual grain weight.

The experiment was set up as a three factor treatment framework. The first factor was the use of planting materials from short-duration (2 and ½ months) types with two different grain sizes (large seeded variety: Ld253, small seeded variety: Bg252). Nitrogen was applied as the second factor at three different levels from the optimal level: 50% N, 100% N, and 150% N. Well-watered condition and vegetative stage and reproductive stage drought conditions were maintained as the levels of third factor. Plant pots were arranged in six blocks in a plant house.

Every other agronomic practices, including weeding, controlling pests and diseases, and thinned out, was carried out in a methodical way.

Figure 1: The pot arrangement in the plant house

What did the study find?

Differential effects have been seen in the grain production of both types (Bg252 and Ld253) due to rising N levels and water stress. The grain yield of the large-seeded variety (Ld253) responded better to increased N supply and was less susceptible to water stress. Under all moisture regimes, the combined impacts of rising nitrogen levels did not substantially boost the individual grain weight of either Bg252 or Ld253. Conversely, compared to drought during the vegetative stage, the conditions of water shortage during the reproductive stage result in a larger reduction of individual grain weight. In rice plants, grains serve as the most prominent and strong sink. In both kinds, this sink capacity rose as the N supply increased in both well-watered and water-stressed environments. Additionally, there was a noticeable decrease in grain quantity due to the water stress.
Thus, it is essential to fully understand how various N levels and drought conditions affect grain yield and the economic value.

The ultimate outcome

The sink limitation of the large seed variety (Ld253) is lower than that of the small seeded variety (Bg252). Therefore, by overcoming sink restriction, developing rice types with large individual grains has the potential to boost rice productivity. It turned into a brilliant strategy for increasing rice production while making effective use of available resources.

This is a non-technical summary of the project report titled "Influence of Varying Nitrogen and Water Supply on Source-Sink Relations in Two Rice Varieties with Different Sink Capacities" supervised by Professor W.A.J.M. De Costa*, Department of Crop Science, Faculty of Agriculture, University of Peradeniya. *janendramg@agri.pdn.ac.lk

FROM DRIPS TO ROOTS: EXPLORING SOIL MOISTURE AND NUTRIENT STATUS IN COCONUT UNDER SUBSURFACE DRIP IRRIGATION

M.A.B.Tharushika Nethmini Bandara

Did you know coconut growers attempts to irrigate their crops underground?

Imagine a world where irrigation happens underground. It's all thanks to an innovative system known as subsurface drip irrigation (SDI). Not only irrigation, but fertilizer application can also be coupled with SDI system. Subsurface irrigation delivers water and fertilizers (fertigation) directly and effectively to the root zone of plant through emitters attached to buried pipes. Coconut growers are ready to invest capital to install SDI systems, but real impacts need to be assessed. This study assessed impacts on soil moisture distribution and soil nutrient supply on a sandy loamy coconut soil.

Impact of SDI on soil moisture and root distribution

What we did? We conducted soil vertical sectional observations from various distances from an emitter of the drip irrigation system. This enabled us to understand the moisture distribution patterns and their effect on root distribution in coconut trees (see Picture 1) with both high and low yields.

Picture 1: A vertical sectional observation 15 cm away from the emitter (The red line shows the boundary of wetting zone)

What we observed?After three hours of irrigation, th away from the emitter, forming a 5 x 3 cm elliptical area. The gravelly soil observed around the low-yielding tree was dry at 25 cm from the emitter. A larger wetting area (30 x 10 cm) was observed in the cross-sectional area 15 cm away from the coconut trees. Results indicated that the wetting zone of a dripper is approximately an elliptical volume with a height of 40 cm and a width of 15 cm.

Moreover, SDI has caused a significant impact on root distribution, leading to concentration within the wetting zone. Therefore, coconut trees irrigated with SDI would have limited access to water available in deeper soils. The impact of this would be felt by the trees during drought seasons, especially if irrigation water is also limited.

- **Levels of soil and leaf nutrients**

The nutrient levels of coconut trees were similar under SDI with fertigation and manually fertilized trees. An important finding was that SDI coupled with fertigation supported a 30% reduction in fertilizer application without negatively affecting the nutrition of coconut trees. This observation was further supported by nutrient accumulation in soils of manually fertilized fields.

Picture 2: Field and laboratory work seeking the soil and plant nutrient status

- **What can we conclude?**

We concluded that subsurface drip irrigation provides water to small volumes of soil and, consequently, to roots. This volume becomes even smaller when the soil is gravelly and compacted. Therefore, proper site-specific planning of irrigation is needed to address soil variability and plant water requirements. Moreover, drip irrigation can limit the drought resistance of coconut trees due to the restriction of root distribution. The provision of fertilizers through SDI has proven to be promising in nutrient use efficiency.

This is a non-technical summary of the project report titled "Exploring soil moisture and nutrient status in a subsurface drip irrigated coconut (*Cocos nucifera* L.) cultivation" supervised by Prof. W. A. U. Vitharana*, Department of Soil Science, Faculty of Agriculture, University of Peradeniya. *uvithara@agri.pdn.ac.lk

DEVELOPMENT OF A HYBRIDIZED HALF-FAT COOKING CREAM THROUGH THE INTEGRATION OF DAIRY AND COCONUT FAT

M.N.H.T.B. Deniyawaththa

Cooking cream??

Cooking cream is a product containing high fat content and a thinner consistency that is utilized in a wide array of culinary applications.

Gaps identified (existing cooking cream)

- Low consumer **affordability**
- Not addressing the **Hybrid food trend**
- Only **dairy** ingredients
- **High-fat** content

Money is everything!!

The cooking cream products in the current market exhibits considerably a high price due to the utilization of dairy ingredients. Incorporating only milk cream, which is quite expensive as a raw material has resulted in this heavy price of cooking cream products. This controversy has impacted significantly for the downfall of the market demand of the product due to the abated consumer affordability.

Only Dairy? Why not Non-dairy??

Existing cooking cream products have employed only dairy ingredients. Using non-dairy sources of ingredients not only enhances the nutritional and health attributes but also, the consumer affordability compared with the existing product.

Non-dairy source – Coconut cream

Blending coconut cream with dairy cream has amplified the nutritional profile of the cooking cream while deducting the cost of the product **(Cost Efficiency = 31.7%).**

Hybrid food trend - a promising solution

Hybrid food trend is the involvement of animal-based and plant-based ingredients together in developing a final product. The persisting cooking cream in the market doesn't address this evolving technology. This imparts a solution for **lactose-intolerant** and **vegan** people as this trend can adjust the dairy ingredient composition under the tolerance limits of the lactose-intolerant people while bestowing the essential nutrients from dairy sources that cannot be gained from consuming only non-dairy sources.

High-fat content – High health impact

High-fat content of the existing cooking cream not only uplifted the price of the product, but also, influenced the health of frequent consumers.

Half-fat standards – healthy solution

The final fat content of the product is adjusted to **15%** to meet the half-fat standards.

Bridged the Gap ✓

Developed a commercially viable and consumer-acceptable blended half-fat cooking cream through the integration of dairy and coconut fat.

This is a non-technical summary of the project report titled "Development of A Hybridized Half-Fat Cooking Cream Through the Integration of Dairy and Coconut Fat" supervised by Prof. W.M.T. Madhujith*, Department of Food Science & Technology, Faculty of Agriculture, University of Peradeniya. *madhujith@agri.pdn.ac.lk

BEHIND THE SCENE: UNVEILING DIVERSE STUDENTS' PERSPECTIVES ON HUMAN–MONKEY INTERACTION AT THE UNIVERSITY OF PERADENIYA

Nirmani Godamunna

Human-Wildlife Conflict (HWC) is indeed a growing issue with serious implications for both humans and wildlife animals. Negative interaction between humans and wild animals leads to undesirable consequences for both parties involved. This conflict arises when there is a clash of interests or competition for resources between humans and wildlife, often leading to negative consequences for both the human communities and the animal populations. Human-Monkey Conflict (HMC) is a significant part of HWC, particularly prevalent in developing countries like Sri Lanka and posing a major threat to biodiversity conservation. In Sri Lanka, HMC is more extensively spreaded throughout the country compared to human-elephant conflicts, which are primarily constrained to the dry zone. The Purple-faced langur, Toque macaque, and Gray langur are the three types of monkeys found in Sri Lanka. According to studies, the Toque macaque more commonly known as "Relawa" tend to cause more trouble than the Purple-faced monkey which is more commonly known as "Kalu wadura". The Toque macaque is a species that causes problems in certain areas of Sri Lanka because it often interacts with humans and damages crops.

The University of Peradeniya is situated in a captivating area surrounded by rich biodiversity. In the University of Peradeniya premises, there is a large number of monkeys, and students are affected by their behavior regularly. Research conducted at the Veterinary Teaching Hospital of the University from 2000 to 2016 highlighted the extent of HMC

involving monkeys attracted to the University area due to habitat loss and availability of food resources.

A total of 474 students at the University of Peradeniya have been involved in face-to-face and online interviews conducted through questionnaire surveys. According to my study, the majority of the students had a negative perception on monkeys and they were physically, mentally and economically affected by HMC in the University area.

Students have suggested various solutions, including establishing physical barriers around hostel rooms, introducing birth control methods for monkeys and implementing proper waste management systems to reduce food waste that attracts monkeys. Additionally, recommendations include collaborating with wildlife experts to repel monkeys humanely and relocating them to natural habitats away from human settlements. The overall opinion of the students is to control the monkey population while ensuring their safety and minimizing harm to students.

This is a non-technical summary of the project report titled "Huaman-Monkey Conflict: A Case Study of University of Peradeniya" supervised by Dr. W.E.M.L.J. Ekanayake*, Department of Animal Science, Faculty of Agriculture, University of Peradeniya. * jayampathiekn@gmail.com

FACTORS AFFECTING THE PERFORMANCE OF WOMEN ENTREPRENEURS IN CENTRAL PROVINCE, SRI LANKA

Ruwini Wijerathna

Women entrepreneurship is an act of owning a business which makes women economically independent. In Sri Lanka, current population is 21.79 million. Although the majority of the population (50.7%) in Sri Lanka is women, still the active labor force participation of women (ages 15+) is only 33%. Every other does not contribute to the Sri Lankan economy even under this kind of bad economic condition of the country. They are just passive recipients. Under this kind of condition, it is very important as scientific researchers if we can contribute to promote women entrepreneurship in Sri Lanka. With that intention the research problem for this study has identified under women entrepreneurship.

The survey report, 2023 done by Ministry of Sports, Youth Affairs, Women, Rural Development and Industries of Central Province has reported whether there is a huge variation in performance of women entrepreneurs in Central province. Monthly income is a good indicator of performance of women entrepreneurs.
In Central Province, there are some very low-income generating entrepreneurs to very high-income generating entrepreneurs who deal with foreign markets also. With the interest of exploring the factors affecting on this performance variation, this study was conducted with 100 women entrepreneurs in Central province including Kandy, Matale and Nuwara Eliya districts. The sample was consisted with respondents representing from all the 37 Divisional Secretariat divisions in Central Province purposively in order to catch the real ground situation through a better representation for the Central Province as much as possible. The sample was comprised of women entrepreneurs from different service sectors like salon, canteen and tailoring and different product categories like food & agricultural sector, home decorative items, textiles & shoewear related items, jewellary & cosmetics and handmade kitchen appliances. They were from 21 years of age upto 74years of age and most of them are raised from a good educational background. From respondents fourty five percent have completed their education upto A/L and fourty one percent have completed their education upto O/L.
Currently, ninety five percent of the sample are selling their products only to the local market. Only five percent have able to reach foreign market for higher profit earnings. That shows us if women entrepreneurs will receive a proper guidance to develop their products to reach foreign market requiring conditions, there is a potential within women entrepreneurs to contribute more to the economic development of the country increasing their performance.

Only 29% of the respondents is used online marketing strategy to promote their business. Still 71% of the respondents are not using this online marketing. If women entrepreneurs will receive a proper guidance to build and maintain business social media accounts, they can expand their customer range and contribute more to the economic development of the country increasing their performance.
Findings shows that Motivational factor significantly positively affects on performance of women entrepreneurs. That means entrepreneurs who are raising from motivating/ encouraging family background and formal network will increase their performance. Cultural factor significantly negatively affects on performance. That means different cultural barriers will decrease the performance of women entrepreneurs. Financial factor significantly negatively affects on performance of women entrepreneurs. Financial difficulties when initiating and running the business will decrease the performance of women entrepreneurs.

Study has identified major barriers faced by women entrepreneurs in Central Province. They are not having a fixed market place to sell their products, not having places in rural towns to purchase raw materials at a low price, existence of a huge competition with imported products as they are very low in price, having problems when obtaining Business Registration (BR) and when getting loans. There are recommendations which can express in order to increase the performance of women entrepreneurs. They are Giving a fixed market place in crowded town areas to sell their products continuously at a good price, giving priority for local entrepreneur's products rather than importing low-cost products, building markets near to their residential areas to purchase raw materials at a reasonable price, introducing opportunities to sell their products at shops in tourist hotspot areas and giving financial & instrumental support to start & continue the business. Considering those aspects in allocating provisions and when building policies will open avenues to increase the performance of women entrepreneurs thereby contribute more to the economic development of the country.




This is a non-technical summary of the project report titled "Factors affecting the performance of women entrepreneurs in Central Province, Sri Lanka" supervised by Dr. Kumudu P.P.Kopiyawattage*, Department of Agricultural Extension, Faculty of Agriculture, University of Peradeniya.
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NEXT-GEN GINGER: DEVELOPING SHELF-STABLE, HIGH-QUALITY PRODUCT THROUGH OSMOTIC DEHYDRATION

P.R.E.M.K. Pallemulla

Ginger: A Versatile Root with Global Appeal

Ginger (*Zingiber officinale* Roscoe) is a perennial herbaceous plant that belongs to the Zingiberaceae family. Local ginger (Beheth Inguru or Siddha Ginger), Chinese ginger, and Rangoon ginger varieties are grown in Sri Lanka. Ginger has several medicinal properties; anticancer, anti-inflammatory, antimicrobial, antioxidant, neuroprotective, cardiovascular protective, respiratory protective, anti-obesity, anti-diabetic, and antiemetic activities.

Value addition and Preserve Ginger Sensory Attributes using Osmotic Dehydration

The osmotic dehydration (OD) is one of the promising method to preserve ginger because it helps to preserve bulk raw material during harvesting season.

What is Osmotic Dehydration?

OD is a mass transfer operation that immerses products in hypertonic aqueous solutions, such as syrups or brines, resulting in partial removal of water. As a result, color, aroma, and vital nutrients are preserved.

Osmotically Dehydrated Ginger

Natural spiciness of ginger, sweetness of sugar, the savory touch of salt, and a hint of sodium metabisulphite are used to create this perfect novel product.

Benefits of OD Ginger and Human Health

Due to the presence of antioxidants, the product possesses anticancer, anti-inflammatory, antimicrobial, antioxidant, neuroprotective, cardiovascular protective, respiratory protective, anti-obesity, anti-diabetic, and antiemetic activities.

Prolonged Shelf Life: The shelf life of ginger is significantly increased while reducing the surplus and spoilage.

Enhanced Sensorial Quality: The developed ginger cubes possessed the characteristic pungency, flavor, and color of ginger.

Packaging and Distribution

As a stable preserved product, overall cost for packaging and distribution is comparatively low.

Microbiological Safety: Lower water activity in the dehydrated product reduces the growth of harmful microbes ensuring the safety of the product.

Market Potential in Sri Lanka: The value-added ready-to-eat ginger cubes could achieve a premium price compared to raw ginger. Unique flavor, health benefits, and convenience lead to the high demand during the off-season of ginger.

Income Generation for Farmers: OD offers a great solution to manage surplus ginger during harvest seasons and ensure better income stability for farmers.

Export Potential: The unique flavor of dehydrated ginger and prolonged shelf life make it ideal for export. And also, this product helps to open a new market for Sri Lankan ginger.

Osmotic Dehydration – Truly Preserve Freshness with Taste and Aroma of Ginger

OD possesses a massive potential for value addition of fresh ginger and a potential for exportation ensuring a better income for farmers. The developed product will satisfy the growing demand as a food ingredient and ready-to-eat (RTE) products or semi-processed products.

This is a non-technical summary of the project report titled "Development of Osmotically Dehydrated Ginger (*Zingiber officinale* Roscoe) and Product Quality Evaluation" supervised by Mr. P.C. Arampath*, Department of Food Science & Technology, Faculty of Agriculture, University of Peradeniya. *arampath@agri.pdn.ac.lk

Unlocking the Potential of Young Jackfruit: A Solution for Food Waste and Security

K.D.I.K. Edirisinghe

The Hidden Gem of Jackfruit

Jackfruit is a widely consumed seasonal fruit in many parts of Asia, prized for its versatility in various culinary dishes. However Young jackfruits have a short shelf life and tend to go to waste during the season. To address this problem, this research project aims to explore different preservation methods to prolong the shelf life of young jackfruit.

Blanching; A Hot Bath for Preservation

Blanching is a food preservation technique where food is briefly exposed to boiling water or steam. This process helps to preserve the food, retain its color and flavor, and prepare it for further processing or storage.

Various blanching techniques were tested to preserve jackfruit, a tropical fruit with a distinctive color and taste. Several trials were conducted to determine the most effective method. It was found that submerging young jackfruit in hot water with a temperature of 95°C for only 15 minutes provided the best results.

Dehydration; Keeping Things Dry

Following the initial blanching stage attention was directed to dehydration techniques. The extraction of moisture from the fruit is integral in prolonging its shelf life. Through the application of hot air drying with varying temperatures and durations, an optimal condition was determined: 60°C for 4 hours. This approach not only conserved the fruit's color but also preserved its texture and structural integrity.

Rehydration; Bringing Jackfruit Back to Life

The pinnacle of success was attained during experiments focused on the rehydration of jackfruit. Upon submergence in 50°C water for a period of 90 minutes, the fruit regained its original physical composition, which was nearly identical to its fresh counterpart. This process yielded an impressive 83.8% volume retrieval, underscoring the fruit's inherent resilience.

Consumer Acceptance; From Palate to Plate

Upon conducting sensory tests to evaluate consumer preferences, our optimized processing method has significantly enhanced the fruit's appeal, resulting in a product that surpasses mere preservation and resonates with consumer tastes.

A Flavorful Future

This study has identified young jackfruit as a promising market product that is convenient and delicious. It has the potential to address food waste and enhance food security, rendering it a significant food source in Sri Lanka and other regions. The innovative preservation techniques employed in this research guarantee that the flavor of jackfruit can be savored throughout the year. This not only ensures the fruit's longevity but also safeguards a rich culinary heritage for future generations.

This is a non-technical summary of the project report titled "Optimizing processing parameters for young jackfruit: A Scientific Exploration of Blanching, Dehydration and Rehydration Conditions" supervised by Dr. E.R.J. Samarakoon*, Department of Food Science & Technology, Faculty of Agriculture, University of Peradeniya. *rasanjalis@agri.pdn.ac.lk

FED UP WITH SYNTHETIC FERTILIZERS…? NOTHING TO WORRY… LET'S USE BLACK SOLDIER FLY FRASS (BSFF)….

Ishara Premachandra

Organic fertilizers in Agriculture

Throughout history, agriculture has evolved from subsistence farming to industrialized systems to meet the increasing demand for food and other agricultural products. However, reliance on synthetic chemical fertilizers has led to environmental and sustainability challenges such as harming soil microorganisms, contaminating groundwater, and disrupting ecosystems. To address these issues, there's a need to explore sustainable alternatives like organic fertilizers that can enhance crop production while minimizing negative environmental impact and health risks.

Black Soldier Fly (BSF) and BSF Frass…

Black Soldier Fly (BSF) is a remarkable insect species that has gained the attention worldwide as a new producer of organic fertilizer. The *Hermetia illucens* L., or Black Soldier Fly, is particularly well-suited for this role due to its adaptability to a wide range of organic by-products and its natural habitat being on rotting fruits and plant residues, especially in tropical and subtropical areas. The Black Soldier Fly undergoes a life cycle consisting of five stages: egg, larva, pre-pupa, pupa, and adult. These larvae consume organic matter at a rapid pace, producing nutrient-rich frass as the byproduct of their digestion.

In commercial BSF production, the larvae are taken as a poultry feed in poultry industry. The byproduct, Black Soldier Fly Frass (BSFF) is enriched with essential nutrients crucial for plant growth, making it a highly valuable organic soil amendment or a fertilizer. By utilizing BSFF and other organic fertilizers, we not only recycle organic waste but also reduce our dependency on synthetic chemicals, offering a sustainable and eco-friendly solution for agricultural practices.

What we tried to find out…

BSFF being that much of a useful substance, still it has not been tested scientifically as a fertilizer for vegetables. Therefore, our target was to test this BSFF as a fertilizer on okra and radish in comparison with Department of Agriculture recommended conventional fertilizers and vermicompost. We compared BSFF with vermicompost in order to test BSFF's effectiveness in comparison to an already available and widely used organic fertilizer as well.

Can BSF frass be used as a fertilizer?

What we found was amazing. BSFF increased the vegetative growth of okra even than that of in the chemical fertilizers. Also, it showed same growth and yield in radish as it was in the chemical fertilizers. Therefore, it is obvious that BSFF can be used as a very good fertilizer for growing vegetables and also it can even replace some of the currently used synthetic fertilizers. So, what we are waiting for...? Let's use this very valuable source of nutrients in nourishing our plants.

This is a non-technical summery of the project report titles "Identifying the Potential of Black Soldier Fly Frass (BSFF) to be Used as a Fertilizer" supervised by Dr. L.M. Rankoth*, Department of Crop Science, Faculty of Agriculture, University of Peradeniya. * lalithrankoth@agri.pdn.ac.lk

GIVE A CRISP TO THE POOR MAN'S FOOD

R. A. M. H. Perera

Need to substitute wheat? Wheat is considered to be the second source of cereal supply in Sri Lanka which has low fiber content. Similarly, it is associated with an allergic reaction known as gluten intolerance. The impact of the Ukraine war and the COVID-19 pandemic has increased the global price of wheat and implemented trade barriers to wheat-importing countries like Sri Lanka. Therefore, the local price of wheat flour has increased dramatically during the past few years.

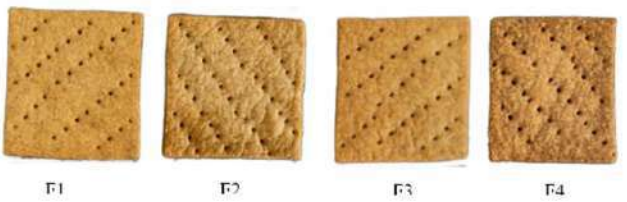
Swap wheat for the golden bounty of Jackfruit….

Why 'jackfruit'…..??? Jackfruit is considered to be an underutilized crop which yields gigantic composite fruit, ranging from 10- 25 kg depending on the variety. A very low percent nearly amounting to 30% of total produce is consumed while 70% of total produce is lost due to pre- and post-harvest practices. The presence of macro and micro nutrients and phytochemicals, that are responsible for antifungal, anti-cancer, anti-aging, antioxidant, and antiulcer properties.

Potential for product development: In order to ensure the utilization of local inputs minimizing the wastage, both jackfruit bulb and seed were used for food processing. Jackfruit bulb and seed flour were prepared with 500µm particle size and with a <15% moisture content. Three different composite flour ratios were made using wheat flour (WF), jackfruit bulb flour (JBF) and jackfruit seed flour (JSF) *viz*, 50% WF+ 25% JBF+ 25% JSF, 50% WF+ 37.5% JBF+ 12.5% JSF and 50% WF+ 12.5% JBF+ 37.5% JSF. The developed composite flour blends resulted in higher water absorption capacity and swelling capacity in comparison to wheat flour. Among composite flours, flour contain higher jackfruit bulb flour showed highest values for bulk density, water absorption capacity, solubility and swelling capacity which are beneficial in food industry.

Let's have a bite of cracker from jackfruit

Crackers, a type of biscuits which are neutral or less sweet, generally contain inner flaky layers. The developed crackers showed higher crude fiber content than wheat flour based crackers, ranged from 2.09% to 2.73%. Among composite flour incorporated crackers content of crude protein, crude fat, crude fiber, and ash increased with increasing inclusion of jackfruit seed flour. The antioxidant activity of composite flour based crackers increased with increasing amount of bulb flour. The hardness of the developed crackers increased with inclusion of more seed flour. The cracker with 50% WF+ 25% JBF+ 25% JSF was selected as the cracker with best sensory attributes which was similar to control cracker in terms of aroma, texture and overall acceptability



This is a non-technical summary of the project report titled "Development and Characterization of Jackfruit (*Atocarpus heterophyllus*)" Seed and Bulb Flour based Crackers supervised by Dr. D.M.S.S. Daundasekara*, Department of Food Science & Technology, Faculty of Agriculture, University of Peradeniya. *saumalid@agri.pdn.ac.lk

තේ කෝප්පයක් පිටුපස සැගවී ඇති කතාව තේ කෝප්පයක් තරම්ම රසවත්ද?

කාවින්දි හේරත්

ශ්‍රී ලංකාවේ දෙවනියට වැඩිම අපනයන ආදායමක් හිමිවන්නේ තේ කර්මාන්තය සඳහා වන අතර 2019 දී ශ්‍රී ලංකාව ලෝකයේ 3 වෙනියට විශාලතම තේ අපනයනය කරනු ලැබූ රට ලෙස සැලකේ. තේ වගාව සැලකූ විට තේ දලු නෙලීම එහි මූලිකම සහ වැදගත්ම අංගයයි.

තේ දලු නෙලීම ගැන කිවූ පමණින් ඔබේ මතකයට නැගෙනුයේ කුමක්ද? **ඔබ නිවැරදියි, ඒ උඩරට කඳුකරයේ පමණක් නොවේ රටේම ජීවනාලිය බදු තේ දලු නෙලන ලදුන්ය. ශ්‍රී ලංකා කාන්තා ජනගහනයෙන් 6% ක් පමණ තම වෘත්තිය ලෙස තේ දලු නෙලීමේ නිරත වෙයි. ඉතින් මේ අධ්‍යයනය ඔවුන් පිලිබඳවයි.**

ශ්‍රී ලංකාවේ වතු ජනගහනය 4.3% ක් වන අතර ඔවුන්ගෙන් 77% ජීවත් වන්නේ ප්‍රාදේශීය වැවිලි සමාගම් සතු වතුවල ය. මෙම අධ්‍යයනය සිදු කරනු ලැබුවේ තේ දළු නෙලන කාන්තාවන්ගේ ජීවන තත්ත්වය මැනීමට සහ ඔවුන්ගේ ආදයම් මාර්ගය සමඟ ඔවුන්ගේ ජීවන තත්ත්ව සංසන්දනය කිරීමටය. මෙය ශ්‍රී ලංකාවේ මධ්‍යම පළාතේ හැටන් ප්‍රදේශයේ පිහිටි තේ වත්තක සිදු කරන ලද ප්‍රමාණාත්මක හා ගුණාත්මක අධ්‍යයනයකි.

අධ්‍යයන ජනගහනය වූයේ එක්තරා තේ වත්තක සේවය කරන තේ දළු නෙළන කාන්තාවන් 67 දෙනෙකි. ලෝක සෞඛ්‍යය සංවිධානයේ ජීවන තත්ත්වය මැනීමට යොදා ගන්නා ප්‍රශ්නාවලිය භාවිතා කරමින් ඔවුන්ගේ ජීවන තත්ත්වය, කායික, මානසික, ආර්ථික සහ සමාජ සබඳතා අංශයන්ට අදාළව තොරතුරු ලබාගෙන ඇත.

අධ්‍යයන ජනගහනය 61.2% ස්ථිර සේවකයන් වූ අතර ඉතිරි 38.8% කොන්ත්‍රාත් සහ ආදායම බෙදීයාමේ පදනම මත බඳවාගත් සේවකයින් විය. තේ දළු නෙලන කාන්තාවන්ගේ සමස්ත ජීවන තත්ත්වය සැලකූ විට සමස්ත කම්කරුවන්ගෙන් 80% කට වඩා ඔවුන් විසින් වටහා ගත් පරිදි සතුටුදායක මට්ටමක සිටියහ. ආදායම බෙදීයාමේ පදනම මත බඳවාගත් සේවකයින් අනෙක් සේවකයන්ට වඩා යහපත් සමස්ත ජීවන තත්ත්වයක් පෙන්වයි. තවදුරටත් සිදු කරන ලද විශ්ලේෂණයට අනුව, සමස්ත ජීවන තත්ත්වය විවාහක තත්ත්වය සමඟ මෙන්ම රැකියාවේ ගිවිසුම් සබඳතාව සමගද සම්බන්ධතාවයක් පවතින බව සොයා ගන්නා ලදී.

අධ්‍යයනයේ නිරවද්‍යතාවය සඳහා වෙනම සිදුකරන ලද්ද විශ්ලේෂණය අනුව ආර්ථික සහ මනෝවිද්‍යාත්මක ජීවන තත්ත්වයන්, සමස්ත ජීවන තත්ත්වය සමඟ සම්බන්ධයක් පවතින බව හඳුනා ගැනිණි.

තේ දළු නෙළන කාන්තාවන් වියදම් කපාහැරීමක් සිදුනොකර තම අත්‍යවශ්‍යතා සපුරා ගන්නා අතර, සමාජ සබඳතා පවත්වාගෙන යාම සහ භාණ්ඩ මිලදී ගැනීම සඳහා ඉහළ අවශ්‍යතා පෙන්නුම් කරන නමුත් ඔවුන්ට අඩු මූල්‍ය මට්ටමක් පවතී. මෙම අවශ්‍යතා සහ මූල්‍ය තත්ත්වය අතර පරතරය සපුරාලීම සඳහා ඔවුන් විවිධ ණය මූලාශ්‍ර සොයා ගැනීමට පුරුදු වී ඇත. සිදුකරන ලද දත්ත විශ්ලේෂණයට අදාළව ඔවුන්ගේ පුද්ගලික සබඳතා අවම මට්ටමක පැවතිණි.

ඉතා බරකින් යුතු (කිලෝග්‍රෑම් 10-15 පමණ) තේ දළු කූඩ රැගෙන ඇවිදීමට, කදු සහ විශාල බෑවුම් සහිත ස්ථාන වල තේ දලු නෙලීමට සිදුවී ඇති නිසා තේ දළු නෙලන කාන්තාවන්ට ශාරීරික වේදනාවන්, විශේෂයෙන් බෙල්ල, අත, උරහිස, කොන්ද ආශ්‍රිත වේදනාවන් සැලකිය යුතු ලෙස පවතී. ඔවුන් සමග සිදුකළ කතාබහට අනුව දැඩි සූර්ය රශ්මියෙන්, වර්ෂාවෙන්, බඹර ප්‍රහාර වලින් සහ කූඩැල්ලන්ගෙන් විශාල ලෙස ඔවුන් පීඩාවට පත්වේ.

කෙසේවෙතත් බහුතරයක් තේදලු නෙලන ලදුන් තේ වත්තක මායිමෙන් එපිට ලෝකය දැක ඇත්තේ ඉතාමත් කලාතුරකිනි. ඔවුන් තේ වත්තක ඉපිද කිසිම සැපක් නොවිඳ තම තාරුණ්‍යය මෙන්ම වැඩිහිටිවියත් තේ වත්තකටම දියකර කිසිවෙකුට මැසිවිලි නොනගා සදාකාලිකවම නිහඬ වී යයි.

නිදහස් පුද්ගලයෙක් ලෙස ඔබ අත්විඳින නිදහසෙන් සුලු නිදහසක් හෝ ඔවුන් අත්විඳිද යන්න ගැටලුවකි. මේ පොළොව ඔවුන්ගේ නිජබිම නොවුහත් දශක තුනකට ආසන්න කාලයක් මේ පොළොව වෙනුවෙන් තම දහදිය කදුලු හෙලන ඔවුන්ට සාධාරණයක් ඉටුවී නිබේද යන්න ඔබේ හෘද සාක්ෂියෙන් විමසා බලන්නට ඇවසි කාලය එලබී නිබේ.

This is a non-technical summary of the project report titled "The Nature of the Contractual Relationship and the Quality of Life of Women Tea Pluckers: The case of a plantation company based in Hatton" supervised by Prof. Shamala Kumar*, Department of Agricultural Economics and Business Management, Faculty of Agriculture, University of Peradeniya. *skumar@agri.pdn.ac.lk

වෙළඳපළ ජයගත් බාබටන්ඩෙසි

එම්.ඩී.සි.කුලතුංග

කැපූ මල් වගාව යනු දේශීය මෙන්ම විදේශීය වශයෙන්ද ඉහළ ආදායමක් ලබාගත හැකි මාගර්යක් වන අතර වතර්මානය වන විට ලෝකය පුරා විසිතුරු කැපූ මල්, කැපූ ශාක, බදුන් ගත විසිතුරු පැළ, වියලන ලද විසිතුරු ශාක, සහ විසිතුරු ශාක බීජ, සඳහා ඉහළ ඉල්ලුමක් නිමර්ාණය වී ඇත. කැපූ මල් වගාව අතරින් Asteraceae ශාක පවුලට අයත් බාබටන්ඩෙසි (*Gebera jamesonii*) යනු අධික වාණිජ වටිනාකමක් සහිත ගෝලීය වෙළඳපළ තුළ අධික ඉල්ලුමක් සහිත විසිතුරු මල් වගර් 10 න් එකකි. මෙම මල් විශේෂය තනි හෝ ද්විත්ව වණර් වශයෙන් වණර් ගණනාවකින් දැකිය හැක. එම ආකෂර්ණියභාවය නිසාම විවිධ ආකාරයේ මල් සැකසුම් සඳහා මෙම මල් වගර් යොදා ගනු ලබයි

දේශීය සහ විදේශීය වෙළඳපළ අරමුණු කර ගනිමින් ශ්‍රී ලංකාව තුළ නුවරඑළිය බදුල්ල වැනි සිසිල් දේශගුණය පවතින ප්‍රදේශ තුළ මහා පරිමාණ වශයෙන් මෙම ශාකය වගා කරනු ලබයි. නමුත් ඩෙසිමල් වගාකරුවන් මුහුණ දෙන ප්‍රධාන අභියෝගයක් වන්නේ අස්වනු නෙලූ අවස්ථාවේ සිට පාරිභෝගිකයා අතට පත්වනතුරු මලේ ගුණාත්මකභාවය පවත්වාගෙන යාමයි. විශේෂයෙන් ඩෙසිමල් වල පවතින දුවර්ල නටුව නිසා ඇතිවන ගැටලු සහ මලෙහි සිදුවන දුවර්ණර්තා, මැලවීම වැනි කරුණු නිසා මලෙහි ගුණාත්මක භාවයට හානි වීමට වැඩි ඉඩකඩක් පවතී. මේ සඳහා නියමිත පෙර සහ පසු අස්වනු තාක්ෂණික ක්‍රම භාවිතා කළ යුතු වේ. මෙම ලිපිය තුළින් අස්වනු නෙලන ස්ථානයේ සිට දේශීය හෝ වෙළඳපොළ තුළට ප්‍රවාහනය කිරීමේදී මල් සඳහා ඇතිවන ආතතිය හා හානිය අවම කිරීම පිළිබඳව අවධානය යොමු කරනු ලබයි.

කැපූ මල්වල ගුණාත්මක භාවය සහ නැවුම් බව ඒවායේ වෙළඳපළ වටිනාකම තීරණය කරන ප්‍රධාන සාධකයක් වේ. කැපම් මල් වල ආයු කාලය දීඝර් කිරීම සහ ප්‍රශස්ත තත්ත්වයෙන් තම ගමනාන්තය වෙළඳපළ දක්වා ළඟා වීම එම නිසා විසිතුරු කැපූ මල් ප්‍රවාහනයේදී ඇතිවන ආතතිය අවම කිරීමට මල් අඩංගු බහාලුම් තුළට ද්‍රාවණයක් භාවිතා කරනු ලබයි. මෙම ද්‍රාවණය මගින් ප්‍රධාන වශයෙන්ම කැපූ මල් සඳහා අවශ්‍ය පෝෂක සහ ජලය ලබාදීම සිදු කරනු ලබයි.

එම ද්‍රාවණය විවිධ රසායනික ද්‍රව්‍යයෙන් සමීක්ෂණය කර සාදනු ලබන අතර එහිදී යොදා ගන්නා ද්‍රාවණයේ ස්වාභාවය, අඩංගු සංඝටක සහ ඒවායේ සාන්ද්‍රණයන් ප්‍රමාණයන් පිළිබඳව අවධානය යොමු කළ යුතුය. විශේෂ වශයෙන් මෙම භාවිතය මගින් අපනයනය ක්‍රියාවලිය පුරාවටම ඇතිවන පාරසරික ආතතියට හා යාන්ත්‍රික හානිවලට ඔරොත්තු දීමේ හැකියාව වැඩිදියුණු කරයි.

මෙම පරීක්ෂණයේ මූලික අරමුණ වූයේ කාමර උෂ්ණත්ව ($25\pm C^{o}$) සහ සිසිල් උෂ්ණත්ව ($15\pm2C^{o}$) තත්ව යටතේ ඩෙසිමල් ප්‍රවාහනය කිරීමේදී සිදුවන ආතතින් අවම කර ගැනුම්කරුවන්ගේ ඉල්ලුමට සරිලන ප්‍රමිතීන් සහ ගුණාත්මකභාවයන් සපුරාලීම වඩාත් සුදුසු වන ද්‍රාවණයක් හඳුනා ගැනීමයි. එම පයෙර්ෂණයේ දී විවිධ අම්ල වගර් සහ කාබෝහයිඩ්‍රේට අඩංගු සීනි වගර් කිහිපයක් භාවිතා කර සදාගත් ද්‍රව්‍යයන් 16 ක් අතරින් වඩාත්ම ඵලදායි ද්‍රාවණයක් හඳුනd ගන්නා ලදී.

එහිදී කාමර උෂ්ණත්වය ($25\pm2C^{o}$) යටතේ ප්‍රවාහනය කරන්නේ නම් **3% ෆෘකෘටෝස් සහ 1% සිට්‍රික් අම්ලය** 3:1 අනුපාතයෙන් මිශ්‍ර කර සාදාගත් ද්‍රාවණයත්, සිසිල් උෂ්ණත්ව ($15\pm2C^{o}$) යටතේදී 3% ග්ලූකෝස් පමණක් අඩංගු ද්‍රාවණයත් වඩාත් යෝග්‍ය බව සොයා ගන්නා ලදී. මෙහිදී කාබෝහයිඩ්‍රේට අඩංගු රසායනික ද්‍රව්‍යයක් භාවිත කිරීමෙන් කැපූ මල් ශාකයෙන් ඉවත් කළ පසු අහිමිවන පෝෂණය නැවත ලබාදීමක් අපේක්ෂා කරන අතර කැපූ මලෙහි සිදුවන පරිවෘත්තීය ක්‍රියා පවත්වා ගැනීමට උපකාර වේ. එසේම ආම්ලික මධ්‍යයක් ලබාදීම මගින් ද්‍රාවණයේ අඩංගු පෝෂක සහ ජලය අවශෝෂණය කායර්ක්ෂම කිරීම මෙන්ම ඩෙසි මලයෙහි නටුව ආශ්‍රිතව සිදුවිය හැකි අහිතකර ක්ෂුද්‍රජීවී වධර්නය පාලනය කරනු ලබයි.

This is a non-technical summary of the project report titled "Evaluation of pulsing Solutions in Improving the Postharvest Quality of cut Gerbera Flowers during Export Simulation" supervised by Dr.H.M.P.C.Kumarihami*, Department of Crop Science, Faculty of Agriculture, University of Peradeniya. *prathibhani@agri.pdn.ac.lk

පවතින නිස්සරණ ක්‍රම අතරින් ඉතා සුදුසු භෞතික රසායනික ගුණ සහිත ඉහල කැරජීනන් ප්‍රමාණයක් නිස්සාරණය කිරීමට සුදුසුම ක්‍රමයක කුමක්දැයි ඔබ සිතුවාද?

ඒ.එම්. ධනංජනා මධුභාෂිණී අධිකාරී

කැරජීනන් ගැන ඔබ දැනුවත්ද?

කැරජීනන් යනු ඇල්ගී වල සෛල බිත්තියේ පවතින ස්වාභාවික පොලිසැකරයිඩයක් වන අතර එය බහුලවම විවිධ නිශ්පාදන ක්ශේත්‍රයන් වල අමුද්‍රව්‍යක් ලෙස භාවිතා කරනු ලබයි. කැරජීනන් වල ඇති විශේෂ භෞතික රසායනික ගුණයන් නිසාම ප්‍රධාන වශයෙන් ආහාර ක්ශේත්‍රය තුල ආහාර ඝනකාරයක් ලෙසත්, ආහාර දුස්ස්‍රාවිකාරකයක් ලෙසත් භාවිතා භාවිතා වෙයි.

කැරජීනන් වලට ඇති ඉහළ වටිනාකම හේතුවෙන් විවිධාකාර වූ කැරජීනන් නිස්සාරණ ක්‍රම මේ වන විට ලොවට හඳුන්වා දී ඇති නමුත්, ඉතා ඉහළ භෞතික රසායනික ගුණ යටතේ උපරිම කැරජීනන් ප්‍රමාණයක් නිස්සාරණය කර ගැනීමට සුදුසුම කැරජීනන් නිස්සාරණ ක්‍රමය ගැන මේ වන තෙක් කිසිදු විද්‍යාමාන හෙලිදරව්වක් ඇති බව පෙනෙන්ට නැත.

මෙම වත්මන් පරීක්ශණය එම අරමුණ සාක්ශාත් කරගැනීම සඳහා දියත් කරනු ලැබූ අතර දින 45ක් වයසැති දුඹුරු ඇල්ගේ (*Kappaphucus alvarezii*) විශේෂය ස්වභාවික කැරජීනන් ප්‍රභවය ලෙස යොදා ගනු ලැබීය. මෙම පරීක්ශනයේදී, 6% පොටැසියම් හයිඩ්‍රොක්සයිඩ්, 6% කැල්සියම් හයිඩ්‍රොක්සයිඩ්, 6% සෝඩියම් හයිඩ්‍රොක්සයිඩ් සහ සාම්ප්‍රදායික කැල්සියම් හයිඩ්‍රොක්සයිඩ් යන ක්‍රමයන් ප්‍රධාන නිස්සාරණ ක්‍රම ලෙස භාවිතා කරනු ලැබූ අතර පරීක්ශනයේ පරාමිතීන් ලෙස නිස්සාරණ ක්‍රියාවලියෙන් පසු නිස්සාරණය වූ කැරජීනන් ජෙල් ප්‍රමාණය, ජෙලයේ ශක්තිමත්භාවය, ජෙලය සතු ජලය රඳවා ගැනීමේ හැකියාව හා ජෙලයේ පැහැය විශ්ලේෂනය කරනු ලැබීය. මීට අමතව නිස්සාරණය වූ ජෙලයේ සංශුද්ධතාව නිර්ණය කිරීමට ඉහත සඳහන් කල ප්‍රධන ක්‍රම හතර යටතේ නිස්සාරණය කලා වූ කැරජීනන් එෆ්.ටී,අයි.ආර්. වර්ණාවලිය මගින්ද පරීක්ශා කරනු ලැබීය.

සියලු පරාමිතීන්ට අදාල දත්ත විශ්ලේශණය කිරීමෙන් පසුව නිරූපණය වූයේ ඉහත සඳහන් කල කැරජීනන් නිස්සරණ ක්‍රම අතරින් (6%) පොටැසියම් හයිඩ්‍රොක්සයිඩ් නිස්සාරණ ක්‍රමය ඉහල කැරජීනන් ප්‍රමාණයක් ලබා දෙමින් ඉහල ජෙලයේ ශක්තිමත්භාවත්, ජලය රඳවා ගැනීමේ හැකියාවත් ලබා දුන් බවයි.

කෙසේ වුවත් භාවිතා කල ප්‍රධාන නිස්සාරණ ක්‍රම හතරට අදාල එෆ්.ටී.අයි.ආර්. වර්ණාවලීන්ගේ හැඩයේ තිබූ බොහෝ සමානතාවන් නිසාම පරීක්ශා කල සියලු නිස්සාරණ ක්‍රමයන් ලබා දුන් කැරජීනන් සංයුතියෙන් එකිනෙකට බොහෝ සමාන බව නිගමනය කල හැකි විය.

ඒ අනුව භාවිතා කරන්නා වූ කැරජීනන් නිස්සාරණ ක්‍රමය්, නිස්සාරණය වූ කැරජීන් වල සංයුතියට මහත් සේ බල නොපෑ නමුත් එය ස්ථුවම නිස්සාරණය වූ කැරජීනන් ප්‍රමාණයටත්, එහි භෞතික රසායනික ගුණ වලටත් බලපානන බව අවසානයේ සාරාංශ කල හැක.

This is a non-technical summary of the project report titled "Do Different Carrageenan Extraction Methods Influence on the Carrageenan Yield, Carrageenan Fraction and Gel Strength of a Marine Red Seaweed, Kappaphycus alvarezii (Elkhorn Sea Moss or Doty)?" supervised by Prof. J.K. Vidanarachchi*, Department of Animal Science, Faculty of Agriculture, University of Peradeniya. *janakvid@pdn.ac.lk |

අණුක සහ රූප විද්‍යාව භාවිතා කරමින් සහල්වල අස්වැනු පරාමිතීන් ගවේෂණය කිරීම

W.M.M. සොයිසා

සහල් යනු ශ්‍රී ලංකාව ඇතුළුව බොහෝමයක් රටවල්වල ප්‍රධානතම ආහාරමය භෝගයයි. නමුත් ලෝක ජනග්‍රහණයේ සීඝ්‍ර වර්ධනයේ ප්‍රතිඵලයක් වශයෙන් සහල් ඇතුළුව අනෙකුත් ආහාර වල හිඟයක් ඇති වෙමින් පවතී. මෙම අහිතකර බලපෑම් විසඳීම සඳහා පර්යේෂකයන් අවධානය යොමුකර ඇති අතර අස්වැන්න ඉහළ නැංවීමේ ක්‍රම සොයා බැලීම ප්‍රධානතම සාධකය බවට පත්වී ඇත. සහල් වල අපේක්ෂිත ධාන්‍ය අස්වැන්න ගණනය කිරීම සඳහා සමීකරණයක් පවතී. එම ගණනය කිරීමට අස්වනු සංරචක හතරක් උපයෝගී කර ගනී. ඒවා නම්,

- වර්ග මීටර් එකකට කරල් සංඛ්‍යාව
- කරලක ඇති ශුශිකා සංඛ්‍යාව
- කරලක ඇති පූර්ණ බීජ ප්‍රතිශතය (%)
- බීජ 1000ක බර (g)

නමුත් ශ්‍රී ලංකාවේ දැනට පවතින පර්යේෂණ ප්‍රධාන වශයෙන් අවධානය යොමු කරන්නේ මෙම අස්වැන්න සංරචක වලට වඩා අස්වැන්න කෙරෙහිය. තවද මෙම අස්වැන්න සංරචක වල රූප විද්‍යාත්මක හා ජානමය ඇගයීම යන දෙක ඒකාබද්ධ කර සිදුකරන අධ්‍යනයන් වලද හිඟයක් පවතී.

එම නිසා මෙම පර්යේෂණයේදී සහල් වර්ග/ රේඛා පහළොවක රූප විද්‍යාත්මක ලක්ෂණ හා ජානමය ලක්ෂණ අධ්‍යනය මගින් සහල් ශාකයේ අස්වැන්න සංරචක මෙන්ම තවත් සමහර භෞතික ලක්ෂණ කිහිපයක් අධ්‍යනය කෙරේ. මේ සඳහා ශ්‍රී ලංකාවේ ඉහළතම ක්‍රියාකාරිත්වයක් සහ ජනප්‍රියත්වයක් සහිත සහල් වර්ග දහය (Top Ten) ඇතුළුව තවත් සහල් රේඛා කිහිපයක් සහ උසස් සහල් වර්ග කිහිපයක් උපයෝගී කරගනී. මෙම පර්යේෂණය බතලේගොඩ පිහිටි සහල් පර්යේෂණ හා සංවර්ධන ආයතයේ සිදුකරන ලද අතර ඒවා ශාකයම අවදියේ සිට අස්වැන්න නෙලන අවස්ථාව දක්වා අධීක්ෂණය කරන ලදී. මෙහිදී මෙම රූප විද්‍යාත්මක ලක්ෂණ ඇගයීම සඳහා සංඛ්‍යාන මෘදුකාංගයක් (Minitab) භාවිතා කරන ලදී.

මෙම ප්‍රතිඵලයන්ට අනුව සහල් ප්‍රභේද/ රේඛා අතර අස්වැන්නේ සැලකිය යුතු වෙනසක් සහ අස්වනු සංරචක අතර සංකීර්ණ අන්තර්-සම්බන්දයක් පවතින බව අනාවරණය විය. තවද මෙම සංරචක අතුරින් වර්ග මීටර් එකකට කරල් සංඛ්‍යාව සහ කරලක ඇති ශුශිකා ගණන අස්වැන්න කෙරෙහි ඉහල බලපෑමක් පවතින බව නිරීක්ෂණය විය. එමෙන්ම තවදුරටත් විශ්ලේෂණය කිරීමෙන් පෙන්නුම් කලේ මාස හතරකින් පරිණත වන ප්‍රභේද/ රේඛා අධ්‍යනය කරන ලද අස්වනු සංරචක සහ අස්වැන්න අතර ධනාත්මක සහ-සම්බන්ධතාවයක් පවතින බවයි.

මෙහිදී අනෙකුත් කැපී පෙනෙන ලක්ෂණය වන්නේ උසස් ප්‍රභේදයක් වන Bg 17-245 ප්‍රභේදය ඉහළම ක්‍රියාකරිතාවක් සහිත ප්‍රභේද දහයද අභිබවා යමින් ඉහළ අස්වැන්නක් ඇති බව හඳුනා ගැනීමයි. මේවා පර්යේෂණයේ රූප විද්‍යාත්මක අධ්‍යනයන් ලබාගත් නව තොරතුරු වේ.

අස්වැන්න කෙරෙහි ඇති ජානමය බලපෑම පේරාදෙණිය විශ්වවිද්‍යාලයේ කෘෂිකර්ම පීඨයේ පිහිටි අණුක ජීවවිද්‍යා හා ජෛවතාක්ෂණ විද්‍යාගාරය තුලදී සිදුකෙරුණි. ඒ සඳහා සියලුම සහල් ප්‍රභේද/ රේඛා වල නියැදි රැගෙන යන ලදී. එයට පහත සඳහන් පිළිවෙල අනුගමනය කරන ලදී.

DNA නිස්සාරණය → **PCR පරීක්ෂණය**

මෙහිදී මෙම DNA පරීක්ෂණයදී, අස්වැන්නට බලපාන ලක්ෂණයක් යැයි අනුමාන කරන කල හැකි ඇමයිලොස් අන්තර්ගතය නිරීක්ෂණය කිරීම සඳහා අණුක සලකුණක් වන RM142 සලකුණ භාවිතා කරන ලදී. කෙසේවෙතත් මෙම ලක්ෂණය හඳුනා ගැනීම සඳහා භාවිතා කරන ලද අණුක සලකුණ තෝරාගත් ප්‍රභේද/ රේඛා සඳහා නුසුදුසු බව අනාවරණය විය. එබැවින් අස්වැන්නට බලපාන අතිරේක ජාන සලකුණු භාවිතා කලයුතු බව මෙම අධ්‍යනයෙන් පිළිබිඹු විය. මෙම පර්යේෂණයෙන් සහල් පැළ වල රූප විද්‍යාත්මක ලක්ෂණ සහල් අස්වැන්නට බලපාන ආකාරය ඉස්මතු කරයි. පරීක්ෂකයින්ට සහල් අභිජනනය සඳහා වඩාත් ඵලදායී මාර්ගයන් සකස් කළ හැක්කේ අස්වැන්න තීරණය කිරීමේදී රූප විද්‍යාත්මක හා ජාන විද්‍යාත්මක යන දෙවර්ගයම සැසඳීමෙන් බව මෙහිදී පෙන්නුම් කරයි. මෙම පරීක්ෂණයෙන් ලබාගන්නා ලද දැනුම ගෝලීය ආහාර සුරක්ෂිතතාවය තහවුරු කිරීම සඳහා අතිශයින් ප්‍රයෝජනවත් වේ. එමෙන්ම වඩා ඵලදායී ඉහළ අස්වැන්නක් ඇති නව සහල් ප්‍රභේද සංවර්ධනය සඳහාද යොදාගත හැකිය.

රූප විද්‍යාත්මක පරාමිතීන් කිහිපයක දත්ත ලබාගැනීම සහ **DNA** නිස්සාරණය කිරීමේ අතරමැදි පියවරක්

This is a non-technical summary of the project report titled "Morphological And Molecular Evaluation of Yield Parameters of a Panel Of Recommended Rice Cultivars" supervised by Prof. S.A.C.N. Perera*, Department of Biology, Faculty of Agriculture, University of Peradeniya. *chandrikaperera@agri.pdn.ac.lk

පියවි ඇසින් නොදකින - ගොවියාගේ පුංචි මිතුරන් කරළියට.....

එච්.බී.එස්. පබසරා ධර්මදාස

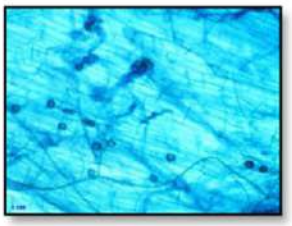
වගා මාධ්‍යයක් ලෙස සළකා බලන කළ, කොහුබත් මඟින් බෝග ශාක වර්ධනයට සැපයෙන පිටුවහල අතිමහත්ය. වර්තමානයේදී සුලභව භාවිතා කරනු ලබන බොහෝ වගා මාධ්‍යයන් වල කොහුබත් අත්‍යවශ්‍ය අංගයක් බවට පත් වී ඇත. දේශීය කප්රුක ලෙස සැළකෙන පොල් ශාකය ආශ්‍රිත නිෂ්පාදන රාශියක අතුරුඵලයක් ලෙස කොහුබත් සැලකිය හැක.

විදෙස් වෙළෙඳපොළ තුළ ශ්‍රී ලංකාවේ දී සැකසීමට ලක් කල කොහුබත් සඳහා පවතිනුයේ අධික ඉල්ලුමකි. බහුතරයක් වූ කොහුබත් නිෂ්පාදකයන් වගා මාධ්‍යයක් ලෙස කොහුබත් "තොග" වශයෙන් අපනයනය කරයි. ශ්‍රී ලංකාව තුළ කොහුබත් සඳහා පවත්නා විභවයත්, විදෙස් වෙළෙඳපොළ තුළ පවතින ඉහල ඉල්ලුමත් සළකා බලන කල, අගය එකතු කළ නිෂ්පාදනයක් සතුව ඉහළ වාණිජමය වටිනාකමක් පවතී. බොහෝ කෙටි කාලීන බෝග තවාන් පැළ නිෂ්පාදනය සඳහා යොදා ගත හැකි හිතකාමී ක්ෂුද්‍ර ජීවීන් යොදා ගනිමින් සම්පීඩනයට ලක් කල (Compressed) කොහුබත් නිෂ්පාදනයක් ලෙස වැඩි දියුණු කරන ලද "ජිෆී පෙලට්"(Jiffy pellet)* හඳුන්වාදීමේ විභවය තහවුරු කරගැනීම සඳහා මෙම පර්යේෂණය සිදු කෙරිණි.

ඉහත සඳහන් අගය එකතු කල කොහුබත් නිෂ්පාදනය සඳහා, ශාක රෝග කෙරෙහි ඔරොත්තු දීමේ හැකියාව වැඩිදියුණු කරගනිමින්, ප්‍රගස්ත බෝග වර්ධනයක් තහවුරු කරගැනීම අරමුණු කොටගෙන, ජෛව පාලක ක්ෂුද්‍ර ජීවී විශේෂයක් වන ට්‍රයිකොඩර්මා"(ඩිලීර) සහ ශාක වර්ධන නියාමක ක්ෂුද්‍ර ජීවීන් විශේෂයක් වන "ග්ලෝමස්"(ඩිලීර) හඳුන්වා දී ඇත.

මෙම ක්ෂුද්‍ර ජීවීන් සතුව රෝගකාරක ඩිලීර මත පරපෝෂී වීමේ හැකියාව පවතියි. එසේම බොහොමයක් තවාන් රෝග සඳහා බෝග තුළ ස්වාභාවික ප්‍රතිරෝධීතාවය ඇති කිරීම මෙන්ම, අඩු වගා මාධ්‍ය පෝෂක තත්ත්ව යටතේ මූල පද්ධතිය සමඟ සහජීවී සංගම් ඇති කරගනිමින් පෝෂක භාවිත කාර්ක්ෂමතාවය වැඩි දියුණු කිරීමේ හැකියාව මෙහිදී සැලකිල්ලට ගනු ලැබිණි. මෙය ස්වාභාවික පරිසරයේ දී හමුවන වෙනස් විශේෂයන්ට අයත් ජීවීන් අතර පවතින සහජීවී සබඳතා ඵලදායී වශයෙන් තිරසර බෝග නිෂ්පාදනයක් සඳහා යොදාගන්නා කදිම අවස්ථාවකි.

මෙම පර්යේෂණයේදී කොහුබත් සහ ක්ෂුද්‍ර ජීවීන් අතර මිශ්‍ර කිරීමේ අනුපාතයන් දෙකක් (1:4 සහ 1:8) යටතේ රෝපණය කරන ලද, තක්කාලි බෝග පැළ වල වර්ධන පරාමිතීන් කිහිපයක් (වියළි බර, හරිතප්‍රද ප්‍රමාණයන් සහ ප්‍රරෝහණ ප්‍රතිශතය) පරීක්ෂාවට ලක් කෙරිණ. එහිදී ලද ප්‍රතිඵල වලට අනුව, තෝරාගත් ක්ෂුද්‍ර ජීවීන් විශේෂයන් සාමූහිකව තවාන් පැළ වල ප්‍රගස්ත වර්ධනය කෙරෙහි සැලකිය යුතු අන්දමේ බලපෑමක් ඇති බව තහවුරු විය. මිශ්‍ර කිරීමේ අනුපාතයන් අතර ලද ප්‍රතිඵල සළකා බැලීමේ දී, අඩු අනුපාතයකින් (1:8) එනම් අඩු ක්ෂුද්‍ර ජීවී ගහණයක් යටතේ වගා කළ ශාක ඉහල වර්ධන විලාසයක් පෙන්නුම් කරන ලදි. එසේම, තෝරාගත් රෝගකාරකයක් හඳුන්වා දුන් වගා මාධ්‍යය තුළ ඉහත සඳහන් මිශ්‍රණ අනුපාතය යටතේ වගා කළ ශාක වල පවා ප්‍රගස්ත වර්ධනයක් නිරීක්ෂණය කළ හැකිවිය.



වෙළෙඳපොළ තුළ පවතින බොහෝ ක්ෂුද්‍ර ජීවී ආමුකුලකයන් දියරමය ස්වභාවයෙන් පවතී. ඇතැම් ඒවා පවුඩර්මය තත්ත්ව යටතේ පැවතියද ඒවායේ ආයු කාලය පිළිබඳව ගැටලුවක් පවතී.

මෙහිදී ක්ෂුද්‍ර ජීවීන් කොහුබත් වෙත හඳුන්වාදීම සඳහා වාහක ද්‍රව්‍යය ලෙස කෙඔලීන් භාවිතා කර ඇත. කෙඔලීන් වල පවත්නා ජලාකර්ෂක හැකියාව නිසා ඉහත සඳහන් ක්ෂුද්‍ර ජීවීන් හට සැළකිය යුතු කාලයක් කොහුබත් තුළ නොනැසී පැවතීමේ හැකියාව පවතී. විදෙස් අපනයනය වෙළෙඳපොළ නිර්ණායක සළකා බැලීමේදී මෙමගින් සැලසෙන වාසිය ඉමහත් ය.

ශ්‍රී ලංකාවේ පොල් ත්‍රිකෝණය ආශ්‍රිතව බහුලව නිපදවෙන අතුරුඵලයක් ලෙස සැළකෙන කොහුබත් සඳහා අගය එකතු කරමින් නිෂ්පාදනය කරනු ලබන "Jiffy Pellet" අපනයන වෙළෙඳපොළ ඉලක්ක කරගනිමින්, වාණිජමය මට්ටමෙන් නිපදවීමට ඇති හැකියාව විමසා බලන්නේ නම් එය විදෙස් වෙළෙඳපොළ ජයගත හැකි යෝධ පිම්මක් වනු නොඅනුමානය.

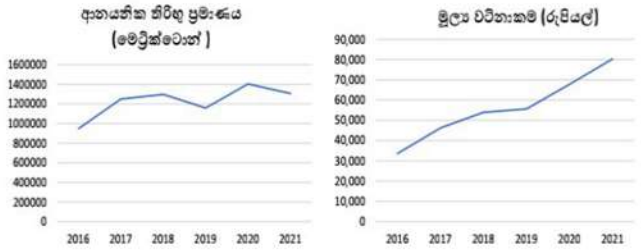
This is a non-technical summary of the project report titled "Introducing a Bio Enriched C7 Jiffy Pellet by Incorporating a Selected Group of Beneficial Fungi for Healthy Nursery Seedling Production" supervised by Prof. W.A.P. Weerakkody*, Department of Crop Science, Faculty of Agriculture, University of Peradeniya. *wapweerakkody@agri.pdn.ac.lk

ආනයනික තිරිඟු සඳහා දේශීය අල භෝග වලින් විසඳුමක්

J.A.නිරෝමි ශාලිකා

ඔබගේ කැමැත්ත සාම්ප්‍රදායික ලෙස සකස් කරන තැම්බූ අල පරිභෝජනයට ද? එසේත් නැත්නම් අල යොදාගෙන සකස් කරන ලද පැස්ටා ආහාරයට ගැනීමට ද? නවීන ජීවන රටාවට පුරුදු වී ඇති ඔබ නිසැකයෙන් ම පැස්ටා වැනි සැකසීමට පහසු ආහාරයක් සඳහා වැඩි කැමැත්තක් දක්වාවී. සැබැවින්ම දේශීය අල වර්ග යොදාගෙන පැස්ටා වැනි නිෂ්පාදනයක් කල හැකි ද? ඔබට ඇතිවන පැනයයි. මේ ඔබ වෙත ගෙන එන්නේ ඒ සඳහා පිළිතුරු සැපයිය හැකි පර්යේෂණ අධ්‍යයනයක ප්‍රතිඵලයි.

ශ්‍රී ලංකාව තිරිඟු නිෂ්පාදනය නොකරන රටක් බව ඔබ හොඳින් ම දන්නා කරුණකි. නමුත් පාන්,බනිස්, පැස්ටා වැනි සියලු ආහාර නිෂ්පාදනය කරනු ලබන්නේ තිරිඟු පිටි භාවිතයෙන් ය. එබැවින්, ශ්‍රී ලංකාව සිය සම්පූර්ණ තිරිඟු අවශ්‍යතාවය සපුරා ගනු ලබන්නේ ආනයනික තිරිඟු මතය. පහත ප්‍රස්තාර පෙන්වනු ලබන්නේ ජන හා සංඛ්‍යාලේඛන දෙපාර්තමේන්තුව පෙන්වා දෙන දත්තවලට (2022) අනුව, වසරින් වසර ඉහළ යන ආනයනික තිරිඟු ප්‍රමාණය සහ ඊට අනුරූප මූල්‍ය වටිනාකම ශ්‍රී ලංකා ආර්ථිකය මත ඇති කරන මූල්‍ය බර වැඩි වීමට සෘජුවම හේතු වන බවයි. මෙම අධික යැපීම අවම කිරීම සඳහා සහ ආහාර සුරක්ෂිතතාව සහතික කිරීම සඳහා, තිරිඟු පිටි සඳහා දේශීය ආදේශක ගවේෂණය කල යුතු නොවේද ?



දේශීය අල භෝග ඒ සඳහා කදිම පිලිතුරක් සපයයි.

කෘෂිකර්ම දෙපාර්තමේන්තුවේ දත්තවලට අනුව ශ්‍රී ලාංකේය සන්දර්භය තුළ, හඳුනාගත් අල භෝග විශේෂ 55ක් දිවයින පුරා විසිරී ඇත. ඒ අතරින් කිරි අල සහ හුලන්කිරිය කැපී පෙනෙන වැදගත්කමක් ගන්නා අතර අද්විතීය පෝෂණ පැතිකඩ සහිත පිෂ්ඨය ගබඩා කරන මෙම භූගත මුල් සහ අල භෝග ශ්‍රී ලාංකේය පාරිභෝගිකයින්ගේ කැලරි අවශ්‍යතා සපුරාලීම උදෙසා දෛනික ආහාර වේලට දායක විය හැකි මූලික කාබෝහයිඩ්‍රේට් ප්‍රභවයකි. නමුත් වර්තමානය වනවිට දේශීය අල වර්ග බොහොමයක වැදගත්කම නැති වී ගොස් ඇති අතර ඒවා ප්‍රයෝජනයට ගැනීම අඩු වී ඇත. පාරම්පරික අල තම්බා ආහාරයට ගන්නා පරිභෝජන රටාවෙන් ඉදිරියට ගොස් අල භෝග වලින් සැකසූ පහසු ආහරයක් වන පැස්ටා වැනි ආහාරයක් සැකසීමට තිරිඟු පිටි වෙනුවට ආදේශකයක් ලෙස යොදා ගත හැකි ද? යන්න පිළිබඳ ගවේෂණයක යෙදීම සඳහා කිරි අල සහ හුලංකිරිය පිටි වර්ග දෙකෙහි එකතුවෙන් හොඳම සංයුතිය සහිත පිටි මිශ්‍රණය මගින් පැස්ටා සෑදීමට ඇති හැකියාව තක්සේරු කරන ලදී.

අධ්‍යයනයේ ප්‍රතිඵලවලින් හෙළි වූයේ කිරි අල සහ හුලන්කිරිය 1:2 අනුපාතයෙන් මිශ්‍ර කරන ලද පිටි මිශ්‍රණය ප්‍රශස්ත ගුණ පෙන්වන බව සහ එම මිශ්‍රණයට තිරිඟු පිටි ආදේශ කිරීමටත් ඉහළ හැකියාවක් ඇති බවයි. සංසන්දනාත්මකව තිරිඟු පිටි 30%ක ප්‍රතිශතයකින් ආදේශ කිරීම වඩාත් ප්‍රතිඵලදායී පිසීමේ ගුණාත්මකබවක් සහ ඒ සඳහා ඉහළ පාරිභෝගික මනාපයක් ඇති බවයි. එබැවින් පැස්ටා නිෂ්පාදනය සඳහා කිරි අල සහ හුලංකිරිය පිටි මගින් 30% ක ආදේශකයක් නිර්දේශ කළ හැකිය.

අනාවරණය වූ ප්‍රතිඵලවලින් කිරි අල සහ හුලංකිරිය යන අල වර්ග පැස්ටා නිෂ්පාදනයේදී තිරිඟු පිටි ආදේශ කිරීම සඳහා විභවයක් සහිත අමුද්‍රව්‍ය ලෙස නිර්දේශ කල හැකිය. තවද මෙම අල වර්ග ග්ලූටන් රහිත අමුද්‍රව්‍ය බැවින් Gluten Intolerance සහිත පුද්ගලයින් සඳහා මෙම නිෂ්පාදන වඩාත් සුදුසු පිළිතුරක් සපයයි.

This is a non-technical summary of the project report titled "Characterization of composite flour derived from *Kiri ala* (*Xanthosoma Sagittifolium*) and *Hulankeeriya* (*Maranta Arundinacea*) and the determination of the potential of substituting wheat flour in Pasta Production" supervised by Dr. D.M.M.S.Daundasekara*, Department of Food Science and Technology, Faculty of Agriculture, University of Peradeniya. *saumalid@agri.pdn.ac.lk

වස විස නැති පරිරක්ෂක

ඩබ්. පබා නවාංජනා

වර්තමාන ලෝකයේ ජනයා ජීවන අරගලය හමුවේ තම තමන්ගේ එදිනෙදා කටයුතු සමඟ කාර්යබහුලව ඇති සමයක පිසින ලද ආහාර වෙනුවට ක්ෂනික ආහාර හා කල් තබා ගත හැකි ආහාර වෙත යොමුවී ඇත.

වෙලඳපොළ පවතින මෙම ක්ෂ්නික සහ කල්තබා ගත හැකි ආහාර මුලුමනින්ම පාහේ කෘතිම පරිරක්ෂක නැතහොත් ආහාර කල්තබා ගැනීමේ ද්‍රව්‍ය මත පදනම්ව නිපදවා ඇති ආතර ඒවා පරිභෝජනය හේතුවෙන් නොයෙකුත් සෞඛ්‍යමය ප්‍රශ්න උද්ගත වීමේ ශීඝ්‍රතාවය වැඩි වී ඇත.

එම හේතුවෙන් බොහෝ මිනිසුන් කෘතිම ආකලන ද්‍රව්‍ය වෙනුවට ස්වාභාවික ආකලන ද්‍රව්‍ය යෙදූ ආහාර වෙත නැඹුරුවක් දක්වන බව නවතම සංගණන වලින් හෙළි වී ඇතිඅතර එම හේතුවෙන් ආහාර විද්‍යාඥයින් සහ ආහාර පයෝශකයින් මෙම ස්වාභාවික ආකලන ද්‍රව්‍ය නිපදවීම කෙරෙහි වැඩි නැඹුරුවක් දක්වන බව පෙනී යයි.

එහිදී, ලෝකයේ අපද්‍රව්‍ය ඝනත්වය ඉහළ ගොස් ඇති සමයක, ඉවතලන කාබනික අපද්‍රව්‍ය වලින් විශේෂයෙන්ම ජෛව ක්‍රියාකාරී සංයෝග බහුලව හමුවන ශාකමය අපද්‍රව්‍ය මගින් මෙම අරමුණ ජය ගැනීම පහසු සහ වඩාත් තිරසාර බව ඔවුන්ගේ අධ්‍යන වලදී හෙළිවී ඇත.

පරිරක්ෂක නැතහොත් ආහාර කල් තබා ගැනීමේ ද්‍රව්‍ය වල ප්‍රධාන ගුණාංග වන්නේ ඒවායේ ඇති ප්‍රතිඔක්සිකාරක සහ ක්ෂුද්‍රජීවී නාශක ගුණාංග නිසා ආහාරයේ රසය, ගුණය , වයනය රැකීම තුළින් ආහාරයට නව ජීවයක් මෙන්ම ආහාරයේ ගුණ දිගු කලක් නොවෙනස්ව පවත්වා ගැනීමයි.

මෙම කරුණු කාරණා සියල්ලක්ම පාහේ සලකා බැලීමෙන් අනතුරුව මෙම අධ්‍යනයේ ප්‍රධාන අරමුණ කර ගත්තේ, ආහාර කර්මාන්තයේදී මෙන්ම, එදිනෙදා ක්‍රියාකාරකම් වලදී බහුලවම ඉවතලන, ශාකමය අමුද්‍රව්‍ය මෙන්ම ශ්‍රීලංකාවේ ප්‍රධාන වශයෙන් වගා කරන අපනයන බෝගයක් වන තේ ශාකයෙහි පත්‍ර වල මෙම ප්‍රතිඔක්සිකාරක සහ ක්ෂුද්‍ර ජීවී නාශක ගුණ අධ්‍යනය කිරීමයි.

ඒ අනුව මෙම අධ්‍යනයේදී භාවිතා කල ප්‍රධාන අපද්‍රව්‍යමය අමුද්‍රව්‍ය ලෙස කෙසෙල් පොතු, අන්නාසි පොතු සහ ලොකු ලූණු පොතු මෙන්ම ඊට අමතරව තේ පත්‍ර ද යොදා ගැනිණි.

එසේම මෙම අමුද්‍රව්‍ය ද්‍රාවක නිස්සාරණය හරහා නිස්සාරණය කර ගත් අතර ඒ සඳහා ද්‍රාවක නිස්සාරණ හැකියාව එකිනෙකින් වෙනස් වෙන ද්‍රාවක හතරක් (එතනෝල් 80%, මෙතනෝල් 80%, ඇසිටෝන් 80% සහ ජලය) යොදා ගන්නා ලදී.

එසේම මෙම අධ්‍යනයේදී අමුද්‍රව්‍ය වල වූ ජෛව ක්‍රියාකාරී සංයෝග ප්‍රමාණාත්මක කිරීමට එක් පරීක්ෂණයක් ද ප්‍රතිඔක්සිකාරක ගුණ අධ්‍යනය කිරීමට ඒ හා සම්බන්ධ වූ පරීක්ෂණ 3 ක් ද යොදාගැණිනි. එසෙම ඒවායේ වූ ක්ෂුද්‍රජීවී නාශක ගුණය එක් පරීක්ෂණයක් හරහා අධ්‍යනය කිරීම සිදු කෙරිණි. මෙහිදී ප්‍රතිඔක්සිකාරක ගුණ අධ්‍යනය කිරීමට පරීක්ෂණ තුනක් යොදා ගැනීමේ අරමුණ වූයේ එම පරීක්ෂණ තුන එකිනෙකට වෙනස් වූ ප්‍රතිඔක්සිකාරක ගුණ අධ්‍යනය කිරීමත් එය අධ්‍යනයේ ප්‍රතිඵල වල විශ්වාසනීයත්වය මෙන්ම අධ්‍යනයේ සාර්ථකත්වය තහවුරු කිරීමට පිටිවහලක් වීමත්ය.

පරීක්ෂණ අවසානයේ ලබාගත් ප්‍රතිඵල සංඛ්‍යානමය විශ්ලේෂණයක් හරහා ගණනය කෙරුණු අතර ප්‍රතිඵල අධ්‍යනයේදී පෙනී ගියේ අධ්‍යනයට යොදා ගැණුනු ශාකමය ද්‍රව්‍ය සියල්ලක්ම පාහේ ජෛව ක්‍රියාකාරී සංයෝගවලින් අනූන බවත් කිසියම් හෝ ප්‍රතිඔක්සිකාරක සහ ක්ෂුද්‍ර ජීවී නාශක ගුණ පෙන්වන බවත් ය.

ඒ අතරිනුත් සමස්ථයක් ලෙස ගත් විට ලූනු පොතු වල සහ කෙසෙල් පොතු වල වඩා හොඳ ප්‍රතිඔක්සිකාරක සහ ක්ෂුද්‍ර ජීවී නාශක ගුණාංග තිබෙන බව සොයා ගැනුණු අතර එක් පරීකෂණයක් හරහා තේ පත්‍ර කැපී පෙනෙන ප්‍රතිඔක්සිකාරක සහ ක්ෂුද්‍ර ජීවී නාශක ගුණ පෙන්වන ලදී. එමෙන්ම එක් ද්‍රාවකයක්(ඇසිටෝන් 80%) මගින් නිස්සාරණය කෙරුණු අමුද්‍රව්‍ය වඩාත් කැපී පෙනෙන ලෙස ඉහත කී ගුණාංග පෙන්වන බවත් ප්‍රතිඵල අධ්‍යනයේදී තහවුරු විය.

ඒ අනුව පරීක්ෂණයේ අවසාන නිගමනය වූයේ මෙම ශාකමය අමුද්‍රව්‍ය සියල්ලක්ම පහේ ප්‍රතිඔක්සිකාරක සහ ක්ෂුද්‍ර ජීවී නාශක ගුණාංග වලින් පොහොසත් බවය. කෙසේ නමුත් කෘතිම පරිරක්ෂක වලට ආදේශකයක් ලෙස භාවිතා කිරීමේදී මෙම අමුද්‍රව්‍ය වල ප්‍රතිඔක්සිකාරක සහ ක්ෂුද්‍ර ජීවී නාශක ධාරිතාවය අගයක් ලෙස අවම මට්ටමක පවතින බැවින් ආකලන ද්‍රව්‍ය ලෙස ආහාර වලට එක් කිරීමට ප්‍රථම වැඩිදුර අධ්‍යනයන්හි නිරත විය යුතු බව පැහැදිලි විය.

This is a non-technical summary of the project report titled "Comparative analysis of antioxidant and antimicrobial properties of fruits and vegetables waste and Tea(camellia senesis) leaves" supervised by Prof. R.P.N.P.Rajapaksha*, Department of Food Science and Technology, Faculty of Agriculture, University of Peradeniya. *niranjanp@agri.pdn.ac.lk

වියළි කලාපයේ ස්වභාවිකව හමුවන රයිසෝබියම්ගෙන් ජනිත කල හැකි ජෛව පොහොර තුලින් තිරසාර කෘෂිකර්මාන්තයක් කරා.....

D.W.U.N. බණ්ඩාර

දේශීය ආහාර නිෂ්පාදනයට විශාළ වශයෙන් උරදෙන ශ්‍රී ලංකාවේ වියලි කලාපය කෘෂි කර්මාන්තය හදවත බඳුය. හරිත විප්ලවයෙන් පසු ලෝකයට විවෘත වූ නූතන කෘෂිකර්මාන්තයත් සමග,ශ්‍රීලංකාවේ කෘෂිකර්මාන්තයේද විශාල ප්‍රගමණයක් අත්පත් කරගැනීමට මග පෑදුණි. ඒ අතරින් රසායනික පොහොර භාවිතය වැඩිවශයෙන් සිදුවීම දැකගත හැකිවිය. කෙසේ වුවත් අද වනවිට, දිගුකාලින හා පමණ ඉක්මවූ අධික රසායනික පොහොර භාවිතය හේතුවෙන්, පාරිසරික බලපෑම් ඇතිවීම හා රසායනික පොහොර ආනයනය කිරීම සඳහා විශාල වියදමක් රජය විසින් දරනු ලබයි. .(කෘෂිකර්ම හා වැවිලි කර්මාන්ත අමාත්‍යාංශයේ දත්තවලට අනුව, එය වසරකට බිලියන 56 ඉක්මවයි) මෙවැනි ගැටලු මතුවීමත් සමග, තිරසාර කෘෂිකර්මාන්තයක් කරා පියනැගීමේ අවශ්‍යතාව අදවන විට තදින්ම මතුව පවතියි. පස තුල ස්වභාවිකව හමුවන, අපගේ සාමාන්‍ය ඇසින් දැකිය හැකි ප්‍රමාණයටත් වඩා(0.1mm) 100න් එකක විශාලත්වයක් ඇති, ඉතාමත් කුඩා ක්ෂුද්‍ර ජීවියෙකුට මේ සඳහා පිළියමක් ලබාදෙමින්, පිළියමක් ලබාදෙමින්, කෘෂිකර්මාන්තය නව මාවතක් වෙත යොමු කිරීමට සමත්ව ඇතිබව පැවසුවොත් ඔබ විශ්වාස කරනවාද? **"රයිසෝබියම්"** නමින් හඳුන්වන මෙම බැක්ටීරියාව ස්වභාවිකව පස තුල ජීවත්වන සහ රනිල කුලයේ ශාකවල මූල ගැටිතිතුල හමුවන අතර රයිසෝබියම් බැක්ටීරියාව සතු සුවිශේෂීම හැකියාව වන්නේ, සහජීවී සම්බන්ධයක් මගින් ශාක වර්ධනය සඳහා අත්‍යාවශ්‍ය පෝශක සංඝටකයක් වන නයිට්‍රජන් සපයාදීමයි. (ජෛව නයිට්‍රජන් තිරකිරම) එපමණක් නොව පසෙහි ඇති පොස්පරස්,පොටෑසියම් වැනි පෝෂක බලමූල ගැන්වීම පහසු කිරීම, ශාකවල වර්ධනයට වැදගත්වන හෝමෝන නිෂ්පාදනය ,යකඩ වැනි පෝෂක අවශෝෂණයට දායක වීම ආදි ක්‍රියා රැසක් මගින් ශාක වර්ධනය ප්‍රවර්ධනය කිරීමට දායකත්වයක් සපයයි. පෙර කරන ලද පර්යේෂණ වලට අනුව, රයිසෝබියම් ජෛව පොහොර භාවිතය මගින් ශාකවලට යෙදිය යුතු අකාබනික පොහොර ප්‍රමාණය අවම කිරීම සහ ශාකවල වර්ධනය හා අස්වැන්න ඉහළ නැංවීමට හැකියාව ඇති බව සොයාගෙන ඇත.

මාගේ අධ්‍යාණය මූලික වූයේ වියළි කලාපයේ ස්වභාවිකව හමුවන නිදිකුම්බා(*Mimosa pudica*)සහ ග්ලිරිසිඩියා (*Gliricidia sepium*) යන ශාකයන්හි මූලගැටිති වලින් රයිසෝබියම් බැක්ටීරියාව ඒකලිත කරගැනීම හා එසේ ලබාගත් රයිසෝබියම් ගණාවාසවල නයිට්‍රජන් තිරකිරීම, අඳ්‍රව්‍ය පොස්පේට් ද්‍රාව්‍ය පොස්පේට් බවට පත් කිරීම හා ඉන්ඩෝල් ඇසිටික් ඇසිඩ් යන හෝමෝන නිෂ්පාදනය යනාදී ශාක වර්ධනය සඳහා වැදගත් වන ක්‍රියාවලට, ලබාගත්රයිසෝබියම් ගණාවාස (Rhizobium isolates) දක්වන ප්‍රතික්‍රියා පරීක්ෂා කර බැලීමයි. එහිදී රයිසෝබියම් ඒකලිත (isolates) 11ක් ඉහත පරීක්ෂණ තුනම සඳහා ධනාත්මක ප්‍රතිචාර ලබාදුනි. ඉන්පසු එම රයිසෝබියම් ඒකලිත 11 වෙත විවිධ පාරිසරික තත්ත්ව ලබා දී ඒවාට ඔරොත්තු දීමේ හැකියාව පරීක්ෂා කරන ලදී. එහිදී, එම ගණාවාස ද්‍රව රෝපණ මාධ්‍යන් තුල ආමුකූලනය කර, pH 5-8 දක්වා පරාසය තුල වර්ධන හැකියාව, 25^0C, 27^0C, 35^0C සහ 45^0C යන උෂ්ණත්ව වලදී රයිසෝබියම්ගේ වර්ධන තත්ත්වයන් සහ කෘතිමව ලබා දුන් ආසෘතික පීඩනයක් මගින් නියහ වැනි තත්ත්ව වලට ඔරොත්තු දීමේ හැකියාව පරීක්ෂා කරන ලදී.

එහිදී දැකිය හැකි රසවත්ම කරුණ නම්, බෝහෝමයක් රයිසෝබියම් ඒකලිත ගණාවාස මෙම සියලු තත්වයන් වලදී වර්ධනයක් පෙන්නුම් කල බවයි. උදාහරණයක් ලෙස 45^0C වැනි ඉහළ උෂ්ණත්වයකදී පවා ඔවුන්ගේ වර්ධනයක් පෙන්නුම් කල අතර, 35^0C යන උෂ්ණත්වය තුලදී සියල්ල පාහේ යහපත් වර්ධනයක් පෙන්නුම් කරන ලදී. එසේම ආම්ලික (pH 5-6) හා භාෂ්මික මාධ්‍ය (pH 8) තුලදීද ඔවුන්ගේ වර්ධනයක් දැකගත හැකි වූ අතර භාෂ්මික මාධ්‍යයේදී ආම්ලික මාධ්‍යට වඩා වැඩි වර්ධනයක් පෙන්නුම් කරන ලදී. එසේම කෘතිමව ලබාදුන් නියහ තත්ත්වන් තුලදීද ඔවුන් සැලකිය යුතු වර්ධනයක් පෙන්නුම් කරන ලදී. එලෙසම අධ්‍යානයේ අමතර පැනිකඩක් ලෙස තෝරාගත් ශාක ව්‍යාධිජනකයන් කෙරෙහි ඔවුන් දැක්වූ බලපෑම පරීක්ෂා කරනලදී. එහිදී *Fusarium* spp. (සුලබ ශාක ව්‍යාධිජනක දිලීරයකි) හා *Xanthomonas* spp. (ශාක ව්‍යාධිජනක බැක්ටීරියාවකි) යන ව්‍යාධිජනකයන්ගෙ වර්ධනය මර්ධනය කිරීමට ඇති හැකියාව පරීක්ෂා කර බැලිය. එහිදී ඇතැම් රයිසෝබියම් ඒකලිත ගණාවාස *Fusarium* spp. ගේ වර්ධනය යම් තරමක පාලනයක් පෙන්වන ලදී. රයිසෝබියම් ජෛව පොහොර නිෂ්පාදනයට අදාල මූලික අඩිතාලමක් ලෙස මෙම අධ්‍යනය හඳුන්වා දිය හැකි අතර, මෙම අධ්‍යනය තවදුරටත් වැඩි දියුණු කිරීම මගින්,ජෛව පොහොර නිෂ්පාදනය හා ඒ තුලින් තිරසාර කෘෂිකර්මාන්තයක් කරා පියවර නැඟීම වෙත බලාපොරොත්තු දල්වා ගතහැක.

This is a non-technical summary of the project report titled "Evaluation of Plant Growth Promoting Attributes and Abiotic Stress Tolerance of Native Rhizobial Symbionts of Green Manure Crops (Gliricidia sepium & Mimosa pudica) Grown in Dry Zone, Sri Lanka" supervised by Dr. P.A.I.U. Hemachandra*, Department of Agricultural Biology, Faculty of Agriculture, University of Peradeniya. *ishankah@agri.pdn.ac.lk

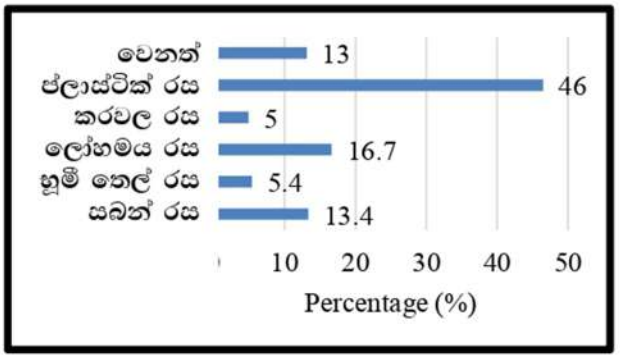
බෝතල් කල පානීය ජලයෙහි ආගන්තුක රසයන් සහ ගන්ධයන් හඳුනාගනිමු.

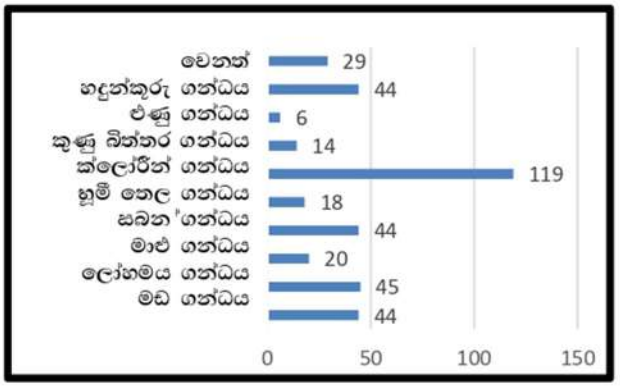
අයි.ඩී.ස්.යූ.ස්. කුමාර

ජලයේ ගුණාත්මක භාවය, සෞඛ්‍යරාක්ෂිත භාවය, දැරිය හැකි මිල, භාවිතායේ පහසුව ආදී කරුණු පදනම් කර ගනිමින් වර්තමානයේ ශ්‍රී ලංකාව තුල ප්ලාස්ටික් ඇසුරුම් තුල පවතින බෝතල් කළ පානීය ජලය භාවිතය දිනෙන් දින ඉහල යමින් පවතී.

නමුදු ඇතැම් අවස්ථාවන්හීදී බෝතල් කළ පානීය ජලයෙන් ආගන්තුක රසයන් හා ගන්ධයන් දැනිය හැක. එම නිසා පාරිභෝගිකයන් විවිධ ගැටලු වලට මුහුණ දෙමින් සිටී. සම්මත තත්ත්ව සහතිකන්ට අනුකූලව ආගන්තුක රසයන් හා ගන්ධයන් බෝතල් කළ පානීය ජලයෙන් නොදැනිය යුතුය.

මෙය ඇතිවන ආකාරය පිළිබඳව හා එයට පිළියම් සෙවීම සම්බන්ධව සිදුකරන ලද පර්යේෂණයකට සමගාමීව ප්‍රථමයෙන්ම පාරිභෝගික සමීක්ෂණයක් ඔස්සේ ආගන්තුක රසයන් හා ගන්ධයන් මොනවාදැයි හඳුනාගන්නා ලදී.





එලෙස හඳුනාගත් ආගන්තුක රසයන් හා ගන්ධයන් ඇති විමට අවශ්‍ය තත්ව සැපයීම මෙහිදී සිදු කරන ලදී. ඒ අනුව බෝතල් කළ පානීය ජලය ආසන්නයේ සබන්, හඳුන් කුරු, කරවල, මඩ හා ක්ලෝරීන් ස්ථානගත කිරීමත් එමෙන්ම බෝතල් කළ පානීය ජලය හිරුඑළියට නිරාවරණය කිරීමත් විවිධ කාල සීමාවන්ට අනුකූලව සිදු කරන ලදී.

ඉන්පසු එම බෝතල් කළ පානීය ජලයේ ආගන්තුක රසයන් හා ගන්ධයන් පවතීද නැද්ද යන්න වග ජලය කෙරිහිම පුහුණු සංවේදක මණ්ඩලයක් ඔස්සේ තහවුරු කර ගැනිම සිදු කරන ලදී. එහිදී අනාවරණය වුයේ දවස් තුනක් වැනි කෙටි කාලයකින් සබන්, හඳුන්කුරු හා කරවල ගන්ධයන් මෙන්ම සබන් රසයද ලබාදෙන බවයි. සති දෙකක කාලයකදී හඳුන්කුරු රස සහ කරවල රස ලබා දෙන ලදී. මාස දෙකක කාලයකින් අනතුරුව මඩ රස හා මඩ ගන්ධයද, එම කාල සීමාවේදීම හිරු එළියට නිරාවරණය කර තැබූ බෝතල් කල පානීය ජලයෙන් ප්ලාස්ටික් රස සහ එයට අනුරූප ගන්ධයත් ලබාදෙන බවයි. එමෙන්ම මෙම කාල සීමාවන්ට අනුරූපව ක්ලෝරීන් රස හෝ එහි ගන්ධය මෙහිදී නොලැබීමෙන් තහවුරු වූයේ එවැනි ක්ලෝරීන් රසයන් හෝ ගන්ධයන් ඇතිවිම සිදුවනුයේ නිෂ්පාදනයේ දෝෂ නිසා බවයි. ආගන්තුක රසයන් හා ගන්ධයන්ගෙන් තොර ප්ලාස්ටික් ඇසුරුම් තුල බෝතල් කළ පානීය ජලය මිලදී ගැනිම සඳහා පහත දැනුවත්භාවයේ අවශ්‍යතාවය මෙම පරීක්ෂණය අවසානයේදී තහවුරු කරගන්නා ලදී.

- හැකිතාක් නව නිශ්පාදිත දිනයන් සහිත පානීය ජල බෝතල් මිලදී ගැනීම.
- සෘජුව හිරු එළියට නිරාවරණය වන පරිදි තබා ඇති පානීය ජල බෝතල් මිලදී නොගැනීම.
- ගබඩා කර තබා ඇති විට බාහිරට ගන්ධයක් ලබාදෙන සහ ඉතා වාෂ්පශීලී සංඝටක අන්තර්ගත ද්‍රව්‍යයන් ආසන්නයේ (උදාත හඳුන්කුරු, සබන්, කරවල, භූමි තෙල්, සුවඳ විලවුන්...) තබා ඇති පානීය ජල බෝතල් මිලදී නොගැනීම.
- ඖෂධ, කෘමිනාශක ආදී ද්‍රව්‍යය අසල තබා ඇති පානීය ජල බෝතල් මිලදී නොගැනීම.
- පොදු ප්‍රවාහන ආශ්‍රිතව සහ මාර්ග දෙපස තබා ඇති පානීය ජල බෝතල් මිලදී ගැනීමෙන් හැකිතාක් වැළකීම.
- බෝතලයේ පියන හොඳින් මුදා තබා (සිල් කොට) ඇත්දැයි බැලීම.
- SLS 1336 සහ SLS 894 යන තත්ත්ව සහතික අන්තර්ගත බෝතල් මිලදී ගැනීම.

This is a non-technical summary of the project report titled "Studying of the Development of off-flavors and off-odors in PET bottled drinking water during storage using trained sensory panel" supervised by MR. N.Y.Jayanath*, Department of Food Science and Technology, Faculty of Agriculture, University of Peradeniya. *jayanathny@agri.pdn.ac.lk

සැහවුණු මැණික්: ශ්‍රී ලංකාවේ දේශීය සහල් වර්ගවල ගුණාත්මකභාවය

එම්.එම්.එම්.ටී.මාරසිංහ

බත් එසේත් නොමැති නම් සහල් ශ්‍රී ලංකාව ඇතුළු ආසියාතික බොහෝ රටවල ප්‍රධාන ආහාරය ලෙස පරිභෝජනය කරනු ලැබේ.මේ වනවිට ශ්‍රී ලාංකීය වෙළඳපොළ තුළ දේශීය සහල් වර්ග සඳහා ඉහළ ඉල්ලුමක් වර්ධනය වෙමින් පවතී.

සහල වර්ගවල ගුණාත්මකභාවය

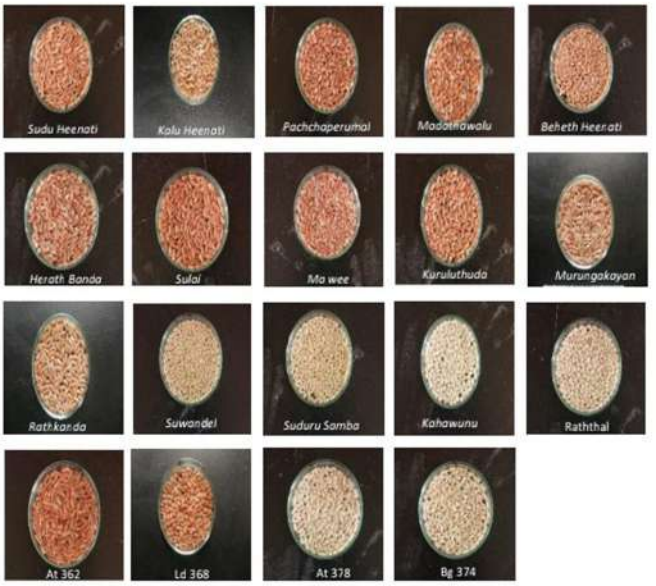
පෝෂක පදාර්ථ හැරුණු කොට සහල් වර්ග වල ගුණාත්මකභාවය සඳහා තවත් සාධක බලපාන බව ඔබ දන්නවාද? ඇඹරුම් යන්ත්‍ර මඟින් වී සහල් බවට සැකසීමේදී සහල් වල ගුණාත්මකභාවය පරීක්ෂාකරන අතරම සහල් ඇටයක දිග, පළල, වර්ණය වැනි පෙනුම සඳහා බලපාන සාධක ද ප්‍රධාන වශයෙන් සහල් වල ගුණාත්මකභාවයට හේතු වේ. එමෙන්ම ඇමයිලෝස් ප්‍රතිශතය, සහල් පිසගැනීම සඳහා ගතවන කාලය, අවශෝෂණයවන ජලය ප්‍රමාණය වැනි සහල් පිසීමට අදාළ සාධකද ගුණාත්මකභාවය සඳහා ප්‍රධාන වශයෙන් ඉවහල් වේ.
මෙම පර්යේෂණය දේශීය සහල් වර්ග පහළවක් සහ දැනට ශ්‍රී ලංකාව තුළ වගා කරන වැඩිදියුණු කළ ප්‍රභේදයන් හතරක් යොදා ගනිමින් සිදු කරන ලදී. ඉන්පසු ගුණාත්මකභාවයෙන් ඉහළ දේශීය සහල් ප්‍රභේදය හඳුනාගෙන වැඩිදියුණු කළ ප්‍රභේදයන්වල ගුණාත්මකභාවය සමඟ සංසන්දනය කරන ලදී. දේශීය රතු සහල් වර්ග ලෙස සුදු හීනටි, කළු හීනටි, පච්චපෙරුමාල්, මඩතාවුලු, බෙහෙත් හීනටි, හේරත් බණ්ඩා, සුලායි, මා වී, කුරුළුතුඩ, මුරුංගකායන්,සහ රත්කන්ද යොදාගත් අතරම දේශීය සුදු සහල් වර්ග ලෙස සුවඳල්, රතල්, කහවණු, සහ සුදුරු සම්බා මෙම පර්යේෂණය සඳහා භාවිතා කරන ලදී. එලෙසම At 362, Ld 368 රතු සහල් ප්‍රභේදයන්ද At 378, Bg 374 සුදු සහ ප්‍රභේදයන්ද වැඩිදියුණු කළ ප්‍රභේදයන් ලෙස මෙම පර්යේෂණය සඳහා භාවිතා කරන ලදී.

පර්යේෂණය තුළින් සොයාගත් දෑ

Ld 368 වැඩිදියුණු කළ ප්‍රභේදය මඟින් ඉහළ නොකැඩුණු සහල් ප්‍රතිශතයක් වාර්තා කල අතර සුලායි සහ රත්කන්ද දේශීය සහල් වර්ගද ඉහළ නොකැඩුණු සහල් ප්‍රතිශතයක් වාර්තා කරන ලදී. මේ අනුව සුලායි සහ රත්කන්ද, Ld 368 වැඩිදියුණු කළ ප්‍රභේදයේ ගුණාත්මකභාවයට සමාන සාම්ප්‍රදායික රතු සහල් ප්‍රභේද ලෙස හඳුනාගත හැකිය. සුදු සහල් වර්ග අතුරින් At 378 ඉහළ නොකැඩුණු සහල් ප්‍රතිශතයක් වාර්තා කළ අතර සුවඳැල් සහ කහවුණු At 378 ප්‍රභේදයට වඩා වැඩි නොකැඩුණු සහල් ප්‍රතිශතයක් වාර්තා කරන ලදී.

ඒ අනුව, At 378 වැඩිදියුණු කළ ප්‍රභේදයේ ගුණාත්මකභාවයට සමාන දේශීය සහල් වර්ග ලෙස කහවුණු සහ සුවඳැල් හඳුන්වා දිය හැක.

සහල් වර්ග සියල්ලම සහල් ඇටයේ දිග අනුව සම්බා හෝ නාඩු ලෙස වර්ග කළ හැකි නමුත් ප්‍රභේදයන් දෙක අතරම පෙනුමේ ගුණාත්මකභාවය අතර කැපී පෙනෙන වෙනසක් දක්නට නොලැබිණි .



පිසීමේ ගුණය අනුව ගුණාත්මකභාවයකින් ඉහළ ප්‍රභේදයන් තෝරා ගැනීම සඳහා සහල් පිසීමේදී අවශෝෂණය වූ ජලය ප්‍රමාණය සහ බත් ඇටයේ දිග ප්‍රධාන පරිමාමිතින් ලෙස භාවිතා කරන ලදී.

ඒ අනුව Ld 368 සහ At 362 වැඩි දියුණු කළ ප්‍රභේදයේ පිසීමේ ගුණාත්මකභාවයට සමාන දේශීය ප්‍රභේදයන් ලෙස මාවී සහ කළු හීනටි හඳුන්වා දිය හැක. සුවඳැල්, රතල්, සුදුරු සම්බා දේශීය සුදු සහල් වර්ග At 378 සහ Bg 374 වැඩි දියුණු කළ ප්‍රභේදයන්වල පිසීමේ ගුණාත්මකභාවයට සමාන ලක්ෂණ පෙන්නුම් කරයි.

ඒ අනුව තෝරාගත් දේශීය සහල් වර්ග අතුරින් රත්කන්ද, සුලායි, මා වී,කලු හීනටි රතු සහල් ප්‍රභේදයන්ද කහවුණු, සුවඳැල්, රතල්, සුදුරු සම්බා සුදු සහල් ප්‍රභේදයන්ද ගුණාත්මකභාවයෙන් ඉහළ දේශීය සහල් වර්ග ලෙස හඳුනාගත හැක.

This is a non-technical summary of the project report titled "Evaluation the Grain Quality of Selected Traditional and Improved Rice Varities in Sri Lanka" supervised by Dr. E.R.J.Samarakoon*, Department of Food Science and Technology, Faculty of Agriculture, University of Peradeniya.
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හැටන් ප්‍රදේශයේ තේ දළු නෙලන්නියන්ගේ ආතති මට්ටම් සහ හේතූන්

ක්‍රිෂානි ඉමාෂා වීරසිංහ

ශ්‍රී ලංකාවේ තේ කර්මාන්තයේ ඉතිහාසය මීට වසර 150 ටත් දුර අතීතයකට දිව යයි. 1867 වසරේ ජේම්ස් ටේලර් විසින් ප්‍රථම තේ පැළය ලූල්කඳුර වතුයායේ රෝපණය කිරීමෙන් පසු ශ්‍රී ලංකාවේ තේ වගාව ව්‍යාප්ත වීම ආරම්භ විය. මධ්‍යම කඳුකරය කේන්ද්‍ර කරගනිමින් මහා පරිමාණ තේ වතු ස්ථාපනය විය. මෙහිදී මෙම තේ වතු සඳහා අවශ්‍ය ශ්‍රම බලකාය පිළිබඳ ගැටලුවක් පැන නැඟුණි. ඒ සඳහා විසඳුමක් ලෙස දකුණු ඉන්දියාවේ "මලෙයියහා" ජනකොට්ඨාසය මෙරටට ගෙන්වා තේ වතු ආශ්‍රිතව පදිංචි කරවා ඔවුන්ගේ සේවය ලබා ගන්නා ලදි.

නමුත් ආරම්භයේ සිටම ඔවුන්ගේ ජීවිත සඳහා නිසි සැලකිල්ලක් නොලැබී යාම ප්‍රධාන ගැටළුවකි. ඔවුන් ලබා දුන් ශ්‍රම දායකත්වය සඳහා නිසි වටිනාකමක් තේවතු හිමියන්ගෙන් නොලැබී ගිය අතර කුලය, දීර්ඝ කාලීනව අධ්‍යාපනය සඳහා වූ අවහිරතා, අවම ආදායම් තත්ත්වය සහ අවම ජීවන තත්ත්වය ආදී ගැටළු රාශියකින් ඔවුහු කාලාන්තරයක් තිස්සේ පීඩා විඳිහ.

අනිශයින් කම්කරු ශ්‍රමය මත රඳා පවතින කර්මාන්තයක් වශයෙන් තේ කර්මාන්තය හඳුන්වා දිය හැකි අතර වැඩිම නිෂ්පාදන වියදමක් වැය වන්නේ තේ දළු නෙළීම සඳහායි. තේ දළු නෙළීමේ නිරත වන බහුතරය කාන්තාවන් වන අතර ඔවුන් ශ්‍රී ලංකා තේ සන්නාමයේ කැපී පෙනෙන සලකුණක් ලෙස හැඳින්විය හැක.

මෙම කාන්තාවන් නිවසේදී මෙන්ම රැකියා ස්ථානයේදී ඉටු කිරීමට සිදු වී ඇති අධික වැඩකටයුතු ප්‍රමාණය සමබර කරගන්නේ කෙසේද යන්න ඉමහත් ගැටළුවකි. මෙම තත්ත්වය යටතේ මොවුන්ගේ මානසික සෞඛ්‍යය තත්වය සහ ආතති මට්ටම් හඳුනා ගැනීම මගින් ඔවුන්ගේ සුබ සිද්ධිය සඳහා ඉදිරි පියවරක් තැබීමට බළධාරින්ට අවස්ථාව ලැබෙනු ඇත.

මේ සඳහා හැටන් ප්‍රදේශයේ වතුයායක් ආශ්‍රිතව තේ දළු නෙලන කාන්තාවන් 67ක් දෙනෙක් සහභාගී කර ගනිමින් සමීක්ෂණයක් සිදු කරන ලද අතර ඔවුන්ගේ එදිනෙදා ජීවිතය ගත වන ආකාරය පිළිබඳව පුළුල් පැහැකඩක් නිර්මාණය කරන ලදි. එහිදී සියලු නෙලන්නියන් සඳහා පොදු වූ ක්‍රියාකාරකම් 20ක් හඳුනාගත් අතර ඒවා රැකියා ස්ථානයේදී සහ නිවසේදී සිදු කරනු ලබන ක්‍රියාකාරකම් වශයෙන් වෙන් කරන ලදි.

ඇවිදීම විශේෂ අංගයක් ලෙස කැපී පෙනුණි. මන්ද යත් සාමාන්‍ය පුද්ගල දින චර්යාවට වඩා බහුල ලෙස මොවුන් හට ඇවිදීම යන ක්‍රියාකාරකමෙහි නිරත වීමට සිදුවී ඇත. තවද එදිනෙදා ක්‍රියාකාරකම් ආශ්‍රිත ආතති මට්ටම සහ සමස්ත ආතති මට්ටම යන පරාමිතින් දෙක එකිනෙකට වෙනස් බව පෙනී ගියේය.

ඉහත සඳහන් පරාමිතීන් දෙක සලකා සමස්ත ජන කණ්ඩායම් කොටස් තුනකට වෙන් කරන ලද අතර ඔවුන්ගේ ආතති මට්ටම සහ සමාජීය තොරතුරු අතර සම්බන්ධතාවයන් විග්‍රහ කරන ලදි. සාමාන්‍ය ආතතිය සහිත පිරිස 27ක් ලෙසද එදිනෙදා ක්‍රියාකාරකම් සම්බන්ධව වැඩි ආතතියකින් යුතු පිරිස 34ක් ලෙස හා වැඩි සමස්ත ආතතියක් සහිත පිරිස 6ක් විය. වයස, විවාහ තත්ත්වය, පවුලේ සාමාජිකයින් සංඛ්‍යාව සහ ඔවුන්ගෙන් ලැබෙන සහයෝගය, ස්වාමි පුරුෂයාගේ රැකියාව මෙන්ම ඔවුන්ගේ අධ්‍යාපන මට්ටම සහ ඉහත කී ආතති මට්ටම් අතර සම්බන්ධතාවයක් ඇති බව පෙනී ගියේය.

සමස්ත ආතතිය අධික පිරිසට තමාටම ආවේණික වූ සුවිශේෂී මැසිවිලි සහ සිදුවීම් ඇති බව පෙනී ගියේය. තවද තේ වතු කළමනාකාරීත්වය මගින් හඳුන්වා දී ඇති නව තාක්ෂණික යෙදවුම් මොවුන්ගේ ආතති මට්ටමට බල නොපාන බව පෙනී ගියේ 100%ක් පිරිස ඩිජිටල් යෙදවුම් සඳහාත් 90%ක් වැනි බහුතර පිරිස යාන්ත්‍රික යෙදවුම් සඳහාත් ධනාත්මක ආකල්පයක් දැරූ බැවිනි. තේ දළු නෙලන්නියන්ගේ ආතති මට්ටම අවම කිරීම සඳහා නිසි ක්‍රියාමාර්ග ගැනීමටත් නව තාක්ෂණික උපාංග තවදුරටත් ව්‍යාප්ත කිරීම සඳහා ඇති ප්‍රවණතාවය හඳුනා ගැනීමට මෙමගින් හැකි වන අතර තිරසාර විසඳුම් ලබා දීම සඳහා මෙම දත්ත සහ තොරතුරු භාවිතා කළ හැකිය.

This is a non-technical summary of the project report titled "Unveiling the Daily Life Events and Stress Factors among Tea Pluckers in Sri Lanka: a Special Focus on their Perception Regarding Technological Adaptation at a Tea Plantation in Hatton, Sri Lanka" supervised by Prof. S. Kumar*, Department of Applied Economics and Business Management, Faculty of Agriculture, University of Peradeniya. *skumar@agri.pdn.ac.lk

ගෝවා වගාවට නව ආරක්ෂකයෙක්...

H.H. ප්‍රදීප් නිමන්ත

තරුපහේ අවන්හලක සිට එදිනෙදා නිවසෙහි පිළියෙළ කෙරෙන බොජුන් මේසය දක්වාම ප්‍රචලිත එළවළුවක් ලෙස ගෝවා හඳුනාගත හැකිය. ශ්‍රී ලංකාවේ නුවරඑළිය, කල්පිටිය ආදී ප්‍රදේශවල ගෝවා වගාව ඉතා සාරවත්ව සිදු කෙරේ. නමුත්, මෙම බෝගයට ඉතා ඉහළ පළිබෝධමය හානි ඇතිවීමේ අවදානමක් පවතී. ඒ අතරින්ද "ගෝවා දළඹු සංකීර්ණය" ප්‍රමුඛ වේ. දුම්කොළ කියත් පණුවා, පුරුක් පණුවා, දැල් බඳින දළඹුවා, පොකුරු දළඹුවා සහ දියමන්ති සලබයින්ගේ දළඹුවා යන දළඹු විශේෂ පහෙන් මෙම පළිබෝධ සංකීර්ණය සමන්විත වේ. මෙම දළඹුවන් ගෝවා වගාවේ විවිධ අවධීන්හිදී පත්‍ර කා දැමීම ඇතුළු හානි රැසක් සිදුකරයි. ගෝවා දළඹු සංකීර්ණයේ ඇති ආර්ථිකමය හානිදායක බව නිසාම වගාකරුවෝ කෘත්‍රිම පළිබෝධනාශක භාවිතයෙන් මෙම තත්ත්වය පාලනයට යුහුසුළු වෙති. එය බොහෝ විට අවසන් වන්නේ නිර්දේශිත පළිබෝධනාශක ප්‍රමාණය දැඩි ලෙස ඉක්මවීමකිනි. මෙය ගෝවා වල නිෂ්පාදන පිරිවැය අධිකව ඉහළ යාමටත් ආර්ථික ලාභය අඩුවීමටත් හේතුවී ඇත. එසේම පරිසර දූෂණය මෙන්ම ජෛව විවිධත්ව හායනය සහ බැඳුණ ගැටලු රැසක් උද්ගත වීමද මෙම නිසා සිදුව ඇත. ඒ අනුව යම් ලෙසකින් කෘමිනාශක භාවිතය අවම කිරීමට හැකිනම් එය ගෝවා වගාකරුවාගේ මුදල් පසුම්බියට මෙන්ම ස්වභාවික පරිසරය සහ ජීවීන්ටද ආශිර්වාදයක් වනු නොඅනුමානය.

දහස්පෙතියා ශාකය සාම්ප්‍රදායිකව කෘමි විකර්ෂකයක් ලෙස නම් දැරුවකි. විද්‍යාත්මක අධ්‍යයනයන් තුළින්ද මෙම විභවය තහවුරු කර ඇත. මේ අනුව යමින් ගෝවා දළඹු සංකීර්ණයට දහස්පෙතියා තුළින් විසඳුම් සෙවීමත් ඒ හරහා ගෝවා වගාවේ ආර්ථික සහ පාරිසරික තිරසර බව ඉහළ නැංවීමත් අරමුණු කරගනිමින් අධ්‍යයනයක් දියත් කෙරිණ. එහි ප්‍රතිඵල වලින් ගෝවා දළඹු සංකීර්ණය පාලනය සඳහා දහස්පෙතියා තුළින් "කොළ එළියක්" දල්වා ඇති බව ගම්‍ය විය. ඒ අනුව පැහැදිළි වූයේ ගෝවා අතර දහස්පෙතියා පේළි අතුරු වගාවක් ලෙස පවත්වාගෙන යාමෙන් ගෝවා බෝගයට ආකර්ෂණය වන දළඹුවන් ප්‍රමාණය අවම කරගැනීමට හැකි බවයි. මෙම දළඹුවන් ආකර්ෂණය අඩු වීමට දහස්පෙතියා ශාක ආශ්‍රිතව වර්ධනය වන ගොවියාට හිතකර කෘමීන් එනම් පළිබෝධ වල "ස්වභාවික සතුරන්" හේතුසාධක වේ. දහස්පෙතියා ශාකය මෙම ස්වභාවික සතුරන්ට වාසස්ථාන, රැකවරණය පමණක් නොව ආහාර ද සපයන නිසා ඔවුන්ගේ ගහනය ඉහළ යයි. මෙලෙස ස්වභාවික සතුරන්ගේ ගහනය වැඩි වන විට ගෝවා වගාව තුළ අහිතකර කෘමීන්ගේ ගහනය අනපේක්ෂිත ලෙස ඉහළ යාම වැළකේ. මීට හාත්පස වෙනස් ලෙස කෘත්‍රිම කෘමිනාශක භාවිතය හිතකර කෘමීන්ගේ ගහනය ඉතා දැඩි ලෙස අඩු කරන බව හෙළිවිය.

මෙමඟින් ගම්‍ය වන්නේ මෙම කෘමිනාශක වලින් ජෛව විවිධත්වයට වන අනිටු බලපෑමයි. එපමණක් නොව ගෝවා වගාව ආශ්‍රිතව දහස්පෙතියා වගාකිරීමෙන් කෘමි සතුන්ට නිසි ලෙස ඔවුන්ගේ ඉලක්කය එනම් ගෝවා බෝගය ට ළඟා වීමේ අපහසුතා ඇති කෙරේ. විශේෂයෙන්ම ගෝවා සහ දහස්පෙතියා පත්‍ර හැඩ වල පවතින විවිධත්වය තුළින් සංචරණයේදී කෘමීන් මුළා වීම සිදුවේ.

මේ අකාරයට ගෝවා අතර දහස්පෙතියා වගාකිරීමෙන් ලැබෙන ප්‍රතිලාභ පැවතියද මෙහිදී ඇතිවන ගැටලුවක් වන්නේ මෙමඟින් ගෝවා වල අස්වැන්න අඩුවීමක් වන්නේද යන්නයි. එහෙත් මෙම අධ්‍යයනය තුළින් හෙළි වූයේ දහස්පෙතියා මඟින් ගෝවා වලට එවැනි තරඟකාරී තත්ත්වයන් ඇති නොවන බවයි. අනෙක් පසෙන් පැහැදිළි වූයේ දහස්පෙතියා ගෝවා වල මනා වර්ධනයට උපකාරී වන බවයි. දහස්පෙතියා අතුරු වගාව ගෝවා බෝගය අවට සෙවණ තත්වය හා ආර්ද්‍රතාව ඉහළ නංවන නිසා බෝගය මැළවීම අවම වන අතර සුවපහසු වර්ධනයට ඉඩ සළසයි.

මේ අනුව පැහැදිළි වන්නේ ශ්‍රී ලංකාවේ ගෝවා වගාවෙහි දැනට පවතින කෘත්‍රිම පළිබෝධනාශක මත පමණක් පදනම් වූ පළිබෝධ පාලන ක්‍රමවේදයට විකල්ප ක්‍රියාමාර්ගයක් වශයෙන් දහස්පෙතියා අතුරු වගාව ගෝවා වගාබිම් වලට හඳුන්වාදීමේ විභවයක් පවතින බවයි. මෙය ගෝවා වගාවේ ආර්ථිකමය සහ පාරිසරික තිරසාර භාවය ඉහළ නැංවීමෙහිලා මහඟු රුකුලක් වනු ඇත.

This is a non-technical summary of the project report titled "Efficacy of African Marigold (*Tagetes erecta* L.) in Cabbage Insect Pest Management in Sri Lanka." supervised by Dr. L.M Rankoth*, Department of Crop Science, Faculty of Agriculture, University of Peradeniya. *lalithrankoth@agri.pdn.ac.lk

සාගර පතුලේ සැඟවුණු කහවනු

පී.එච්.ඩී.ටී. දිල්හාරි

මුහුදු පැලෑටි (seaweeds) යනු ඉතාමත් ඉහල වර්ධන වේගයක් සහිත ඇල්ගී විශේෂයකි. පසුගිය වසර කිහිපය තුල ලොවපුරා මෙම මුහුදු පෑලෑටි වගාව සිග්‍රයෙන් ඉහල යමින් පවතියි. ශ්‍රී ලංකාවේද ප්‍රධාන වශයෙන්ම උතුරු පලාතේ කිලිනොච්චිය, යාපනය, කල්පිටිය ප්‍රදේශ සහ දකුණු පළාත කේන්ද්‍ර කරගනිමින් මෙම වගාව වානිජ වශයෙන් ඉතාමත් සාර්ථකව සිදුකෙරේ.

මුහුදු පැලෑටි සහ කෘෂිකර්මාන්තය

මුහුදු පැලෑටි බොහෝමයක් ශාකවල වර්ධනයට සහ එලදාව ඉහල නැංවීමට අවශ්‍ය පෝශක මූලද්‍රව්‍ය සහ සංඝටක වලින් අනූන වේ. ප්‍රධාන වශයෙන්ම ***kappahycus alverezi*** **මුහුදු** පැලෑටිය, නයිට්‍රජන්, පොස්පරස්, පොටෑසියම්, සෝඩියම්, කැල්සියම්, මැග්නීසියම් වැනි පෝශක මූලද්‍රව්‍ය රැසක් සහ ශාක වර්ධක හෝමෝන වන ඔක්සීන් සහ ගිබරලීන් වැනි ඉතාමත් වටිනා සංයෝග වලින් පිරිපුන් වේ. එම නිසා ශාක වර්ධනය ඉහල නැංවීමේ පොහොරක් ලෙස සහ වර්ධක උත්තේජකයක් ලෙස මුහුදු පැලෑටි භාවිතය කාබනික, සමෝධානිත, තිරසාර කෘෂිකර්මාන්තයෙහිලා ප්‍රධාන හැරවුම් ලක්ෂයක් ලෙස සැලකේ. එසේම පරිසර හිතකාමී කෘෂිකාර්මික යෙදවුමක් ලෙස ලොව පුරා ප්‍රචලිත වීමේ ඉහල විභවයක් මෙම මුහුදු පැලෑටි සුසංයෝගිත පොහොර සතුව පවතියි.

ඇල්බර්ට පොහොර සහ ආරක්ෂිත ගෘහ තුල වගාව

ආරක්ෂිත ගෘහ තුල එලවලු වගාකිරීමෙහිලා ප්‍රධානම යෙදවුම ලෙස කායීභාරය ඉටු කරන්නෙ ඇල්බර්ට පොහොර මාධ්‍යයයි. නමුත් දිගින් දිගටම සිදුවන අකාබනික පොහොර වල මිල ඉහල යාම නිසා එලවලු වගාකරුවන්ගේ මූලික නිෂ්පාදන පිරිවැය සැලකිය යුතු මට්ටමකින් ඉහල යමින් පවතියි. එම නිසා මාගේ පර්යේෂණයේ මූලික අරමුණ මෙම ඇල්බර්ට පොහොර සඳහා වන වියදම අඩු කිරීමට සහ අවසන් අස්වැන්නේ ප්‍රමාණය සහ ගුණාත්මකභාවය ඉහල නැංවීම යන සාධක සියල්ල පූර්ණය කිරීමෙහිලා මුහුදු පැලෑටි වලින් සුපෝෂිත නව පොහොර මාධ්‍යයක් සාර්ථකව හඳුන්වා දීමයි.

මෙම පොහොර නිෂ්පාදනය කිරීමේ පියවරවල් ලෙස හොදින් වැඩුනු නැවුම් ***kappahycus alverezi*** **නම් රතු මුහුදු පැලෑටි** 50g සමග අයන ඉවත් කල පිරිසිදු ජලය (Distilled water) 50 ml හොදින් මිශ්‍ර කොට, ඇඹරුම් යන්ත්‍රයක් ආධාරයෙන් සියුම් කුඩක් වන තුරු මිශ්‍ර කරමින් ඇඹරීම කල යුතුයි. වගාකරුවන්ගේ අවශ්‍යතාවය අනුව මෙම ප්‍රමාණ වෙනස් කරගත හැක.

මෙසේ නිෂ්පාදනය කරගත් පොහොර, ආරක්ෂිත ගෘහ තුල භෝග වගාවන් සඳහා බහුලව භාවිතා වන ඇල්බර්ට් පොහොර වල අඩංගු ප්‍රධාන මූලද්‍රව්‍ය වන නයිට්‍රජන් සහ පොටෑසියම් වෙනුවට ආදේශකයක් ලෙස සාර්ථකව භාවිතා කල හැක. මෙම පර්යේෂණය තුල ශ්‍රී ලංකාවේදී මෙන්ම ලෝකය පුරාම ඉහල ඉල්ලුමක් පවතින අපනයන ඵලවලු වර්ගයක් ලෙස සැලකෙන **සලාද පිපිඤ්ඤා (*Salad cucumber*)** ශාකයේ වර්ධනය සහ අස්වැන්න සඳහා මුහුදු පැලෑටි වලින් නිෂ්පාදිත පොහොර වල බලපෑම අනාවරණය කර ඇත. එමගින් සලාද පිපිඤ්ඤා වගාව සඳහා මූලික යෙදවුම ලෙස භාවිතා කරන ඇල්බර්ට් පොහොර අවශ්‍යතාවයෙන් 50% ක ප්‍රමාණයක් සඳහා මුහුදු පැලෑටි සුසංයෝගිත නව පොහොර මාධ්‍යය වඩාත් සාර්ථක ආදේශකයක් ලෙස භාවිතා කල හැකි බව පෙන්වාදී ඇත. එසේම මෙමගින් සලාද පිපිඤ්ඤා වගාවේ මුලු අස්වැන්න සහ අස්වැන්නේ ප්‍රතිඔක්සිකාරක ගුණ, විටමින් C වැනි පෝෂක ගුණාංගද ඉහල නැංවීම කෙරෙහි කැපී පෙනෙන බලපෑමක් පෙන්නුම් කරන ලදි. එමගින් අස්වැන්නේ ප්‍රමාණය සහ ගුණාත්මකභාවය යන

පාරිභෝගිකයන් ඉහලින්ම බලාපොරොත්තුව වන සාධක දෙකම ඉහල නැංවීමට හැකියාවක් ඇති බව අවසානයේ සොයාගැනීමට හැකි විය. මෙම සාධක සියල්ල සැලකිල්ලට ගනිමින් මුහුදුබඩ වගාකරුවන්ට මෙන්ම රට පුරා විසිරී සිටින ආරක්ෂිත ගෘහ තුල එලවලු වගාකරුවන් හට ඔවුන්ගේ පොහොර සඳහා යන මූලික වියදම් 50% කින් අවම කිරීමට සාර්ථක ආදේශකයක් ලෙස මෙම පොහොර හඳුන්වා දීමට හැකිය. එසේම 1790 km වැනි මුහුදු සීමාවකින් අනූන ශ්‍රී ලංකාව වැනි රටක, ඉතාමත් සාර්ථක ලෙස මෙම මුහුදු පැලෑටි අවම යෙදවුම් සහිතව වානිජ වශයෙන් වගා කොට, කෘෂිකර්මාන්තය සඳහා අවශ්‍ය පොහොර නිෂ්පාදනය කිරීමේ ඉහල හැකියාවක් පවතියි. එසේම එම මුහුදු පැලෑටි සහ පොහොර ලොව පුරා අපනයනය කිරීම මගින් දල දේශීය ආර්ථිකය ශක්තිමත් කිරීමෙහිලා මහැඟි කායීභාරයක් ඉටු කිරීමටද හැකිවේ.

This is a non-technical summary of the project report titled "Identifying the effects of Kappaphycus alvarezii seaweed as an effective fertilizer for Salad Cucumber" supervised by Dr. L.M. Rankoth*, Department of Crop Science, Faculty of Agriculture, University of Peradeniya. *lalithrankoth@agri.pdn.ac.lk

නියඟයෙන් වී ගොවිතැනට වන හානිය හයිඩ්‍රොජෙල් විසඳයිද?

එම්.ඩී.ඩී.එස්.ඩී කුලසූරිය

වී හෝ සහල් ලොව දෙවන ප්‍රධානතම ආහාර භෝගයයි. පිසූ සහල් ශ්‍රී ලාංකිකයන්ගේ ප්‍රධාන ආහාරය වන අතර, ප්‍රෝටීන අවශ්‍යතාවයෙන් 40 ප්‍රතිශතයක් සහ කැලරි අවශ්‍යතාවයෙන් 45 ප්‍රතිශතයක් සපයයි.

1.1 ශ්‍රී ලංකාවේ වී වගාවට නියඟයෙන් වන බලපෑම

වී වගාව සිදු කරනු ලබන්නේ වර්ෂා හෝ වාරිමාර්ග ජලය භාවිතයෙනි. ශ්‍රී ලංකාවේ වී වගා කරන පරිසර පද්ධති 04 අතරින්, වර්ෂා ජලයෙන් වගා කරන උඩරට වී ගොවිතැන වියළි කලාපයේ බහුලව දැකිය හැකිය. එය නියඟය මඟින් ප්‍රධාන වශයෙන අහිතකර බලපෑමට ලක්වේ. වර්තමානයේ සුලභව කතාබහට ලක්වන කාලගුණික විපර්යාස, නියඟ තත්ව තීව්‍ර කිරීමට හේතු වී ඇත. සෑම වර්ෂයකම යල කන්නයේදී, වර්ෂා ජලයෙන් වගා කරන කුඹුරු 35ක ප්‍රතිශතයක් පුරන් වීමට නියඟය හේතුවේ. තවද, නියඟය මඟින් වී ශාකයේ රූප භෞතික විද්‍යාත්මක, ජෛව රසායනික හා ජානමය වෙනස් කිරීම් ඇති කරයි.

1.2 වී වගාවට නියඟයෙන් ඇති වන ගැටලු සඳහා වර්තමානයේ භාවිතා වන විසඳුම් අතර හයිඩ්‍රොජෙල් (සුපර් ඇබ්සෝ(ර්)බන්ට් පොලිමර්) වර්තමානයේදී මෙම ගැටලු සඳහා විසඳුම් ලෙස සාම්ප්‍රදායික හා අණුක ජාන විද්‍යාත්මක අභිජනන ක්‍රම, ජලය සූක්ෂමව ඉතුරු කිරීමේ ක්‍රමවේද හා පාංශු සංශෝධන ද්‍රව්‍යයන් භාවිතාවේ.

මේ අතුරින් පාංශු සංශෝධන ද්‍රව්‍යයක් වන හයිඩ්‍රොජෙල් (සුපර් ඇබ්සෝබන්ට් පොලිමර්) (රූපය 1) ප්‍රධාන තැනක් ගනියි. මෙය පොටැසියම් පොලිඇක්‍රිලේට් අඩංගු, අවශේෂයක් ඉතිරි නොකරමින් ස්වභාවිකව වියෝජනය වන රසායනික ද්‍රව්‍යයකි. මූලික බිම් සැකසීමේදී පසට එක් කල හැකි හයිඩ්‍රොජෙල්, පාංශු ජල රඳවනයක් හා සෙමෙන් මුදා හරින්නක් ලෙස ක්‍රියා කරන අතර, ජල හා පෝෂක කාර්යක්ෂමතාවය වැඩි කරයි. මෙමඟින් ශාක වර්ධනය කෙරෙහි නියඟයෙන් ඇති බලපෑම සමනය කරයි. මූලිකවම හයිඩ්‍රොජෙල් වැසි කාලයේදී ජලය අවශෝෂණය කර, ජලය හිඟ නියං කාලයේදී ශාකවලට අවශ්‍ය අයුරින් මුදා හරියි (රූපය 2).

1.3 හයිඩ්‍රොජෙල් හා කාබනික ද්‍රව්‍ය සුසංයෝජනය

පසට එක් කල හැකි කාබනික ද්‍රව්‍ය පසෙහි ජලය රඳවා ගැනීමේ හැකියාව තවදුරටත් වැඩි දියුණු කරයි. එබැවින් හයිඩ්‍රොජෙල් හා කාබනික ද්‍රව්‍ය සුසංයෝජනය, පෝෂක හා ජලය රඳවා ගැනීම හා පසේ සරුබව වර්ධනය කිරීමට හේතුවේ.

1.4 හයිඩ්‍රොජෙල් තනිව හෝ කාබනික ද්‍රව්‍ය සමඟ මුසුවක් ලෙස වී ශාකයේ නියඟයට ඔරොත්තු දීමේ හැකියාව වර්ධනය

නියඟය හේතුවෙන්, ශාකයේ පටක හානි වීමෙන් විවිධ අයන ශාක පටකවලින් පිටතට පැමිණෙයි. මෙය ශාකයට සම්පූර්ණයෙන් හානි ගෙන දෙන සංසිද්ධියකි. හයිඩ්‍රොජෙල් මෙම සිදුවීම අවම කරන අතර, එමඟින් නියඟයෙන් ශාකයට ඇති වන අහිතකර බලපෑම් අඩු කරයි.

ශාක පටකවල අඩංගු ජල ප්‍රමාණය අඩු කිරීමට නියඟය හේතුවන අතර හයිඩ්‍රොජෙල් ශාකයේ ජල මට්ටම සාමාන්‍ය ජල සම්පාදිත ශාකවල ජල මට්ටම හා සමානව පවත්වා ගැනීමට උපකාරී වේ. එනම් හයිඩ්‍රොජෙල් නියඟ තත්ව යටතේ වුවද ශාක පටකවල ඉහළ ජල මට්ටමක් පවත්වා ගැනීමට උපකාරී වෙයි

හයිඩ්‍රොජෙල් පසට එක් කිරීම මඟින් අඩු ජල ප්‍රමාණයකින්, වැඩි ස්කන්ධයකින් යුතු ශාක හා වැඩි අස්වැන්නක් නිපදවීමට හැකිවේ

මීට අමතරව හයිඩ්‍රොජෙල් වී ශාකයේ මුල් පද්ධතියේ වර්ධනය වැඩි කර, ජලය සොයා යාම පහසු කරයි. එමඟින් ශාකවල නියඟයට ඔරොත්තු දීමේ හැකියාව වර්ධනය කරයි.

හයිඩ්‍රොජෙල් හා කාබනික ද්‍රව්‍ය සුසංයෝජනය කිරීම මඟින් ශාකයෙන් ජලය වාෂ්පීකරණය පාලනය කරනු ලබන අතර, ශාකයේ ප්‍රභාසංස්ලේෂණ වායු හුවමාරුව සිදු කරන පූටිකාවල ක්‍රියාකාරිත්වය ප්‍රශස්ත කරයි. එමඟින් ශාකයේ නියඟයට ඔරොත්තු දීමේ හැකියාව වර්ධනය කර ශාකයේ නිශ්පාදන හැකියාව වැඩි කිරීමටද හේතුවන බව පැහැදිලිය.

විශේෂයෙන්ම ශාකයේ ආහාර නිපදවීමේ ක්‍රියාවලිය වන ප්‍රභාසංස්ලේෂණය වැඩි කිරීමට, හයිඩ්‍රොජෙල් හා කාබනික ද්‍රව්‍ය සංයෝජනය සතු හැකියාව විශ්මයජනක වන අතර එම අගය ජල සම්පාදිත ශාකවල ප්‍රභාසංස්ලේෂණයට වඩා වැඩි බව පෙනේ.

මේ අනුව නියඟය මඟින් ශ්‍රී ලංකාවේ වී ගොවිතැනට වන බලපෑම හයිඩ්‍රොජෙල් හා කාබනික ද්‍රව්‍යය, හයිඩ්‍රොජෙල් සුසංයෝජනය මඟින් සැලකිය යුතු මට්ටමක් දක්වා අඩු කර ගත හැකි බව මනාව පැහැදිලිවේ.

(රූපය 1)

(රූපය 2)

(ඡායාරූප අන්තර්ජාලයෙනි)

This is a non-technical summary of the project report titled "Investigating the Effects of Soil Incorporation of a Superabsorbent Polymer on Drought Tolerance Properties of two rice varieties with or without an Organic Matter Supplementation" supervised by Dr. L.V.Y. Weerarathne*, Department of Crop Science, Faculty of Agriculture, University of Peradeniya. *vishnay@agri.pdn.ac.lk

දැවෙන ගැටලුවකට දැවෙන විසඳුමක් - දෙමුහුම් පිසින උඳුන

රවිඳු උදාන අතුකෝරල

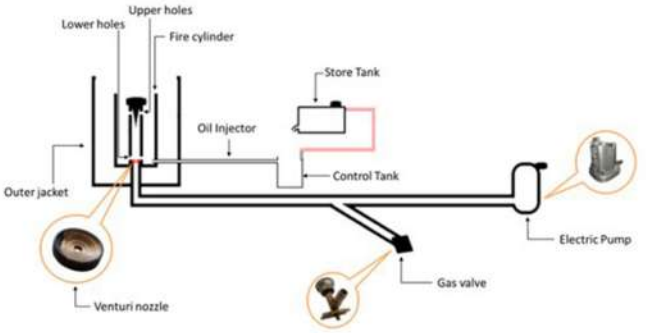
ශ්‍රී ලංකාව තුල වීදි ආහාර පිසින්නන් (Street food vendors) විසින් කළු ගැසුනු තෙල් භාවිත කරමින් ආහාර පිසීම ඔබ අප සැම දැක ඇති සුලභ දසුනකි.විශාල පරිමාණයේ අවන්හල් වලින් ඉවතලන කසල තෙල් මේ සඳහා බොහෝවිට ඔවුන් භාවිත කරනු ලබයි. මහා පරිමාණ අවන්හල් හිමියන් ඔවුන්ගේ ආහාර වල ගුණාත්මකභාවය පවත්වා ගැනීම සඳහා භාවිතයෙන් ඉවත් කලද කසල තෙල් (Waste oil) කළමනාකරණයට සහ බැහැර කිරීමට ඔවුන්ට විශාල මුදලක් වැය කිරීමට සිදුවන නිසා ඔවුන් විසින් මෙම තෙල් බාහිර ගැනුම් කරුවන්ට නොහොත් වීදි ආහාර පිසින්නන් වෙත අලෙවි කිරීම හෝ අවිධිමත් ලෙස බාහිර පරිසරයට මුදාහැරීම ශ්‍රී ලංකාව තුළ සුලභ ක්‍රියාවලියකි. නමුදු මෙමඟින් සිදුවන හානිය තක්සේරු කිරීමට ලෝකය තුල මිනුමක් නොපවතී.

මහා පරිමාණ අවන්හල් හිමියන් හා වීදි ආහාර පිසින්නන් මේ ක්‍රියාවලිය ලාභ අපේක්ෂාවෙන් සිදු කලද මිනිස් සිරුරට හා ස්වාභාවික පරිසරයට සිදුවිය හැකි හානිය සුළුපටු නොවේ. පරීක්ෂණ වාර්තා වලට අනුව පිසින තෙල් නැවත නැවත භාවිතය පිළිකා ඇතුලු බොහෝ ලෙඩ රෝග වලට අතවැනීමකි. එමෙන්ම අවිධිමත් ලෙස කසල තෙල් පරිසරයට මුදා හැරීම නිසා ජල මූලාශ්‍ර ඇතුලු ජීවී අජීවී පද්ධතීන් වලට සිදුවන හානිය මුදලින් තක්සේරු කිරීමට පවා නොහැකිය.

මෙම තත්වය යාමනය උදෙසා ශ්‍රී ලංකාව තුළ මේ සම්බන්ධව කොතරම් නීති රෙගුලාසි තිබුනද මෙම අවාසනාවන්ත තත්වය වළක්වා ගැනීමට අපොහොසත් වීම කනගාටුවකට කරුණකි. යම් හෙයකින් මහා පරිමාණ අවන්හල් වලින් කසල තෙල් බාහිර ගැනුම් කරුවන් අතට අත්පත් වීම වැලැක්වීමට හැකි වුවහොත් එය ලාංකිකයන් වශයෙන් අප ලබන ජයග්‍රහණයකි. මෙම දැවෙන ගැටලුවට උපායමාර්ගිකව පිලියමක් යෙදීමට දැන් කාලය එළඹ ඇත. එම දැවෙන ගැටලුවට දැවෙන විසඳුමක් ලබා දීම මෙම පරීක්ෂණ වාර්තාවේ මූලික අරමුණ කොටගෙන ඇත. මහාපරිමාණ අවන්හල් හිමිකරුවන් ඔවුන් අතින් නිපදවෙන කසල තෙල් ඔවුන් විසින්ම පරිභෝජනය කර අවසන් කරයි නම් එම කසල තෙල් බාහිර ගැනුම්කරුවන් අතට අත්පත් වීම වලකින අතර සුරක්ෂිත ආහාරයක රසය විඳ ගැනීමට අප සැමට අවස්ථාව එළඹෙනු ඇත. එමෙන්ම පරිසර දූෂණයද වැලකේ.

මේ සඳහා උපායමාර්ගික පිලියමක් ලෙස දෙමුහුම් උඳුන හඳුන්වා දිය හැකිය. මෙම දෙමුහුම් උඳුන LPG (Liquid petroleum gas) හා කසල තෙල් මගින් බලගන්වා ක්‍රියාකරවීමට හැකියාව පවතී.මෙම නව සොයා ගැනීම භාවිතය අවන්හල් වලට පමනක් සීමා නොවන අතර ගෘහස්ථ භාවිතය සඳහාද යොදා ගත හැකිය.

එමෙන්ම මෙම උඳුන භාවිතා කිරීම නිසා මෑත කාලීනව ඇති වූ ඉන්ධන ගැටලුවටද විසඳුමක් සපයයි. මෙම දෙමුහුම් උඳුන භාවිතයෙන් LPG පරිභෝජනය 37.5 % කින් අවම කර ගත හැකි බව පරීෂණ තුලින් සනාථ වී ඇත.මෙම නව නිෂ්පාපාදනය සම්පූර්නයෙන්ම වෙන්චුරි සිද්ධාන්තය (Venturi Theory) මත පදනම්ව ඇති අතර LPG හා කසල තෙල් යන දෙකම ඉතා සාර්ථක ලෙස දහනය කර තාපය බවට පත් කිරීමට අනර්ස හැකියාවක් පවතී.



මෙම උඳුන LPG mode හි ක්‍රියාත්මක වන විට 72.30+2.43 % කාර්යක්ෂමතාවයක් පවත්වා ගනු ලබන අතර එම උඳුනම දෙමුහුම් අවස්ථාවේ (Hybrid mode) ක්‍රියාත්මක වන විට කාර්යක්ෂමතාවය 69.48+2.25 % පවත්වාගෙන යනු ලබයි. එනම් LPG දහනයට ආසන්න කාර්යක්ෂමතාවයක් සහිතව කසල තෙල් දහනය කිරීමේ හැකියාව උඳුන සතුව පවතියි. එහෙයින් මෙම උඳුනට LPG හා කසල තෙල් දහනය ඉතා සර්ථක ලෙස සිදු කිරීමේ හැකියාව පවතින බව පරීක්ෂණ මඟින් තහවුරු වී පවතී.

එමෙන්ම සාම්ප්‍රදායික තෙල් උඳුන් වල පවතින විශාල ගැටලුවක් වන හයිඩ්‍රොකාබන හා කාබන් මොනක්සයිඩ විමෝචනය 0.045+0.007 % හා 0.145+0.005 % තරම් කුඩා අගයක් බවට පත් කර ගැනීමට හැකි වී ඇති අතර ඊට හේතුව ලෙස තුකරණය (Atomization) වූ කසල තෙල් හා LPG වායුව සමඟ එකව දහනය වීම ලෙස දැක්විය හැකිය. මෙම සංසිද්ධියද පරීක්ෂණ වාර්ථාවේ ප්‍රධාන ප්‍රතිඵලයක් ලෙස ගෙනහැර දැක්විය හැක.

This is a non-technical summary of the project report titled “Feasability Analysis of Used Cooking Oil as an Alternative Fuel Source and Designing of a Hybrid Stove” supervised by Mr. N.Y.Jayanath*, Department of Food Science and Technology, Faculty of Agriculture, University of Peradeniya. * jayanathny@agri.pdn.ac.lk

கிளிரிசிடியா இலையை கால்நடைகளுக்கான உணவாக சேர்க்கலாமா? எவ்வாறு?

திவ்வியா கனகவேல்ராஜன்

கால்நடைகளுக்கான போசனையை பூர்த்தி செய்வதில் புரதமானது முக்கிய பங்கு வகிக்கின்றது. இலங்கையில் தரவு கணிப்பின் படி கால்நடைகளுக்கான புரத தேவையானது 10.9 மில்லியன் மெட்ரிக்டொன்னாக வரவிடப்பட்டுள்ளது. இருந்தபோதிலும் உற்பத்திகள் மூலமும் இறக்குமதி மூலமும் நிவர்த்தி செய்யப்படும் புரதமானது 6.7 மில்லியன் மெட்ரிக்டொன்னாக கணிக்கப்பட்டுள்ளது. இலங்கையில் புரத உணவுக்காக பயன்படுத்தப்படுபவையான: சோயா, தேங்காய் புன்னாக்கு, எள்ளு போன்றவையாகும். கால்நடைகளுக்கான புரத தேவையை பூர்த்தி செய்வதற்கு பயன்படுத்தப்படும் மூலப்பொருட்களில் சில இடர்பாடுகள் உள்ளன. அவையாவன விலை அதிகரிப்பு, குறிப்பிட்ட காலத்தில் மட்டும் கிடைக்கப்பெறுதல், தரமற்ற பொருட்கள். ஆகவே எளிதாக கிடைக்கப்பெறும் பொருட்களை வைத்து விலை குறைவான புரத உணவுகளை தயாரிப்பது அவசியமான ஒன்றாக காணப்படுகின்றது.

Dentro power உற்பத்தியில் கிளிரிசிடியா தாவரத்தின் தண்டு பகுதியை பயன்படுத்தி சக்தியை தயாரிக்கின்றனர். இந்த உற்பத்தியின் போது உருவாக்கப்படும் சக்தியை எரிபொருளாக பயன்படுத்துகின்றனர். மிகுதியாக உள்ள இலையை குப்பையில் வீசுகின்றனர். நாம் ஏன் அதில் இருந்து கால்நடைக்கான உணவு உற்பத்தியை உருவாக்க கூடாது?

ஆம் நாம் உருவாக்கியது தான் கிளிரிசிடியா துகள்கள் (Pellets). கிளிரிசிடியா இலையை காய வைத்து பகுப்பாய்வு செய்த பொழுது நமக்கு கிடைக்க பெற்ற தகவலானது 25 வீதமான அளவு புரதம் உள்ளது என்பது ஆகும். அத்துடன் கரிமப்பொருள் செரிமானமானது 63.48 வீதமாகவும் காணப்பட்டது. மேலும் குறிப்பிடத்தக்களவு ஏனைய சத்துகளும் கொண்டிருக்கின்றது.

ஆதனால் கிளிரிசிடியாவை கால்நடைகளுக்கு உணவாக கொடுப்பதற்காக அவற்றை சிறிய துகள்களாக்குவதற்கு கிளிரிசிடியா இலை காயவைக்கப்பட்டு அரைக்கப்பட்டு மாவாக்கப்பட்டது. கிளிரிசிடியா இலை பவுடரை வெவ்வேறு அளவீடுகளில் சேரக்கப்பட்டு பகுப்பாய்வு செய்யப்பட்டது. சேர்க்கப்படும் வீதமானது அதிகரித்து செல்லப்படும் பொழுது இந்த சேர்க்கைக்கு பிணைப்பு சக்தியை உருவாக்க கோதுமை மா மற்றும் மொலாசஸ் (molasses) பயன்படுத்தப்பட்டது. சேர்கையானது 77 வீதம் கிளிரிசிடியா இலை பவுடரை உள்ளடக்கமாக தொடங்கி 89 வீதம் கிளிரிசிடியா பவுடர் உள்ளடக்கம் வரை சேர்க்கைகள் உருவாக்கப்பட்டது.

இந்த சேர்க்கைகள் மூலம் உருவாக்கப்பட்ட துகள்கள் உயிரியல் இரசாயனவியல் பௌதீகவியல் பகுப்பாய்வுக்கு உட்படுத்தப்பட்டது. இந்த பகுப்பாய்வின் மூலம் கிடைக்கப்பெற்ற தகவலானது சேர்கை வீதம் அதிகரித்து கொண்டு செல்லும் போது புரத சத்தானது அதிகரிக்கின்றது. இருந்தபோதிலும் கரிம வள செரிமானம் மற்றும் கிடைக்ககூடிய சக்தியின் அளவானது குறைந்து செல்கின்றது. சேர்க்கைகளின் அளவை அதிகரிக்க செரிமான அளவு குறைவதற்கான காரணமாக நார்ச்சத்து விளங்குகின்றது.

பகுப்பாய்வு நடத்தப்பட்டதற்கான நோக்கமானது அதிகளவு உள்ளடக்கம் கொண்டதாக உள்ளதும் போசனை கூடிய துகள்களை கண்டுபிடிப்பதாகும். பகுப்பாய்வின் முடிவாக 77 வீதம் கிளிரிசிடியா பவுடர் உள்ளடக்கப்பட்ட துகளானது மிகவும் போசனை நிறைந்ததாக கருதப்படுகின்றது.

This is a non-technical summary of the project report titled "Biological Value of Gliricidia Leaf Meal Pellets for Supplementing Ruminant Rations" supervised by Dr. M.B.P. Kumara*, Department of Animal Science and Fisheries, Faculty of Agriculture, University of Peradeniya. *pmahi@pdn.ac.lk

இலங்கையில் தேர்ந்தெடுக்கப்பட்ட முக்கிய பகுதிகளில் காணப்படும் கொக்கோ விதைகளின் பொலிபினோல்கள் (polyphenols), ஆன்டிஒக்சிடன்கள் (antioxidants) மற்றும் பார உலோகங்களின் (heavy metals) உள்ளடக்கம்

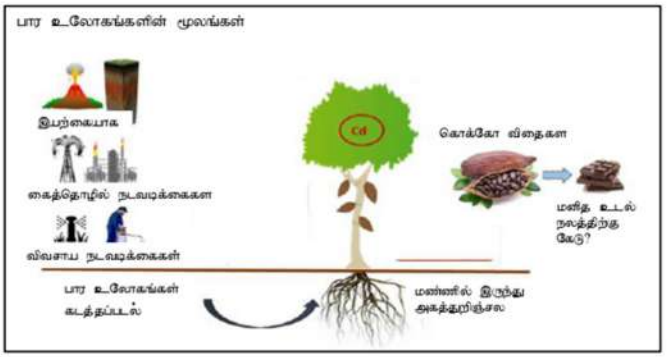
சாஜிதா நிஸாம்

அறிமுகம்

நீங்கள் அறிவீர்களா? நாம் விரும்பி உண்ணும் சாக்லேட்டின் மூலப்பொருள் இந்த கொக்கோ விதைகள் தான். சாக்லேட் மட்டுமல்ல இன்னும் பலவகையான இனிப்புப்பண்டங்கள் கொக்கோ விதைகளைப் பயன்படுத்தி உற்பத்தி செய்யப்படுகின்றன. இந்த கொக்கோ பயன்பாட்டினால் எமது உடலுக்கு பலதரப்பட்ட நன்மைகள் கிடைக்கின்றன. அவற்றில் இதயம் மற்றும் குருதிச்சுற்றோட்டத் தொகுதியின் ஆரோக்கியத்தை மேம்படுத்தல், அதிகளவான ஆன்டிஒக்சிடன்களை உடலுக்கு வழங்குதல், பிரதானமானவைகளாகும். இவ் அனைத்து வகையான நன்மைகளுக்கும் கொக்கோ விதைகளில் காணப்படும் அதிகளவான பொலிபீனோல்களே காரணமாகும். பிரதானமான பொலிபீனோல்களாக கெடசின் (catechin), எபிகெடசின் (epicatechin), புரோசயனிடின் (procyanidin) ஆகியவற்றை கொக்கோ விதைகளில் காணலாம். இவ்வளவு ஆரோக்கியம் நிறைந்த கொக்கோ விதைகளில் ஓர் அவதானமும் இருக்கிறது. அதுதான் பார உலோகங்களினால் மாசுபடுதல்.

எவ்வாறு கொக்கோ விதைகள் பார உலோகங்களால் மாசாக்கப்படுகின்றன?

பார உலோகங்கள் இயற்கையாக மண்ணில் குறைந்த அளவில் காணப்படுகின்றன. இருந்தாலும் இரசாயன உரப்பயன்பாடு, கனிய எண்ணெய்ப் பயன்பாடு போன்ற சில மனித செயற்பாடுகளால் அவற்றின் அளவு மண்ணில் அதிகரிக்கப்பட்டுள்ளது. இதனால் கொக்கோ போன்ற தாவரங்கள் இவற்றை மண்ணில் இருந்து அகத்துறிஞ்சி பழங்கள், விதைகளில் சேமிக்கின்றன. இவ்வாறு சேமிக்கப்படுகின்ற பார உலோகங்கள் கடைசியாக நாம் உண்ணும் உணவுகளை வந்தடைகின்றன. இதனால் ஈரல் பாதிப்பு, சிறுநீரக கற்கள், புற்றுநோய், நரம்பு சம்பந்தமான நோய்கள் போன்ற உடல் கேடுகள் ஏற்படுகின்றன.



இலங்கை தரமான கொக்கோ விதைகளை உற்பத்தி செய்யும் நாடுகளில் ஒன்றாகும். இலங்கையில் பிரதானமாக மாத்தளை, மொனராகலை, கண்டி, பதுளை, கேகாலை, குருணாகலை மாவட்டங்களில் கொக்கோ மரங்கள் அதிகளவில் காணப்படுகின்றன.

ஆய்வின் நோக்கம்

இலங்கை கொக்கோவின் நன்மைகளை இனங்காணும் முகமாக மேலே குறிப்பிட்ட மாவட்டங்களில் சேகரிக்கப்பட்ட கொக்கோ விதைகளில் பொலிபீனோல் அளவு மற்றும் ஆன்டிஒக்சிடன்ட் செயற்பாட்டையும் இலங்கை கொக்கோவா உட்கொள்ள பாதுகாப்பானதா என்பதை இனங்காண பிரதான பார உலோகங்களான கட்மியம் (Cd) மற்றும் ஈயத்தின் (Pb) அளவுகளையும் அறிதலாகும். இதற்காக மேலே குறிப்பிட்ட ஆறு மாவட்டங்களிலிருந்தும் கொக்கோ விதைகள் சேகரிக்கப்பட்டு இரசாயன சோதனைகள் செய்யப்பட்டன.

ஆய்வின் முடிவுகள்

மாவட்டங்களின் பொலிபீனோல்களின் அளவு 82.24±5.65 mg GAE/g இருந்து 117.47±4.35 mg GAE/g வரை வேறுபட்டது. இவ் அளவானது சாதரணமாக வெளிநாடுகளில் உற்பத்தி செய்யப்படும் கொக்கோகளிலுள்ள வீச்சுக்குள் காணப்படுகின்றது. அத்துடன் கட்மியத்தின் (Cd) அளவு மொனராகலை மாவட்ட (0.7 ppm) கொக்கோ விதைகளில் மட்டும் அங்கீகரிக்கப்பட்ட பாதுகாப்பான அளவிலும் (0.5 ppm) சற்று அதிகமாக காணப்பட்டது. ஆனால் ஈயத்தின் (Pb) அளவு எல்லா மாவட்டங்களிலும் அங்கீகரிக்கப்பட்ட பாதுகாப்பான அளவிலும் (1 ppm) குறைவாகவே காணப்பட்டது.

எனவே, இலங்கை கொக்கோவின் தரத்தை அதிகரிக்க அதில் காணப்படும் பொலிபீனால்கள் போன்ற பயனுள்ள சேர்வைகளின் அளவுகள் பற்றி அறிதல் அவசியமாகும். மேலும் கட்மியம் (Cd), ஈயம் (Pb) போன்ற பார உலோகங்களின் மாசாக்கத்தை குறைப்பதற்கு சிறந்த விவசாய பழக்கங்களை பின்பற்றல் (Good Agricultural Practices) , உணவுப் பாதுகாப்பு சட்டதிட்டங்களை முறையாக பின்பற்றல், விவசாயிகளையும் பொதுமக்களை அறிவூட்டுதல் போன்றவற்றை மேற்கொள்ளலாம்.

This is a non-technical summary of the project report titled "Unravelling Polyphenols, Antioxidants, and Heavy Metal Content of Cocoa Beans from Selected Major Cocoa Growing Regions in Sri Lanka" supervised by Prof. W.M.T. Madhujith*, Department of Food Science and Technology, Faculty of Agriculture, University of Peradeniya. *tmadhujith@agri.pdn.ac.lk

சூரிய ஒளியில் உலர்த்துவதற்காக நெல் சேகரிக்கும் மற்றும் பொதியிடும் இயந்திரத்தை வடிவமைத்தல், தயாரித்தல் மற்றும் செயல்திறன் மதிப்பீடு செய்தல்

செல்வரத்தினம் ஜயவாகினி

நெல் சேகரிக்கும் மற்றும் பொதியிடும் இயந்திரம்

இயந்திரமயமாக்கல் மற்றும் தொழினுட்ப முன்னேற்றம் மூலம் விவசாயத்துறையில் பல்வேறு மாற்றங்கள் ஏற்பட்டுள்ளதுடன் மனித வலுப் பாவனை குறைக்கப்பட்டு வினைத்திறனான விளைவுகள் பெறப்படுகின்றன. அந்த வகையிலே நெற்பயிர்ச்செய்கையிலும் இயந்திரப் பாவனைகள் நிலப் பண்படுத்துதல் தொடக்கம் அறுவடை வரையிலான அனைத்து படிமுறைகளிலும் ஆதிக்கம் செலுத்தி வருவதை காண முடிகின்றது. அத்தோடு அறுவடைக்கு பிந்தியதான உலர்த்துதல் மற்றும் சேமித்தலில் இயந்திரமயமாக்கல் மூலம் மனித வலுவைக் குறைத்து வினைத்திறனுடன் செயல்படுவது இன்றியமையாததாகும்.

நெல் அல்லது தானியங்களை உலர்த்துதல் என்பது, தானியங்களில் சேமிக்கப்பட்டுள்ள ஈரப்பதனை (Moisture content) குறைப்பதன் மூலம் அவற்றை சேமிப்பதற்கான பாதுகாப்பான நிலைக்கு கொண்டு வரும் முக்கியமான செயல்முறையாகும். பொதுவாக நெற்தானியங்கள் சூரிய ஒளியைப் பயன்படுத்தி அல்லது உலர்த்திகளைப் பயன்படுத்தி உலர்த்தப்படுகின்றது. சூரிய உலர்த்துதல் வினைத்திறன் கூடியதாகவும் இலாபகரமானதாகவும் உள்ளமையினால் அதிகளவு விவசாயிகளினால் விரும்பப்படுகின்றது.

பாரம்பரிய சூரிய உலர்த்துதலானது பல படி முறைகளைக் கொண்டுள்ளது. நெல் மூடைகளை உலர்த்தும் பிரதேசத்திற்கு கொண்டு வருதல், உலர்த்தும் தளங்களில் பரவி இடையிடையே அவற்றின் படைகளிற்கிடையே நெல்லை திருப்புதல், மற்றும் உலர்ந்த பின் மரப்பலகையைப் பயன்படுத்தி நெல்லைக் குவித்து பின் உலோகக் கோப்பைகளைப் பயன்படுத்தி சேகரித்து பைகளினுள் இடப்படுகின்றது. நெல்லைக் குவித்து பைகளினுள் இடும் செயற்பாடு நேரம் மற்றும் மனித சக்தி அதிகளவு தேவைப்படுகின்ற மிகவும் கடினமான செயற்பாடுகள் ஆகும். எனவே இவற்றை எளிதாக்கி மனித வலுவைக் குறைப்பதற்காக புதிய தொழினுட்பங்களை அறிமுகப்படுத்துவது அவசியமானதாகும்.

இதற்காக நெல் சேகரிக்கும் மற்றும் பொதியிடும் இயந்திரம் வடிவமைக்கப்பட்டு உருவாக்கப்பட்டது. நெல் சேகரிக்கும் மற்றும் பொதியிடும் இயந்திரம் பின்வரும் கூறுகளைக் கொண்டுள்ளது. Auger சேகரிப்பான் (Auger collector), Conveyor belt, என்ஜின், கைப்பிடி மற்றும் Frame ஆகியனவாகும்.

Auger சேகரிப்பான் நெல் படைகளிற்கிடையே தள்ளப்படும் போது Shaft (தண்டு) இல் இரண்டு பக்கங்களிலும் எதிரெதிர் திசையில் தொழிற்பட்டு கொண்டு இருக்கும் Screws தானியங்களை சேகரித்து மையத்தை நோக்கி அனுப்புகின்றது.

மையத்தை நோக்கி அனுப்பப்படும் தானியங்கள் மையத்திலிருந்து 45^0 சாய்வாக மேல் நோக்கி கொண்டு செல்லப்படும் conveyor belt க்கு அனுப்பப்படுகின்றது. Conveyor belt மூலம் கொண்டு செல்லப்பட்ட நெல் பின்னால் பொருத்தப்பட்ட பைகளிற்குள் அனுப்பப்படுகின்றது. Auger மற்றும் Conveyor belt க்கு தேவையான சக்தி என்ஜின் மூலம் வழங்கப்படுகின்றது. இவ் சக்தியானது கப்பி மற்றும் வார் (Belt & Pulley) மூலம் auger சேகரிப்பானுக்கும் conveyor belt க்கும் கடத்தப்படுகின்றது.

Auger சேகரிப்பானால் சேகரிக்கப்பட்டு மையத்திற்கு கொண்டுவரப்பட்ட நெல் முழுவதும் conveyor belt மூலம் பைகளுக்கு தொடர்ச்சியாக கொண்டு செல்லப்பட வேண்டும். எனவே இவற்றிற்கு இடையில் சீரான ஓட்டம் காணப்பட வேண்டும். எனவே இவற்றின் வேகம் மற்றும் rpm வெவ்வேறு விட்டமுடைய சில்லுகளை (pulleys) பயன்படுத்தி மாற்றப்பட்டது.

நெல் சேகரிப்பு மற்றும் பொதியிடும் இயந்திரத்தின் செயல்திறன் மதிப்பீடு செய்யப்பட்டு பாரம்பரிய நெல் சேகரிப்புடன் ஒப்பீடு செய்யப்பட்டது. அதன் போது நெல் சேகரிப்பு வீதம் நெல் சேகரிப்பு மற்றும் பொதியிடும் இயந்திரத்தை பயன்படுத்தும் போது 2.4 மடங்கு அதிகமாக காணப்பட்டது. நெல் சேகரிப்பு மற்றும் பொதியிடும் இயந்திரம் 650 rpm என்ற அதிகபட்ச வேகத்தில் சுழலும் போது அதன் சேகரிப்பு திறன் 77% ஆகவும் சேகரிப்பு வீதம் 4.3 t/h ஆகவும் காணப்பட்டது.

This is a non-technical summary of the project report titled "Design, Fabrication & Testing of a Paddy Collecting and Bagging Machine for Sun Drying on Cement Floors" supervised by Prof. D.A.N. Dharmasena*, Department of Agricultural Engineering, Faculty of Agriculture, University of Peradeniya. *dand@agri.pdn.ac.lk

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மிசேல் ஷலோமி கிறிஸ்தோப்பர்

அறிமுகம்

நீரிழிவு நோயானது தற்காலத்தில் குறைந்த மற்றும் நடுத்தர வருமானம் கொண்ட நாடுகளை வெகுவாக பாதித்துள்ளது. சர்வதேச நீரிழிவு கூட்டமைப்பு அட்லஸ் (2021) அறிக்கையின் படி, வயது வந்தவர்களில் (20-79 வயது) 10.5% ஆனோர் இந்நோயால் பாதிக்கப்பட்டுள்ளனர். 2045 ஆண்டளவில் எட்டில் ஒருவருக்கு (783 மில்லியன்) இந்நோய் இருக்குமென்று எதிர்ப்பார்க்கப்படுகிறது. விரைவாக இரத்த குளுக்கோஸ் மட்டத்தை அதிகரிக்கும் உணவுகளை தவிக்குமாறு இந்நோயாளர்கள் ஆலோசனை செய்யப்படுகிறார்கள். ஆகவே இரத்த குளுக்கோஸ் அளவில் தாக்கம் செலுத்தும் உணவுகள் பற்றி கவனம் செலுத்துதல் முக்கியமாகும். அரிசியானது இலங்கையர்களால் பிரதானமாக நுகரப்படும் உணவுகளில் ஒன்றாகும். பாஸ்மதி அரிசி உட்பட வெவ்வேறு அரிசி வகைகளை நாம் அன்றாடம் உட்கொள்கிறோம். பாஸ்மதி அரிசியானது உலகளாவிய ரீதியில் அதிகளவிலான கேள்வியை ஏற்படுத்தியுள்ளது. இலங்கையை பொருத்தவரையில் பெரும்பாலான உயர்நிலை நுகர்வோரால் இவ்வரிசி நுகரப்படுகிறது. இந்தியாவும் பாகிஸ்தானும் பாஸ்மதி அரிசியை உற்பத்தி செய்யும் பிரதானமான நாடுகளாகும். இந்நாடுகளிலிருந்து பாஸ்மதி அரிசியானது இலங்கைக்கு இறக்குமதி செய்யப்படுகிறது. பாஸ்மதி பயிர்ச்செய்கைக்கு பொருத்தமான காலநிலை இலங்கையில் இல்லாததன் காரணத்தால் இதனை இங்கு பயிரிட முடியாதுள்ளது. எனினும் இலங்கையில் பாஸ்மதி வகையான (basmati-type) அரிசி பயிரிடப்பட்டு சந்தையில் விற்கப்படுகிறது.

கிளைசமிக் சுட்டெண் என்றால் என்ன?

இரத்த குளுக்கோஸ் அளவை அளவிடுவதற்காக கிளைசமிக் சுட்டெண் (Glycemic Index) ஆனது பயன்படுத்தப்படுகிறது. இச்சுட்டெண்ணானது மாப்பொருள் கொண்ட உணவுகள் உட்கொண்ட பின் இரத்த குளுக்கோஸ் அளவில் எவ்வாறான தாக்கத்தை ஏற்படுத்துகின்றன என்பதை அளவிட பயன்படுகிறது.

இதனடிப்படையில் இரத்த குளுக்கோஸ் அளவில் குறைந்தளவு தாக்கத்தை ஏற்படுத்தும் உணவுகளானது குறைந்த கிளைசமிக் சுட்டெண் கொண்ட உணவுகளாகவும் நடுத்தர தாக்கத்தை ஏற்படுத்தும் உணவுகளானது நடுத்தர கிளைசமிக் சுட்டெண் கொண்ட உணவுகளாகவும் அதிகளவு தாக்கத்தை ஏற்படுத்தும் உணவுகளானது உயர்ந்த கிளைசமிக் சுட்டெண் கொண்ட உணவுகளாகவும் வகைப்படுத்தப்படுகின்றன.

இவ்வாராய்ச்சியில் மூன்று வகையான பாஸ்மதி அரிசி வகைகள் (CIC Super Kernel, CIC Red Fragrant, மற்றும் CIC Ceylon Purple Rice) ஆராயப்பட்டன. இம்மூன்று அரிசிகளினதும் ஊட்டச்சத்து விவரங்கள், கிளைசமிக் சுட்டெண் மற்றும் சில முக்கியமான ஆரோக்கியம் சார்ந்த பண்புகள் ஏற்றுக்கொள்ளப்பட்ட முறைகளைப் பயன்படுத்தி (Standard methods) ஆராயப்பட்டன. இதன்படி, வெவ்றே நாட்களில் இம்மூன்று பாஸ்மதி அரிசி வகைகளும் ஆரோக்கியமான நபர்களுக்கு உட்கொள்ள வழங்கப்பட்ட பின் அவர்களின் இரத்த குளுக்கோஸ் அளவு 15 நிமிடங்களுக்கு ஒரு தடவை படி 2 மணித்தியாலங்களுக்கு சோதிக்கப்பட்டது.

ஆராய்ச்சி முடிவுகள்

இம்மூன்று அரிசி வகைகளும் குறைந்த கிளைசமிக் சுட்டெண் பிரிவில் வகைப்படுத்தப்பட்டுள்ளன. இதன்மூலம் இம்மூன்று அரிசி வகைகளும் முக்கியமாக நீரிழிவு நோயாளிகளுக்கு பரிந்துரை செய்ய முடியும். குறைந்த கிளைசமிக் சுட்டெண் உணவுகள் குருதி கொழுப்பைக் குறைப்பதுடன் இதய நோய் ஏற்படுவதையும் குறைக்கிறது. மேலும் அதிக உடற்பருமனை கட்டுப்படுத்துவதிலும் பங்களிக்கிறது. பரிசோதிக்கப்பட்ட பாஸ்மதி அரிசி வகைகளானது மாப்பொருள், புரதம், கொழுப்பு, நார்ச்சத்து, மற்றும் கனிப்பொருட்கள் [பொஸ்பரஸ், பொட்டாசியம், இரும்பு, சோடியம், கல்சியம், மக்னீசியம், சிங் (zinc)] என்பவற்றை உள்ளடக்கியது. சிவப்பு பாஸ்மதி அரிசியில் ஒப்பீட்டளவில் அதிகளவு ஆன்டிஒக்சிடன்கள் (antioxidants) காணப்படுகின்றன. இவை இதயநோய், நரம்பியல் நோய், இரத்தக்கொதிப்பு போன்ற நோய்களிலிருந்து பாதுகாக்கிறது.

This is a non-technical summary of the project report titled "Exploring the Relationship among Nutritional Composition, Glycemic Index, and Functional Properties of Newly Introduced Basmati-Type Rice Varieties in Sri Lanka" supervised by Prof. B.D. Rohitha Prasantha*, Department of Food Science and Technology, Faculty of Agriculture, University of Peradeniya. *bdrp@pdn.ac.lk

நிலத்தடி நீரை உயிரி கார்பனும் செங்கல்லும் உபயோகித்து சுத்திகரிக்க முடியுமா?

முரளிதாஸ் புவித்ரா

அனைத்து உயிரினங்களுக்கும் நீர் இன்றியமையாதது. இலங்கையில் தொழிற்சாலை, விவசாய கழிவுகள் மற்றும் பிற மனித செயற்பாடுகள் காரணமாக நீர் மாசுபாடு அதிகரித்து வருகின்றது. இதனால் நிலத்தின் மேல் உள்ள நீர்நிலைகள் மட்டுமின்றி நிலத்தடி நீரும் பாதிப்படைகின்றது. இதற்கு தனிநபர் அழகு சாதன மற்றும் பராமரிப்பு பொருட்களும் பெரும் பங்கு வகிக்கின்றன. சிகை அலங்கார கடைகளில் இருந்து வெளியேறும் கழிவுநீரானது சுத்திகரிப்பு செயற்பாடுகள் எதுவுமின்றி வெளியேற்றப்படுகின்றன. அழகு சாதன பொருட்களில் இருந்து பல்வேறு அசேதன பொருட்கள் நீரை அசுத்தப்படுத்துகின்றன. அவற்றுள் பார உலோகங்களும் அடங்கும். சிறு துளி பெருவெள்ளம் போன்று ஒவ்வொரு சிகை அலங்கார கடைகளிலிருந்தும் வெளியேறற்றப்படும் சிறிதளவு கழிவுநீரும் நீர்நிலைகளில் சேர்ந்து பெரும் பாதிப்பை ஏற்படுத்துகின்றது.

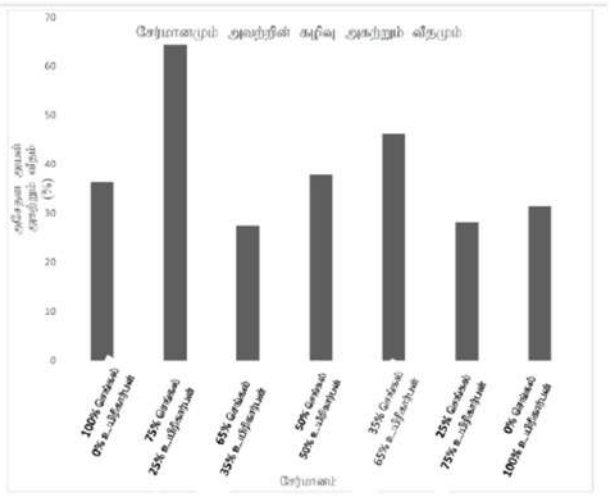
இவ்வாறு நீரில் செறிவாகும் கழிவுகளை குறைப்பதற்காக உயிரி கார்பன் மற்றும் செங்கலை வெவ்வேறு விகிதங்களில் பயன்படுத்தி Permeable Reactive Barrier (PRB) இற்கு பயன்படும் சிறந்த விகிதத்தை இனம்காண்பதோடு செங்கல் மற்றும் உயிரி காபன் ஆகியவற்றின் இயல்புகளை ஆராய்வதை இவ் ஆய்வு முன்மொழிகின்றது. PRB என்பது நிலத்தடி நீரை சுத்திகரிப்பதற்காக வடிவமைக்கப்படும் கள சுத்திகரிப்பு முறையாகும். இது நிலத்தடி நீரின் போக்குக்கு குறுக்காக வடிவமைக்கப்படும் பாரிய வடிவமைப்பு ஆகும். உலகளவில் தற்போது இது தொடர்பான ஆய்வுகள் முன்னிலை வகிக்கின்றன. இவ் ஆய்வுக்காக முடிச்சாயம் முதல்கட்டமாக தெரிவு செய்யப்பட்டது. முதலில் பேராதனை நகரத்தில் உள்ள சிகை அலங்கார கடைகளில் கணக்கெடுப்பு ஒன்று நடாத்தப்பட்டு கடைகளில் அதிகளவு பாவிக்கும் தலைமுடிச்சாய வகைகள், தலைமுடியை சாயம் செய்ய வருகைதரும் வாடிக்கையாளர்களின் எண்ணிக்கை, ஒரு தடவை சாயமிடும் போது அதனை கழுவி அகற்ற அன்னளவாக தேவைப்படும் நீரின் அளவு போன்ற தகவல்கள் சேகரிக்கப்பட்டன.

இவ் ஆய்வின் நோக்கமானது பேராதனையில் அதிகளவு பயன்படுத்தப்படும் நிறச்சாய வகையை கண்டறிவதுடன் உயிரிகார்பன் மற்றும் செங்கல் ஆகியவற்றின் சேர்மானங்களில் கழிவு அகற்றுவதில் எந்த சேர்மானம் சிறந்தது என்பதையும் கண்டறிதலாகும்.

சிறந்த நீரின் ஊடுபுகவிடுதிறன் மற்றும் சிறந்த கழிவகற்றுதிறன் என்பன PRB யின் வினைத்திறனை அதிகரிக்கின்றன. ஆகவே கார்பன் செங்கல் சேர்மானங்களில் அதிக நீர்கடத்துத்திறனையும் கழிவகற்றுதிறனையும் உடைய சேர்மானம் PRB ஐ உருவாக்க சிறந்த சேர்மானமாக கருதலாம்.

இவ்விரு காரணிகளையும் அளவிட உயிரி கார்பன் மற்றும் செங்கல் என்பன உடைக்கப்பட்டு அவற்றின் வெவ்வேறு விகிதங்களில் சேர்க்கப்பட்ட ஏழு சேர்மானங்கள் உருவாக்கப்பட்டன. நிறச்சாயம் ஒன்று தேர்வுசெய்யப்பட்டு குழாய் நீருடன் கலக்கப்பட்டு செயற்கையாக கழிவு நீர் உருவாக்கப்பட்டது. அவ் நிறச்சாயத்தில் உள்ள அசேதன அயன்களின் செறிவு அளவிடப்பட்டு பின்னர் அது சேர்மானங்களினூடாக செலுத்தப்பட்டு வெளிவந்த கரைசலில் உள்ள அசேதன அயன்களின் செறிவு அளவிடப்பட்டது. இதன் மூலமாக சேர்மானங்களினால் அகத்துறிஞ்சப்பட்ட அயன் செறிவு கணிக்கப்பட்டது. சேர்மானங்களில் இருந்து ஓரலகு நேரத்தில் வெளியேற்றப்படும் நீரின் கனவளவு அளவிடப்பட்டு அவற்றின் நீர் ஊடுபுகவிடுதிறன் கணிக்கப்பட்டது.

இவ் ஆய்வின் முடிவில் பேராதனையில் உள்ள சிகையாலங்கார கடைகளில் அதிகளவு பயன்படுத்தப்படும் நிறச்சாய நிறுவனமாக Bellose அவதானிக்கப்பட்டது. உயிரிகார்பன் மற்றும் செங்கல் என்பன தனித்து இருக்கையில் (100%) அவற்றின் நீர் ஊடுபுகவிடுதிறன் அதிகமாக உள்ளது. செங்கல் முக்கால் பங்கும் உயிரி கார்பன் கால் பங்கும் உள்ள சேர்மானம் ஒப்பீட்டளவில் அதிக அசேதன அயன் அகற்றும் திறனுடையது.



This is a non-technical summary of the project report titled "Assessment of Selected Material Composites for Permeable Reactive Barrier (PRB) System to Treat Wastewater Contaminated with Personal Care Products – Hair Dye" supervised by Dr. S.S.K. Chandrasekara*, Department of Agricultural Engineering, Faculty of Agriculture, University of Peradeniya. *sewwandhich@agri.pdn.ac.lk

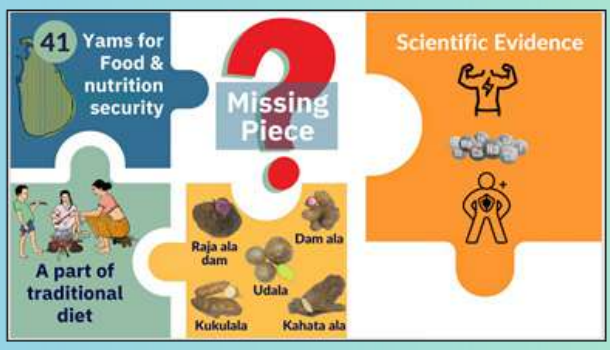
Insight of competitions - FAuRS 2023

Three Minutes Thesis (3MT) Competition

3MT is a research communication competition that aims to develop academic, presentation and research communication skills by effectively explaining the undergraduate research with a report of large number of pages in 3 minutes to a non-specialist audience. Students have to present a compelling oration on their research to the general public and only a single PowerPoint Slide can be used. The founder university of 3MT competition is University of Queensland, Australia and we were the first institute from Sri Lanka to receive permission from University of Queensland to conduct this competition in Sri Lanka.

Winner

S.U. Attygalle

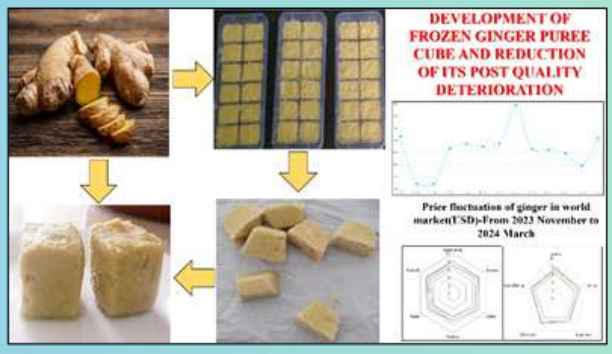


1st Runners-up

J.A.D.K.H. Jayasinghe

2nd Runners-up

R.N. Fransis



Coordinated by:
Prof. A.J. Mohotti
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Mobile:0714300939

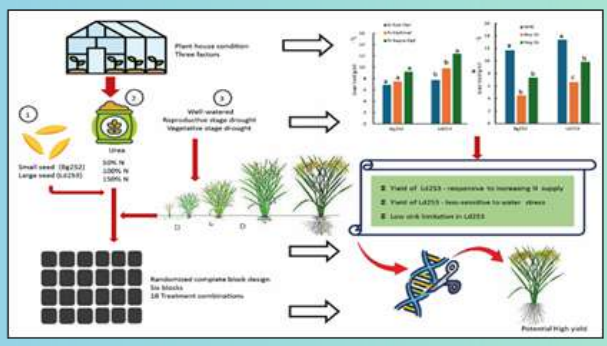
Insight of competitions - FAuRS 2023

Graphical Abstract Competition

In this competition, students can present the important findings of the entire project or just a fraction of it as a pictorial and visual summary. A graphical abstract helps capturing the content of the article or the project report for readers at a single glance. Therefore, readers can understand the main message of the article/report without having to read through the entire text.

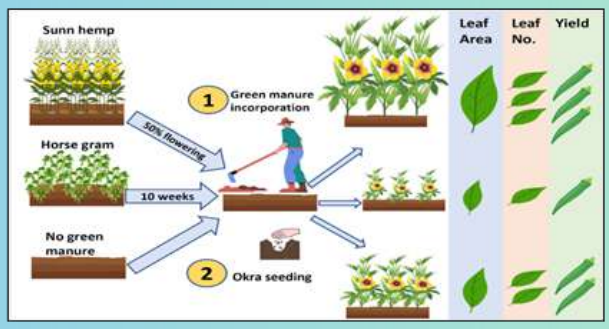
Winner

M.H.N.C. Weerasinghe



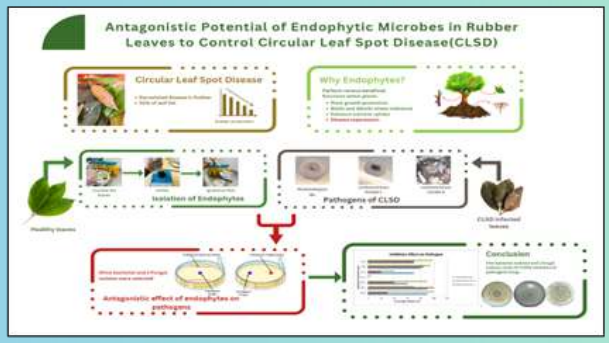
1st Runners-up

W.P.T.P. Jayalath



2nd Runners-up

L.H.N. Sawbhagya



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Insight of competitions - FAuRS 2023

Invention and Innovation Competition

Invention & Innovation competition provides an opportunity for final year students to present their research output/s, promising inventions and innovations. Applicants will also have the opportunity to compete under National level competition "Sahasak Nipayum" organized by the Sri Lanka Inventors commission. This plays a vital role in the process of promoting innovative culture within the undergraduate community of the Faculty of Agriculture, University of Peradeniya.

Winner

K.P. Chathumal

1st Runners-up

B.A.V.M. Kumarasinghe

2nd Runners-up

R.U. Athukorala

Coordinated by:
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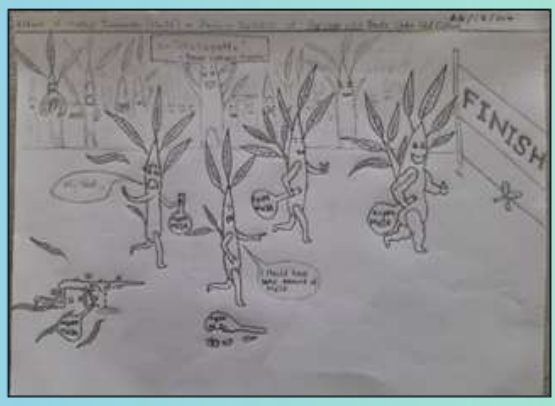
Insight of competitions - FAuRS 2023

ResearTOON Competition

The "ResearTOON" competition allows final year research students to visualize their research findings in cartoon drawings to deliver the message to the general public effectively. Cartoons are used to stimulate inquiries, to initiate discussions, and to enhance the scientific thinking. The sense of humor is the most attractive feature of the cartoons. The "ResearTOON" also disseminates the message to the public fast.

Winner

H.B.T.U.M. Bandara

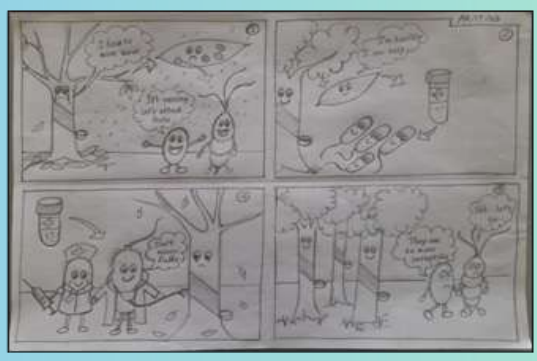


1st Runners-up

M.G. Pathirana

2nd Runners-up

M.H.N.C. Weerasinghe



Coordinated by:
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Insight of competitions - FAuRS 2023

Research Briefs Competition

A research brief is a one-page article that carries the findings of the final year research project, written to the non-scientific community. This allows cascading undergraduate research findings to all the stakeholders including the policy makers, other students, and farming community. Finally, the best of the research briefs are published as trilingual popular articles in the Hanthana Blossoms magazine.

Sinhala Medium

Winner
J.A.N. Shalika

1st Runner-up
Ravindu Udana Athukorala

2nd Runner-up
M.D.D.S.D. Kulasooriya

Insight of competitions - FAuRS 2023

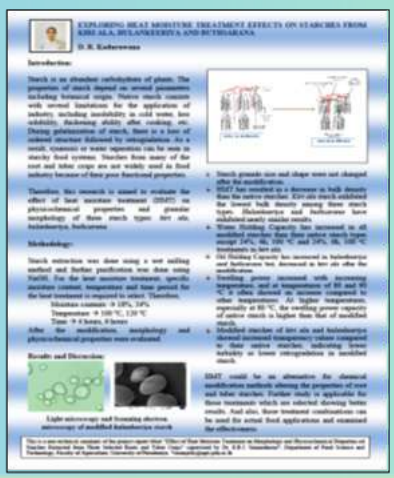
Research Briefs Competition

English Medium:

Winner
Mr. R. N. Fransis

1st Runner-up
Ms. M.A.B.T.N Bandara

2nd Runner-up
Ms. D.R. Kaduruwana



Insight of competitions - FAuRS 2023

Research Briefs Competition

Tamil Medium:

Winner
Ms. Selvaratnam Jayavahini

1st Runner-up
Ms. Thiviya Kanagavelrajan

2nd Runner-up
Ms. M.N.F. Sajidha

Coordinated by:
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Insight of competitions - FAuRS 2023

Research Video Competition

This open competition assesses the ability of the final year undergraduate students to communicate their final year research findings in a short video to a non-specialist audience. Scientists extensively use this tool at present to disseminate research outcomes to the general public, industry stakeholders, policy makers and development practitioners.

Winner

P.K. Nagasinghe

1st Runner-up

G.V. Rajakaruna

2nd Runner-up

H.P.S.R. Premarathne

Coordinated by:
Dr. J.M.P.N.Anuradha
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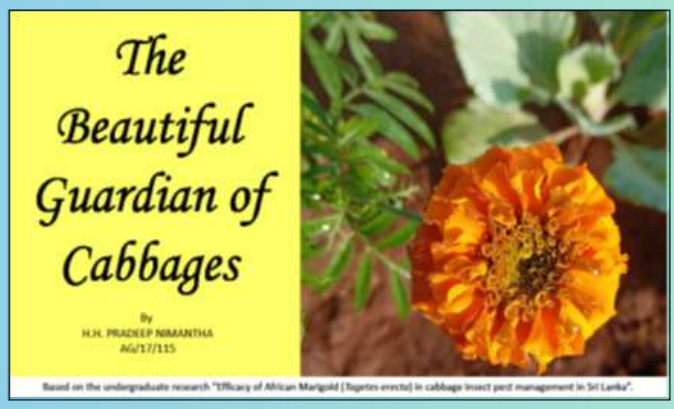
Insight of competitions - FAuRS 2023

Research Storybook Competition

Photography has turned out to be a frontline tool for all scientific research, not only in registering what the eye perceives, but also, in many cases, in registering what is impossible to see our naked eyes. Research storybook will allow the students to present their findings to the general audience in more abstract and illustrative manner using 10-15 photos of their entire research study.

Winner

H.H. P. Nimantha



1st Runners-up

M.N.H.T.B. Deniyawaththa

2nd Runners-up

H.A.S.V. Attanayake

Coordinated by:
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Insight of competitions - FAuRS 2023

Scientific-Eye Photography Competition

Scientists use photo imaging techniques to disseminate scientific information to the general public in a more abstract and illustrative manner. The challenge is to produce a photograph presenting the research outcomes to a wider audience in an abstract manner that visually illustrate the value of the research findings.

Winner

T.M.P.M. Thennakoon

1st Runners-up

W.M.M. Soyza

2nd Runners-up

M.S. Christopher

Coordinated by:
Dr. Ishanka Hemachandra
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Mobile: 0719886895

Insight of competitions - FAuRS 2023

Merit Awards for Undergraduate Research

The Merit Awards for Undergraduate Research acknowledge the scientific merit of research projects carried out by final year undergraduates in the faculty. The first selection is at the respective department level. Applications submitted by selected students are evaluated in the second round by external (outside the faculty) panel of subject matter specialists to select top three research projects under each theme of FAuRS.

Agricultural Production and Diversity

Winner

A.D. Udari Kalpani Rupasingha

Morphological and molecular identification of some economically important shrimp species in western coast of Sri Lanka.

1st Runners-up

H.H. Pradeep Nimantha

Efficacy of African Marigold (Tagetes erecta) in cabbage insect pest management in Sri Lanka.

2nd Runners-up

P.K. Nagasinghe

Effect of Nitrogen Fertilization on Potato (Solanum tuberosum L.) Tuber Quality: Composition, Physico-chemical Properties and Functional Properties.

Insight of competitions - FAuRS 2023

Merit Awards for Undergraduate Research

Technological Interventions and Applications

Winner
Ms. H.G. Lewkebandara

Development of an Efficiency Enhanced Urea Fertilizer Using Rice Husk Biochar and Urease Inhibitor for *Zea mays L.*

1st Runners-up
H.A.S.V. Attanayake

Development of an Artificial Intelligence-Based Image Processing System for Industrial Sorting of Big Onion.

2nd Runners-up
K.P. Chathumal

Design and Development of a Cloud-Based Automated System with Artificial Intelligence for a Spice Dehumidifier.

Insight of competitions - FAuRS 2023

Merit Awards for Undergraduate Research

Food Quality and Product Development

Winner
H.M.Y.T. Chandrasiri

Effect of Atmospheric Non-Thermal Plasma on Physical and Rheological Characteristics of TomEJC Mango (Mangifera indica) Fruit Powder.

1st Runners-up
S.U. Attygalle

Exploring Underutilized Yams in Sri Lanka: An Integrative Assessment of Nutritional, Bioactive, and Processing Attributes of Dioscorea Species and Prospective Food Applications.

2nd Runners-up
Visnuha Sithiravel

Gelatine extraction from sea chicken fish (Canthidermis maculata) by-products for waste reduction and added value in the seafood industry.

Insight of competitions - FAuRS 2023

Merit Awards for Undergraduate Research

Community, Environment and Resource Management

Winner
R.U. Athukorala

Feasibility Analysis of Used Cooking Oil as an Alternative Fuel Source & Designing of a Hybrid Stove.

1st Runners-up
A.G.S.N Karunarathne

Optimizing Nitrogen Fertilizer Allocation across Diverse Agro-climatic Zones for Enhanced Rice Production: An analysis using an integrated crop and economic model.

2nd Runners-up
R.M.V.H. Ranaweera

Influence of Visitors on the Behavior and Welfare of Zoo Housed Tigers and Leopards: A Case Study at the National Zoological Gardens in Sri Lanka.

Coordinated by:
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Department of Animal Science
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Insight of competitions - FAuRS 2023

Poster Presentations

The final year students of all three-degree programs offered by the Faculty of Agriculture present their findings under four themes as poster presentations. The best three poster presentations are selected from each session.

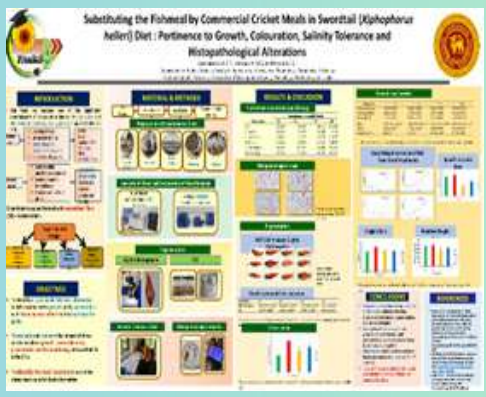
Agricultural Production and Diversity

Winner

S.A.D.N. Senanayake

Substituting the Fishmeal by Commercial Cricket Meals in Swordtail (Xiphophorus helleri) Diet : Pertinence to Growth, Colouration, Salinity Tolerance and Histopathological Alterations.

Senanayake S.A.D.N., Athauda A. R.S.B. and Perera G.S.C.



1st Runners-up

V. Devika

Enhancement of Product Synthesis of Gyrinops walla Shoot Culture by Elicitation with Salicylic Acid Under a Liquid Culture System.

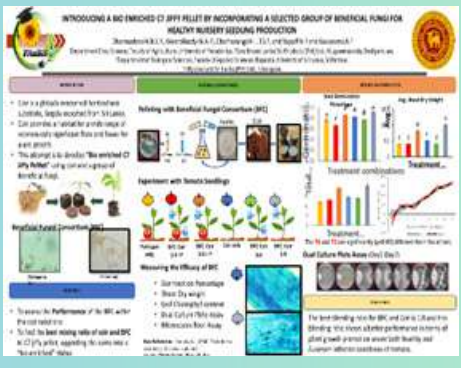
Devika. V., and J.P. Eeswara

2nd Runners-up

H.B.S.P Dharmadasa

Introducing a bio enriched c7 jiffy pellet by incorporating a selected group of beneficial fungi for healthy nursery seedling production.

Dharmadasa H.B.S.P., Weerakkody W.A.P., Chathuranga H.L.T.S. and Yapa P.N. and Gunasena A.



Insight of competitions - FAuRS 2023

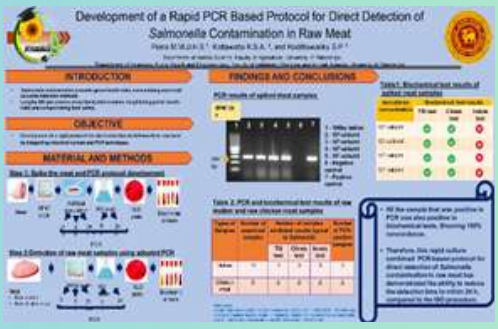
Poster Presentations

Technological Interventions and Applications

Winner
M.M.U.H.S. Peiris

Assessment of Treatment Performance of Plant Species: Implications for Design and Management Practices in Floating Treatment Wetland (FTW) in Beira Lake, Sri Lanka.

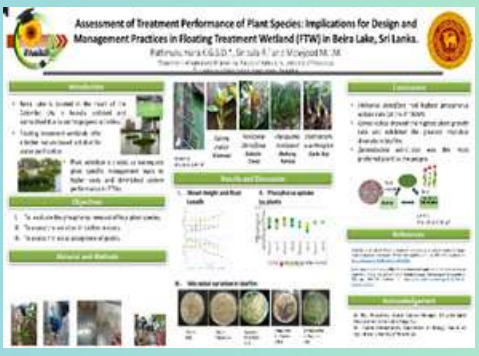
Pathmakumara K.G.S.D., Siripala R. and Mowjood M.I.M.



1st Runners-up
K.G.S.D. Pathmakumara

Assessment of Treatment Performance of Plant Species: Implications for Design and Management Practices in Floating Treatment Wetland (FTW) in Beira Lake, Sri Lanka.

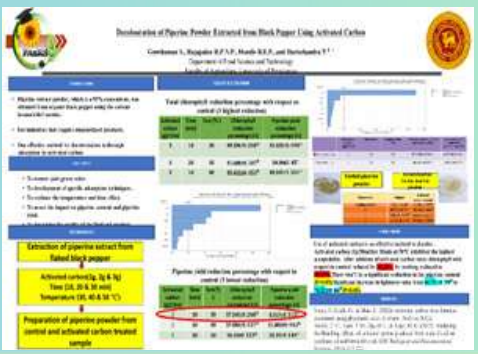
Pathmakumara K.G.S.D., Siripala R. and Mowjood M.I.M.



2nd Runners-up
Gowthaman S.

Decolouration of Piperine Powder Extracted from Black Pepper Using Activated Carbon.

Gowthaman S., Rajapakse R.P.N.P., Mendis B.E.P., and Harischandra T.



Insight of competitions - FAuRS 2023

Poster Presentations

Food Quality and Product Development

Winner
M.M.U.H.S. Peiris

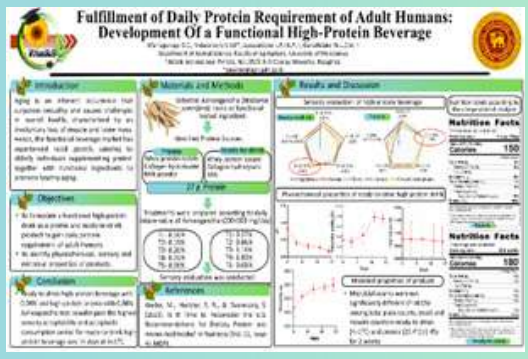
Effect of agar and cinnamon essential oil based edible coating on the quality and shelf life of tea bun.

Madusanka UBDP, Prasantha BDR, and Udayakumara EMS.

1st Runners-up
K.G.S.D. Pathmakumara

Fulfillment of Daily Protein Requirement of Adult Humans: Development Of a Functional High-Protein Beverage.

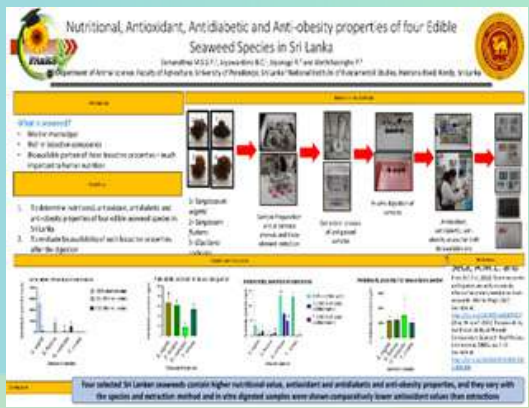
Warnapurage O.C., Vidanarachchi J.K, Jayawardene L.P.I.N.P. 1, Gunathilake W.L.C.M.



2nd Runners-up
Gowthaman S.

Nutritional, Antioxidant, Antidiabetic and Anti-obesity properties of four Edible Seaweed Species in Sri Lanka.

Somarathna M.S.S.P., Jayawardena B.C., Liyanage R. and Weththasinghe P.



Insight of competitions - FAuRS 2023

Poster Presentations

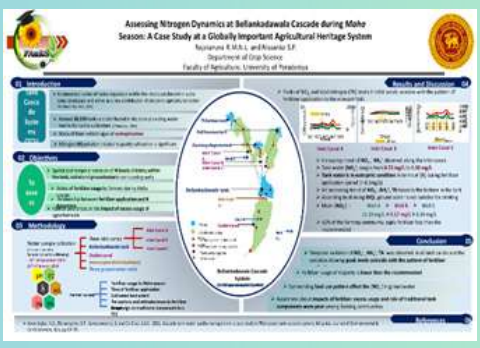
Community, Environment and Resource Management

Winner

R.M.N.L. Rajakaruna

Assessing Nitrogen Dynamics at Bellankadawala Cascade during Maha Season: A Case Study at a Globally Important Agricultural Heritage System.

Rajakaruna R.M.N.L. and Nissanka S.P.

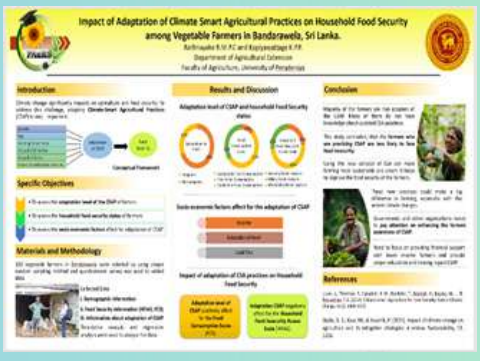


1st Runners-up

R.M.P.C. Rathnayake

Impact of Adaptation of Climate Smart Agricultural Practices on Household Food Security among Vegetable Farmers in Bandarawela, Sri Lanka.

Rathnayake R.M.P.C and Kopiyawattage K.P.P.

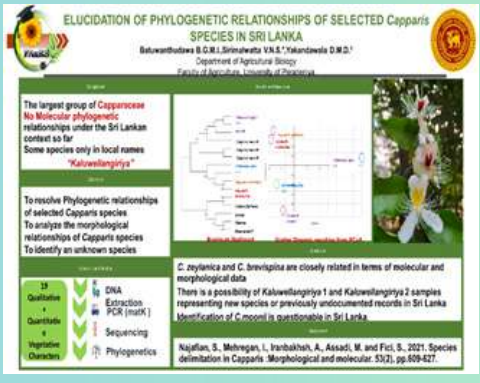


2nd Runners-up

B.G.M. Batuwanthudawa

Elucidation of phylogenetic relationships of selected capparis species in Sri Lanka.

Batuwanthudawa B.G.M.I., Sirimalwatta V.N.S., Yakandawala D.M.D.



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Insight of competitions - FAuRS 2023

Awards for Oral Presentations

The final year students of all three degree programs offered by the Faculty of Agriculture orally present their findings under four themes in parallel sessions at the main event of FAuRS. The best three oral presentations from each session as well as the overall best oral presenter are selected.

Agricultural Production and Product Improvement

Winner

Nimantha H.H.P

Efficacy of African Marigold (Tagetes erecta) in cabbage insect pest management in Sri Lanka.

Nimantha H.H.P., Samita, S., Jayasinghe W.H., Ranil R.H.G., Suriyagoda L.D.B., Rankoth L.M.

1st Runners-up

Perera M.T.N.

Comparison of culturable endophytes in healthy and dieback-affected Calophyllum walkeri in Horton Plains:

Perera M.T.N.M., Samarasinghe, D.P., Nigesh, V., De Costa W.A.J.M. and De Costa D.M.

2nd Runners-up

Kulathunga R.M.S.D.B

Development of chicken foregut for efficient feed utilization through incorporating insoluble fiber in broiler starter diets:

Kulathunga R.M.S.D.B. and Perera W.N.U.

Insight of competitions - FAuRS 2023

Awards for Oral Presentations

Technological Interventions and Applications in Agriculture

Winner
Athukorala R.U.

Feasibility Analysis of Used Cooking Oil as an Alternative Fuel Source & Designing of a Hybrid Stove

Athukorala R.U., Jayanath N.Y., Amarathunga K.S.P., Samarasekara M.A. and Karunarathna A.K.

1st Runners-up
Chandrasiri H.M.Y.T.

Effect of atmospheric non-thermal plasma on physical and rheological characteristics of TomEJC mango (Mangifera indica L.) fruit powder

Chandrasiri H.M.Y.T., Amunugoda P.N.R.J., Prasantha B.D.R., and De Silva G.

2nd Runners-up
Attanayake H.A.S.V.

Development of an Artificial Intelligence (AI) based Image Processing System for Industrial Sorting of Big Onion

Attanayake H.A.S.V. and Amaratunga K.S.P.

Insight of competitions - FAuRS 2023

Awards for Oral Presentations

Food Quality, Safety and Product Development

Winner
Attygalle S.U.

Exploring Underutilized Yams in Sri Lanka: An Integrative Assessment of Nutritional, Bioactive, and Processing Attributes of Dioscorea Species and Prospective Food Applications

Attygalle S.U., Mendis B.E.P., Rajapakse R.P.N.P., and Nissanka S.P.

1st Runners-up
Madushanka H.G.D.

Isolation, Identification, and Characterization of Probiotic Lactic Acid Bacteria from Traditionally Fermented Rice-based Culture to be used in Fermented Dairy Products and Livestock Production

Madushanka, H.G.D., Vidanarachchi J.K., Jayatilake J.A.M.S., Kodithuwakku S.P., Priyashantha H., and Nayanajith A.

2nd Runners-up
Christopher M.S.

Exploring the Relationship among Nutritional Composition, Glycemic Index, and Functional Properties of Newly Introduced Basmati-Type Rice Varieties in Sri Lanka

Christopher M.S., Somaratne G.M., Gunasekara D.C.S., Prasantha B.D.R., and Abeysiriwardena D.S.D.Z

Insight of competitions - FAuRS 2023

Awards for Oral Presentations

Community, Environment and Management

Winner
Karunarathne A.G.S.N.

Optimizing Nitrogen Fertilizer Allocation across Diverse Agro-climatic Zones for Enhanced Rice Production: An analysis using an integrated crop and economic model

Karunarathne A.G.S.N., Weerahewa H.L.J. and De Silva S.H.N.P.

1st Runners-up
Lokuge R.T.D.

Behavioral Strategies to Minimize Losses: Impact of Information Provision and Nudging on Tomato Loss Reduction at Retail Environment

Lokuge R.T.D., Weerahewa H.L.J., and Jayaweera A.

2nd Runners-up
Gunarathna P.V.L.

Identification of Wild Edible Mushrooms in Sinharaja Rain Forest and its Adjacent Environment

Gunarathna P.V.L., and Pushpakumara D.K.N.G.

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EVENT HIGHLIGHTS











































































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Proper Density, Higher Yield

APSIM model was calibrated for find optimum planting density and optimum sowing time for higher green manure yield. Sunn hemp (Crotalaria juncea L.) belongs family Fabaceae and widely use as green manure crop. This photo was captured from base of the plants to create sense of plant density. When plants grow under optimum density, it provides highest green manure yield without reducing the biomass due to competition between plants.

Winner: T.M.P.M Thennakoon (AG/17/154)

Exploring Rice Yield Potential through Morphological and Molecular Analysis

This striking photograph showcases a DNA double helix ingeniously assembled from individual grains of rice, offering a novel perspective on the genetic foundation of crop yield. The image serves as a powerful symbol of the intricate interplay between traditional agricultural practices and modern scientific exploration. Illustrating the intricate genetic blueprint underlying rice yield potential.

1st Runner-up: W.M.M. Zoyza (AG/ 17/ 150)

Basmati Trio: Low GI, High Flavour

All three varieties of basmati-type rice (CIC-Super-Kernel, CIC-Red-Fragrant, and CIC-Ceylon-Purple-Rice) not only offer distinct flavors but also provide the benefits of a low glycemic index, aiding in better blood sugar control, preserving high-density lipoprotein (HDL) cholesterol, and reducing the risk of coronary heart disease (CHD). Additionally, these three basmati-type rice varieties exhibit high levels of minerals, dietary fiber, and amylose content compared to other traditional rice varieties.

2nd Runner-up: M.S. Christopher (AG/17/FT/007)

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