RESEARCH SYMPOSIUM 02
2025

JOINTLY ORGANIZED BY

SRI LANKA COLLEGE OF STATE SCIENTISTS AND
MINISTRY OF PUBLIC ADMINISTRATION

Book of Abstracts

Gate for Integral Research towards Nation Building

25th - 26th September 2025

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SRI LANKA COLLEGE OF STATE SCIENTISTS

Research Symposium 02

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"Gate for Integral Research towards Nation Building"

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PREFACE

The pursuit of scientific excellence is a cornerstone of national progress. For government scientists, the ability to engage in academic research, develop innovative methods, and contribute to the scientific corpus is not merely a professional ambition but a national imperative. However, the framework of a trade union, while vital for its designated purposes, is inherently limited in its capacity to foster and support such specialized scientific activities. Recognizing this critical gap, the State Scientists of Sri Lanka embarked on a transformative journey.

This led to the establishment of the Sri Lanka College of State Scientists (SLCSS), a dedicated professional body conceived to unlock the vast potential within the state scientific sector. The SLCSS was founded on the principle that our specialists and officers possess the expertise to make profound contributions to the nation's vision of prosperity and must be provided with the appropriate platform to do so.

Following our inaugural workshop, the College organized its second major initiative: the second workshop **"The Complete Researcher: From Design to Manuscript."** This event, a strategic collaboration between the SLCSS and the Sri Lanka Scientific Services Division of the Ministry of Public Administration, Home Affairs, Provincial Councils and Locals designed to provide essential guidance on conducting workplace-based research and navigating the path to publication. Its resounding success has been instrumental in stimulating and strengthening the research interests of our young scientists, providing them with the practical tools for scholarly expression.

This abstract book is a testament to the continued success of this initiative. It represents the second significant harvest from the research culture we are cultivating within the state scientific consortium, demonstrating the sustained impact of our capacity-building efforts. The work presented herein is a powerful reflection of the dedication and ingenuity of our State Scientific Officers, who have achieved these advanced results through their routine scientific work, often without a separate.

It is our firm belief that this symposium lays a foundation for dynamic and sustained research. We present these abstracts as a promising beginning and a validation of our capacity for innovation. We urge the entire scientific community to build upon this mission, and we call for increased state investment to fuel the quality and volume of research our nation deserves.

The Organizing Committee,
Sri Lanka College of State Scientists (SLCSS)

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Message from the Minister - Ministry of Public Administration, Provincial Councils and Local Government

It gives me great pleasure to convey this message on the occasion of the Inaugural Research Symposium jointly organized by the Scientific Service Division of the Ministry of Public Administration and the Sri Lanka College of State Scientists (SLCSS) under the theme *"Gate for Integral Research towards Nation Building."*

This event is a significant milestone in the journey of our scientific service, bringing together state-sector scientists from a wide range of disciplines to share their knowledge and experiences. In today's world, where technology and science drive rapid transformation, the role of government scientists in producing reliable, evidence-based research is crucial for addressing pressing national challenges.

The symposium provides an excellent platform to highlight workplace-based research conducted by state scientists, which is not only academically valuable but also practically relevant for shaping public policies and improving service delivery. By fostering collaboration, building networks, and encouraging interdisciplinary dialogue, this initiative will further strengthen the capacity of our scientific service to contribute to sustainable national development.

I wish to place on record my appreciation of the efforts of the organizing committee, the Scientific Service Division, and the leadership of the Sri Lanka College of State Scientists for their vision and commitment in bringing this event to fruition. I am confident that the knowledge generated and the partnerships built through this symposium will serve as a foundation for future progress, ensuring that science continues to be a driving force in nation-building.

I extend my warm wishes for the success of this symposium and for the continued advancement

Dr. A.H.M.H Abayarathna

Minister,
Ministry of Public Administration, Provincial Councils and Local Government

Message from the Secretary – Ministry of Public Administration, Provincial Councils and Local Government

It is with great pleasure that I extend this message on the occasion of the Research Symposium 2025, jointly organized by the Scientific Service Division of the Ministry of Public Administration and the Sri Lanka College of State Scientists, under the timely and relevant theme "Gate for Integral Research Towards Nation Building."

This symposium stands as a significant milestone in advancing Sri Lanka's scientific Service. By convening a diverse body of state-sector scientists, scholars, and practitioners, this creates an exceptional platform for the dissemination of new knowledge, cross-disciplinary collaboration, and critical dialogue on issues vital to national development. In an era defined by rapid technological change and complex societal challenges, such an integrative forum is essential for fostering innovation and evidence-based policy formulation.

The research insights, discoveries, and perspectives shared through this symposium will not only enrich the collective knowledge base of the scientific community but will also provide policymakers with robust, data-driven inputs to strengthen decision-making processes. By bridging the gap between research and practice, this event reinforces the essential role of the scientific service in driving sustainable development and ensuring that public service delivery remains responsive, inclusive, and future-oriented.

I commend the organizers, the Scientific Service Division and the Sri Lanka College of State Scientists for their dedication in bringing this vision to fruition. I extend my best wishes for the success of the symposium and for the continued advancement of Sri Lanka Scientific Service.

S. Alokabandara
Secretary,
Ministry of Public Administration, Provincial Councils and Local Government

Message from the Director- Scientific Services Division

It is with profound pleasure that I extend my warmest greetings to all participants of the Second Symposium on "The Gate for Integral Research towards Nation Building." This symposium represents a significant milestone in our collective effort to advance research, innovation, and evidence-based practice in support of national development

This event follows the successful conclusion of the six-day workshop series on the theme "Complete Research: From Design to Manuscript," which equipped participants with essential competencies in research design, analysis, and scientific dissemination. The progression from practical workshop series to this high-level academic forum reflects our shared commitment in fostering an impactful research culture.

As we convene for this symposium, we are not merely sharing knowledge but creating pathways for interdisciplinary collaboration, intellectual growth, and transformative research outcomes. I am confident that the insights and deliberations emerging from this platform will inspire innovation, elevate standards of excellence, and contribute meaningfully to evidence-based policy and national development.

I take this opportunity to sincerely commend the dedication of the organizing team, facilitators, and participants whose efforts have made this event possible. Together, let us make integral research a cornerstone of innovation and productive service delivery

G.I.D. Chathuradhi Wijesinghe
Director (Scientific, Architectural and Technological Services)
Ministry of Public Administration, Provincial Councils, and Local Government

Message from the President - Sri Lanka College of State Scientists (SLCSS)

It is with great pleasure that I welcome you to the **2nd Research Symposium** under the theme *"Gate for Integral Research towards Nation Building"*, jointly organized by the Sri Lanka College of State Scientists (SLCSS) and the Division of Sri Lanka Scientific Service (SLSS), under the patronage of the Ministry of Public Administration and Home Affairs, Sri Lanka.

The establishment of SLCSS on 18th September 2021 fulfilled a long-felt need to bring Government Scientists together under one platform to enhance scientific output and performance. The Government Science profession is a vibrant community with one common goal – to make a real difference through science. Our vision at SLCSS is to strengthen the integration of science into government decision-making and to uplift the professional capacity of scientists serving the nation.

I extend my heartfelt gratitude to the scientists who contributed to formulating the constitution of the College. I also sincerely appreciate the dedication of all participants, speakers, sponsors, and partners for their commitment to making this initiative a success.

During the past two years (2024 and 2025), SLCSS has successfully organized **six workshops** and now proudly presents its **2nd Research Symposium** on 25th and 26th September 2025. This symposium, along with its valuable publications, reflects the collective efforts and contributions of our scientific community. I warmly thank all the participants who have enriched this event with their research and insights.

I wish to record my deep appreciation to the Honorable Minister of Public Administration, Provincial Councils and Local Government, **Dr. A.H.M.H. Abayarathna**, Secretary **Mr. S. Alokabandara**, and **Mrs. Chathuradi Wijesinghe and her team**, for their immense support in ensuring the success of this event.

When we began this journey with the first symposium and workshops, it was a challenge to find researchers, contributors, and young scientists. Today, it is encouraging to witness the growing enthusiasm of volunteers who are eager to publish their workplace-based findings and research. This progress is a clear sign of the positive transformation within our scientific community.

Looking ahead, I seek the continued support of all members and stakeholders to take SLCSS to greater heights. Together, let us explore new horizons and harness the power of science in shaping the future of our nation.

J.M.R. Jayasundara

President - Sri Lanka College of State Scientists (SLCSS)

Message from the Chair of the Symposium Organizing Committee

It is with immense pleasure that I welcome you to the second annual symposium of the Sri Lanka College of Scientific Services (SLCSS). Building upon the momentum of our inaugural event, this gathering stands as a testament to our enduring commitment to fostering a vibrant research culture among state sector scientists.

This year's symposium follows a major milestone: the highly successful workshop, **"The Complete Researcher: From Design to Manuscript."** This strategic collaboration between the SLCSS and the Sri Lanka Scientific Services Division of the Ministry of Public Administration, Home Affairs, Provincial Councils and Local Government was designed to equip our young scientists with the essential tools for conducting rigorous research and navigating the path to publication. The workshop's resounding success has been instrumental in stimulating the high-quality work we see presented here today.

This symposium is more than a platform for presenting findings; it is a vibrant confluence of minds dedicated to the pursuit of knowledge and innovation. As you peruse this inaugural **e-abstract booklet**, you will discover the remarkable breadth of groundbreaking research conducted across diverse scientific disciplines from pioneering studies in chemistry, physics, biology, and environmental science to significant advancements in technology. Each abstract is a testament to the hard work, creativity, and dedication of our researchers, who consistently strive to push the boundaries of understanding.

I encourage you all to engage deeply with the research being presented, to ask probing questions, and to forge connections that will fuel future multi-disciplinary collaborations. Let us incorporate these new insights to drive sustainable innovation within the public service.

Finally, I extend my deepest gratitude to everyone who has contributed to making this event a reality the passionate researchers, the dedicated members of the organizing committee, and our invaluable partners. Your collective commitment ensures that the Scientific Service remains at the forefront of scientific research and education in Sri Lanka.

Mrs. Sriyani Amarasinghe

Vice-President - Sri Lanka College of State Scientists

Chair of the Symposium Organizing Committee

Message from the President – Association of Government Scientific Officers (AGSO)

It is with great honor that I convey my message to the Second Research Symposium jointly organized by the Sri Lanka College of State Scientists and the Ministry of Public Administration. This symposium, following the successful completion of the research methodology workshop series, represents not only a continuation of our efforts but also a new direction and a true milestone for the public service. It demonstrates how workplace-based research can be systematically initiated, nurtured, and translated into meaningful outcomes.

The Association of Government Scientific Officers, while functioning as the trade union of state scientists, has always believed that our mission extends far beyond professional demands. We are committed to cultivating a culture of research within every scientific department of the public sector. By embedding research practices into our workplaces, we open the door to developing new applications, tools, and scientific procedures that are not only innovative but also highly cost-effective. Even within low-budget settings, workplace-based research can generate impactful solutions that enhance service delivery, improve efficiency, and ensure high-quality outputs that directly benefit the public.

Our vision is to empower decision-makers with evidence-based findings, enabling them to make informed and practical policy decisions. In doing so, we strengthen the bridge between science and governance, contributing to the sustainable progress of our nation. Though our officers are in high demand globally, their unwavering commitment to serving Sri Lanka reflects their deep dedication to national development and to securing a better future for our people.

I take this opportunity to sincerely thank the Ministry of Public Administration, the Sri Lanka College of State Scientists, the review panel, the resource persons, and all committees for their tireless efforts in making this event a success. May this symposium continue to inspire innovation, collaboration, and excellence in workplace-based research for years to come. Let it serve as a reminder that research is not an isolated academic exercise but a living process within our institutions—one that directly shapes public service delivery, uplifts communities, and ensures that scientific knowledge becomes a true driving force of national advancement.

As President of the Association of Government Scientific Officers and General Secretary of the Sri Lanka College of State Scientists, I warmly wish this symposium every success, trusting that it will stand as a beacon of innovation and inspire generations of public sector scientists to come.

Lakitha Ruvinda
President - Association of Government Scientific Officers (AGSO)

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Messages from Departments Hosting Sri Lanka Scientific Service (SLSS) Officers

The Department of Health, Sri Lanka

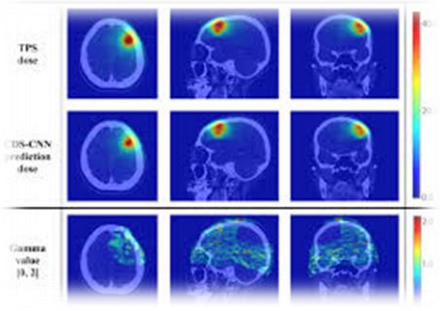
The Ministry of Health is entrusted with the vital mission of providing comprehensive healthcare services to all citizens of Sri Lanka. Its goal is to ensure the delivery of high-quality promotive, preventive, curative, rehabilitative, and palliative care, thereby maximizing potential health gains across the nation.

Officers of the Sri Lanka Scientific Service are integral to this mission, contributing their specialized expertise in numerous critical ways. With a shared commitment to successfully achieving government policy and providing a better life for the public, these dedicated professionals including Research Officers, Biochemists, Chemists, Medical Physicists, Entomologists, Parasitologists, Scientific Officers, and Pharmaceutical Analysts serve within the Ministry of Health, Nutrition, and Indigenous Medicine.

Research Officers attached to the Medical Research Institute engage in rigorous studies spanning infectious diseases, treatment modalities, and preventive measures. Their impactful research covers a wide range of fields, including Virology, Bacteriology, Parasitology, Rabies, Nutrition, Biochemistry, Immunology, Entomology, Molecular Biology, Pharmacology, Electron Microscopy, Toxicology, and Mycology.

Biochemists in state hospitals perform advanced diagnostic tests, assist in clinical diagnosis, and collaborate closely with healthcare professionals. They are instrumental in developing new analytical techniques, ensuring stringent diagnostic quality, managing laboratory operations, and performing essential technical validations.

Chemists of the Scientific Service are primarily attached to Food Quality Control Laboratories (FQCLs). Their principal objective is to provide reliable and accurate test reports for samples submitted by authorized officers, law courts, and other stakeholders, ensuring public safety through rigorous quality assurance.



Medical Physicists play a crucial role in clinical care by applying physics principles to ensure the safe and effective use of radiation in medicine. In radiotherapy, they plan treatments, calculate precise doses, and conduct quality assurance to target malignancies while protecting healthy tissues. They also maintain and optimize imaging technologies like CT, MRI, and PET for accurate diagnostics. Working collaboratively with oncologists and radiologists, they continuously

improve treatment protocols and patient outcomes, in addition to engaging in research to advance medical technology and ensure compliance with national safety standards.

Pharmaceutical Analysts at the National Medicines Quality Assurance Laboratory provide the technical foundation for the national quality assurance system. They monitor the compliance of drugs, devices, cosmetics, and related products concerning quality, safety, and efficacy through laboratory testing at both pre- and post-marketing stages, issuing critical recommendations based on their findings.

Scientific Officers at the Toxicology Laboratory of the Institute of Forensic Medicine and Toxicology provide invaluable support to judicial medical officers and legal authorities. They deliver crucial scientific evidence based on the chemical analysis of autopsy and patient samples, aiding the administration of justice.

Entomologists provide essential technical expertise to control and eliminate vector-borne diseases across Sri Lanka. They contribute novel knowledge, specialized skills, and research-level experience to the field of public health entomology. This role has evolved from the crucial work of Regional Malaria Officers, who were instrumental in eliminating malaria from the country, and is now restructured to enhance national capabilities in vector management and disease control.

The National Measurement Laboratory, Measurement Units Standards and Services Department (MUSSD), Sri Lanka

The Measurement Units, Standards and Services Department (MUSSD) was established under the Measurement Units, Standards, and Services Act No. 35 of 1995 and functions under the purview of the Ministry of Trade, Commerce, and Food Security. Since December 2015, MUSSD has been operating from its modern premises in Techno City, Mahenawatta, Pitipana, Homagama.

MUSSD is the national authority on metrology the science of measurement and its applications. Recognized as the National Metrology Institute (NMI) of Sri Lanka, its core mission is to ensure measurement accuracy, uniformity, and traceability throughout the nation, thereby fostering fair trade, enhancing product quality, and supporting scientific innovation. Through its expert officers, MUSSD provides the critical foundation of measurement certainty that supports government policy, drives industrial growth, and protects the welfare of the public.

As mandated by its founding act, MUSSD established the National Measurement Laboratory (NML) as its central body. The NML is responsible for establishing, maintaining, and disseminating the National Measurement Standards and ensuring the implementation of the International System of Units (SI) in Sri Lanka.

Measurements of physical quantities such as mass, length, time, temperature, pressure, volume, electrical parameters, humidity, and chemical composition are fundamental to daily life, industry, and research. Metrology sustains the unity of these measurements on both a local and international scale.

The main activities of MUSSD, as vested by the Act, include:

- Establishing the National Measurement System via the NML.
- Representing, maintaining, and disseminating National Measurement Standards.
- Implementing the SI system in Sri Lanka and maintaining international measurement traceability.
- Upgrading Calibration and Measurement Capabilities (CMC) through participation in international inter-comparisons.
- Conducting metrology research and generating the Sri Lanka Standard Time (broadcast via www.sltime.org).
- Providing calibration services for industry and promoting measurement technology.
- Providing Type Approval and verification for weights, measures, and instruments used in the trade sector.

MUSSD maintains robust international collaboration as an associated member of the General Conference on Weights and Measures (CGPM), a full member of the International Organization of Legal Metrology (OIML), and a full member of the Asia Pacific Metrology Programme (APMP). Furthermore, MUSSD is a signatory to the International Committee for Weights and Measures Mutual Recognition Arrangement (CIPM MRA), which ensures the global acceptance of its measurement standards and calibration certificates.

The Department of Labour: Scientific Service Officers in the Occupational Hygiene Division, Sri Lanka

Scientific Service Officers within the Occupational Hygiene Division of the Department of Labour play a vital role in safeguarding worker health and safety, making a direct and significant contribution to national productivity and development. Guided by the vision that a healthy worker is a national asset, their mission is dedicated to ensuring the comprehensive well-being of all workers physically, mentally, socially, and spiritually.

These officers apply their scientific expertise and unwavering commitment to successfully achieve the government's policy objectives for a safe and productive workforce, thereby protecting the public and ensuring better livelihoods for citizens across the country.

The key activities undertaken by these officers include:

- **Hazard Identification:** Systematically recognizing potential workplace hazards, including physical, chemical, biological, psychosocial, and ergonomic risks.
- **Risk Assessment and Control:** Conducting thorough evaluations of identified hazards and developing effective strategies to mitigate risks, ensuring a safe and healthy working environment.
- **Environmental Monitoring:** Performing regular and precise monitoring of critical factors such as illumination, heat stress, ventilation, and noise levels to ensure they adhere to established safety standards.
- **Safety Audits:** Conducting comprehensive audits to verify strict compliance with occupational safety and health regulations as per the Factories' Ordinance and other relevant statutes.
- **Awareness Programs:** Designing and implementing educational initiatives to inform and empower both employees and employers on best practices in occupational safety and health.
- **Expert Evidence:** Providing authoritative scientific insights and evidence in the investigation of industrial accidents and occupational diseases, supporting legal and preventive measures.

Through these essential activities, the Scientific Service Officers ensure that workplaces across Sri Lanka not only comply with regulatory standards but also foster a culture of safety and health. This work is crucial for protecting the well-being of every worker and underpinning the nation's economic stability and growth.

The Ministry of Science, Technology, Sri Lanka

Officers of the Sri Lanka Scientific Service (SLSS) assigned to the Research Division of the Ministry of Science, Technology, are at the forefront of driving the nation's strategic pivot towards a knowledge-based, innovation-led economy. They play a pivotal role in building a robust research and development ecosystem, directly supporting the government's ambitious vision for sustainable economic growth through science and technology.

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Ministry of Science, Technology & Research

Their work is fundamental to the Ministry's mandate of fostering cutting-edge research, promoting international scientific collaboration, and popularizing science across all levels of society. The Division serves as a main pillar for this new economic direction by strategically guiding the national research agenda and cultivating a culture of innovation.

Research Facilitation for National Innovation:

The Research Division is the central node for research facilitation, providing strategic guidance to five national research institutions and two major research grant-awarding bodies. A core function involves assisting these institutions in developing their annual research action plans and meticulously monitoring their progress to ensure alignment with national goals. The Division proactively identifies emerging national research needs and facilitates critical stakeholder discussions to ensure the country's research culture is responsive and dynamic.

Key strategic initiatives led by the Division include the development of a National Research Roadmap**,** which will provide the essential framework to direct research activities towards national priorities, including commercializable technology and innovation. Furthermore, the Division is establishing a centralized mechanism to manage all government-funded research projects and oversee institutional performance. This ensures a coordinated, efficient, and impactful approach to managing the nation's research resources and outputs, maximizing return on investment for the public good.

The Division also oversees the grant-awarding process and manages internationally collaborative research programs, ensuring these ventures align with Sri Lanka's economic priorities and deliver tangible, meaningful outcomes.

Science Popularization and Building a Culture of Innovation:

Beyond facilitation, the Research Division is instrumental in networking and coordinating nationwide science popularization activities. This includes organizing flagship events such as the annual National Science Day celebration. By championing these activities, the Division ignites public scientific awareness, inspires future generations of scientists and entrepreneurs, and fosters a widespread culture of scientific inquiry and innovation essential for a modern economy.

Through these multifaceted efforts, the SLSS officers in the Research Division provide the critical scientific governance and strategic direction necessary to position Sri Lanka as a competitive player in the global innovation landscape.

The Government Analyst's Department, Sri Lanka

The Government Analyst's Department stands as the premier and only comprehensive forensic science laboratory in Sri Lanka, operating through two major divisions: the Food Science Division and the Forensic Science Division.

The Food Science Division ensures public safety and health through the scientific analysis of food, liquor, milk, and water. The Forensic Science Division comprised of nine specialized disciplines Forensic Ballistics, Forensic Serology and DNA, Forensic Toxicology, Explosives and Fire Investigation, Narcotic Drugs, Forensic Questioned Documents, Computer Forensics, and a Forensic Miscellaneous Section provides the critical scientific backbone for the nation's justice system.

As a cornerstone service-providing institution, the Department delivers essential scientific-analytical, advisory, and consultancy services to the nation. Its officers apply their expert knowledge and rigorous analytical skills to support law enforcement, ensure public health, and uphold the integrity of consumer products, directly contributing to government policy and a safer life for the public.

Core Services and Functions:

- Scientific Analysis for Justice: The Department issues authoritative analytical reports on evidence (productions) referred by the Law Courts, the Police, Customs, Excise, Local Government Institutions, the Ministry of Health, the Port Authority, and other government bodies. All analyses are conducted in strict accordance with relevant national acts and ordinances.
- Quality Assurance and Public Health: The Department carries out vital quality control analysis on food, liquor, milk, dairy products, and imported goods (from Customs) to ensure they meet safety standards, protecting consumers from harm.
- Specialized Forensic Support: Experts provide crucial investigation and consultancy services to the Police for major crime scenes involving explosions, shootings, fires, and fatal traffic accidents. The Toxicology Section also ensures the safety of foreign VIP delegations through food testing.
- Expert Testimony: Officers provide expert testimony in courts of law, supporting the scientific reports issued by the Department and aiding the judicial process.
- National Advisory Role: The Department serves as the primary scientific and technical consultant to other government departments. This includes contributing to national standards at the Sri Lanka Standards Institution and assisting the Ministry of Defense in the technical evaluation of arms, ammunition, and explosives.
- Capacity Building: The Department is committed to knowledge sharing, providing specialized training for Judicial Medical Officers, Police, Scenes of Crime Officers, the armed forces, trainee lawyers, and Public Health Inspectors in both forensic and food science.

Through these multifaceted roles, the Government Analyst's Department provides an indispensable foundation for justice, public health, and national security in Sri Lanka.

The Department of Export Agriculture, Sri Lanka

The Department of Export Agriculture (DEA), established in 1972, is the principal government institution under the Ministry of Agriculture and Plantation Industries dedicated to the Research and Development (R&D) of Export Agricultural Crops (EAC). The department is a key driver of the national economy, focusing on enhancing the productivity, production, and quality of a diverse range of high-value crops, including Black Pepper, Cardamom, Clove, Nutmeg, Coffee, Cocoa, Vanilla, Betel, Citronella, Lemongrass, Ginger, Turmeric, Goraka, and Arecanut.

Driven by the vision of achieving "Excellence in Exports of Spices and Allied Products," the DEA leverages scientific expertise to successfully implement government policy, boost foreign exchange earnings, and provide better economic opportunities for farmers and the public.

Research and Development Infrastructure:

The DEA's R&D divisions were established alongside the department itself. Its research capabilities have grown significantly from its first research station in Matale, now the Central Research Station**,** to a network of sub-research stations in Narammala, Walpita, Kundasale, Delpitiya, and Nilambe. Recognizing the importance of a data-driven approach, a dedicated unit was also established for Economic Research activities related to EACs. The Development Division has expanded its outreach to seventeen key districts to support cultivation at the grassroots level.

Farmer Empowerment and Market Compliance:

A core function of the DEA is to empower farmers with the technical knowledge and support needed to adopt modern, sustainable practices. This is achieved through comprehensive training programs, workshops, media broadcasts, and field demonstrations. The department is a national leader in promoting Good Agricultural Practices (GAP) and Good Manufacturing Practices (GMP)**,** ensuring that local production systems implement stringent food safety standards to meet the demanding requirements of the global export market.

National Spice Garden:

In a strategic move to promote agri-tourism and showcase Sri Lanka's rich botanical heritage, the DEA established the National Spice Garden in Matale**.** This unique facility provides both local and foreign tourists with an immersive live experience of Export Agricultural Crops.

A dedicated team of Sri Lanka Scientific Service officers, alongside other service personnel, works permanently within the department. Their scientific commitment and research excellence are fundamental to enhancing the value and competitiveness of Sri Lanka's agricultural exports, making the DEA an indispensable institution for the nation's economic growth.

The Department of Meteorology, Sri Lanka

Historical Foundation and Mandate

Operating under the Ministry of Defense, the Department of Meteorology is Sri Lanka's oldest scientific institution. Its origins trace back to formal observations begun by the Survey Department in 1867. It evolved into the Colombo Observatory in 1909 and was established as an independent department in 1948. It now serves as the statutory government agency responsible for all meteorological and climate services and is the official National Agency for Early Warning of meteorological and tsunami disasters.

Scientific Mission and Vision

The department's vision is to function as the nation's leading intelligence center for weather and climate services, adhering to the highest national and international standards. Its core mission is to safeguard life, property, and economic prosperity by delivering precise, timely, and actionable scientific intelligence to the public, government agencies, and the private sector.

Core Scientific Services and Applications

The department's work is fundamental to national security and sustainable development. Key services include:

- **Operational Forecasting and Early Warning:** Generating critical forecasts and warnings for severe weather phenomena such as tropical cyclones, monsoonal activity, severe thunderstorms, and lightning. These services are vital for disaster risk reduction and protecting lives and national assets.
- **Sector-Specific Applications:** Delivering tailored meteorological services for vital economic sectors:
  - **Aviation & Maritime:** Ensuring safety and operational efficiency for international/domestic flights and shipping.
  - **Agriculture & Water Management:** Providing essential agro-meteorological data and seasonal forecasts to optimize irrigation, support climate-resilient farming, and manage water resources.
  - **Energy:** Supplying forecasts to facilitate the integration of renewable energy into the national grid.
- **Climate Data Curation and Research:** Maintaining the national archive of meteorological data, which is the fundamental dataset for policy formulation, infrastructure design, and climate change research.
- **Public Engagement and Capacity Building:** Organizing educational programs and workshops to enhance public understanding of meteorological science and climate-related risks.

National Infrastructure and Human Expertise

Led by the Director General of Meteorology, the department is supported by a network of 23 regional offices, including units at international airports. Its observational infrastructure includes a sophisticated network of 38 Automatic Weather Stations, 135 Automatic Rain Gauges, 35 Agro-meteorological Centers, and approximately 450 collaborative rainfall stations.

The Forest Department, Sri Lanka

Established in 1887, the Forest Department is the principal government agency responsible for the sustainable management, conservation, and development of Sri Lanka's forest resources. It operates under the national commitment to environmental protection, biodiversity conservation, and climate resilience.

Mission and Vision

The department's mission is to sustainably conserve, protect, and manage forest resources for present and future generations. Its vision is to ensure productive, healthy, and resilient forest ecosystems that support Sri Lanka's social, economic, and environmental well-being.

Forest Cover and Biodiversity

Sri Lanka is a globally significant biodiversity hotspot with high endemism. Forest cover is currently 29.7%. Headed by the Conservator General of Forests, the department manages this natural heritage through a network of 5 regional and 23 divisional offices, overseeing protected areas such as national parks, conservation forests, and reserved forests.

Key Responsibilities and Initiatives

- **Forest Conservation and Protected Area Management:** Prevents deforestation, forest degradation, and illegal activities like logging, encroachment, and poaching through monitoring and enforcement.
- **Reforestation and Afforestation:** Implements large-scale tree planting programs to restore degraded lands, increase forest cover, and support climate goals.
- **Sustainable Forest Management:** Promotes responsible timber harvesting, agroforestry, and non-timber forest products to balance ecology and livelihoods.
- **Biodiversity Protection:** Conducts scientific research on native species and ecosystems through divisions in Kubalpola and Badulla to guide conservation.
- **Eco-Tourism Development:** Develops and manages low-impact ecotourism facilities such as nature trails and eco-lodges to raise awareness and generate conservation revenue.
- **Community Engagement and Education:** Involves local communities in conservation through education, sustainable land-use incentives, and stewardship programs.

Challenges and Future Directions

The department addresses ongoing challenges like deforestation, human-wildlife conflict, illegal extraction, and climate vulnerabilities. Future efforts will focus on strengthening partnerships, integrating technology for monitoring, and expanding landscape restoration and climate adaptation initiatives.

Through its dedicated work, the Forest Department supports Sri Lanka's vision of a greener future preserving natural treasures, protecting ecosystems, and enhancing the country's status as a leading ecotourism destination.

The Department of National Museums

Sri Lanka

The Department of National Museums (DNM) of Sri Lanka serves as a vital custodian of the nation's heritage, bridging the past and present through the preservation and interpretation of both tangible and intangible cultural and natural treasures. Its mission is to deliver meaningful museum experiences that inspire discovery, creativity, and public engagement, guided by a vision to become South Asia's leading museum service provider by 2035.

The DNM is dedicated to the scientific acquisition, documentation, and conservation of artifacts and specimens that reflect Sri Lanka's diverse heritage. Its collections span multiple disciplines, including archaeology, anthropology, botany, zoology, entomology, and geology, forming an invaluable resource for researchers, students, and the public.

Strategic Priorities (2023–2027)

In line with its forward-looking agenda, the department has established key strategic priorities:

- Marking the 150th anniversary of the Colombo National Museum with innovative programs aimed at strengthening public engagement and attendance.
- Accelerating digital transformation to enhance accessibility and relevance in an increasingly connected world, ensuring broader reach beyond physical visits.
- Expanding research access and increasing awareness of its extensive collections through digitization, publications, and interactive platforms.
- Refining exhibition design and narrative techniques to attract wider and more diverse audiences.
- Boosting educational outreach by enhancing programs for school groups and fulfilling its role as an informal learning center.
- Increasing annual revenue through improved visitor services, cultural tourism promotion, and partnerships.

Services and Contributions

The DNM supports academic and public knowledge through:

- The **National Museum Library**, which houses some of the country's oldest books and manuscripts, offering a rich resource for researchers.
- Conducting and publishing original research, reprinting rare books, and organizing workshops, seminars, and educational programs.
- Serving as a resource institution for university students and higher education institutes.
- Providing expert consultancy for public and private museum development.
- Contributing to national income by promoting museum tourism domestically and internationally.

Through these efforts, the Department of National Museums reinforces national identity, fosters lifelong learning, and supports the government's commitment to cultural preservation and sustainable tourism.

The Department of Archaeology, Sri Lanka

Sri Lanka possesses a profound and diverse legacy of both tangible and intangible cultural heritage. The Department of Archaeology is entrusted with the critical responsibility of preserving this tangible heritage for future generations. Through systematic archaeological excavations, the department uncovers invaluable artifacts including ancient coins, Buddha statues, clay pots, and other historical objects that offer insight into the island's rich past.

Upon discovery, these artifacts, whether metallic, ceramic, or composed of other materials, are transferred to the Chemical Conservation Division of the department. Here, each item undergoes specialized conservation treatment tailored to its physical and chemical properties, ensuring its long-term preservation and stability.

In addition to artifact conservation, the Division is responsible for the preservation of mural paintings and sculptures found at renowned World Heritage Sites such as Sigiriya and the Dambulla Cave Temple. As the apex body overseeing the protection of these cultural treasures, the Department integrates innovative conservation technologies emerging from international research, adapting globally recognized methods to local contexts.

The Department also addresses biological threats to monuments, including lichen infestation and the growth of wild vegetation on historic structures. In alignment with national environmental policies and a commitment to sustainability, the Department employs eco-friendly traditional methods for plant suppression, avoiding the introduction of harmful chemicals into surrounding soil and water systems.

Through its multidisciplinary efforts in excavation, conservation, and environmental management, the Department of Archaeology plays an essential role in safeguarding Sri Lanka's heritage, supporting cultural continuity, and promoting scholarly and public engagement with the nation's history.





The Department of National Botanic Gardens, Peradeniya, Sri Lanka

Sri Lanka's Botanic Gardens possess a long and distinguished history, shaped by colonial influences, industrial evolution, and periods of conflict. Throughout these transitions, the Gardens have not only endured but thrived, with their plant collections and herbarium expanding into a significant national asset. Today, these living libraries serve as vital resources for education, research, and conservation, offering reference material on diverse plant families, genera, and species.

The Gardens function as both a sanctuary for leisure and a center for botanical knowledge, showcasing flora from around the world to illustrate the richness and beauty of the plant kingdom. They play an essential role in sharing expertise in conservation, biodiversity, floriculture, and sustainability. Annually, the Gardens attract over two million visitors, reflecting their value as a public good and a major recreational resource.

All botanic gardens in Sri Lanka—including the Royal Botanic Gardens in Peradeniya (established 1821), Hakgala (1861), Henarathgoda (1876), the National Medicinal Plant Garden in Ganewatta (1950s), and the more recent gardens in Hambanthota and Avissawella dedicated to dry and wet zone ex-situ conservation—are managed and maintained by the Department of National Botanic Gardens. These institutions were originally founded to conduct experiments on exotic economic plants and explore the island's botanical wealth, and they continue to support the introduction and conservation of species vital to Sri Lanka's economic and environmental development.

Employing nearly 450 people, including a dedicated cadre of scientific officers, the Department works to align its operations with national policies aimed at enhancing cultural and eco-tourism, promoting environmental sustainability, and contributing to public well-being. Scientific officers engage in high-quality research, ex-situ and in-situ conservation, public education, and the continuous development of the gardens—all supporting the government's goals of making these sites more attractive, fulfilling the mental and recreational needs of the public, and strengthening their role as a major income source for the national economy.

The Department's vision is to be the finest botanic garden network in the tropics, providing opportunities for the public to study, sustainably conserve, and admire plant resources in natural and human-made environments. It serves as a regional center for plant life, functions as the national red list authority for plants, and continues to advance its mission through education, research, biodiversity promotion, and the ongoing maintenance and development of all its gardens and allied units.

The Department of National Zoological Gardens, Sri Lanka

Dehiwala Zoological Gardens was started by Mr. John Hargenbergin early 1920s as a private collection on 11 acres. It was officially taken over by the Government on the 1st of July 1936. It was established as an independent public department in1946 and later administrative and management functions were subjected to the National Zoological Gardens Act no. 41 of 1982. At present, the Department consists of four ex-situ conservation operational units namely: Dehiwala Zoo, Pinnawala Elephant Orphanage, Pinnawala Zoo and Ridiyagama Safari Park. Apart from these Gonapola farm, Kahapola farm and Diyagama farm is in operation to produce animal feed.

Ex-situ conservation plays a pivotal role in the protection and preservation of endangered species, and the Department of National Zoological Gardens in Sri Lanka is at the forefront of these efforts. Established with the mission of conserving the rich biodiversity of Sri Lanka, this department operates a network of zoological gardens dedicated to safeguarding both native and exotic wildlife. The primary objective of these gardens is to provide a sanctuary for species facing critical threats in their natural habitats, thereby contributing to global conservation efforts.

Through well-managed breeding programs, habitat replication, and public education, the Department of National Zoological Gardens aims to enhance genetic diversity, foster a deeper understanding of wildlife, and promote conservation awareness among the Sri Lankan public. This holistic approach underscores the department's commitment to preserving the natural heritage of Sri Lanka while contributing to broader global conservation goals.

This holistic approach not only contributes to wider global conservation goals but also underscores the Department of National Zoological Gardens' dedication to preserving Sri Lanka's natural heritage. The department's commitment to excellence in conservation and management has been recognized through the receipt of National Productivity Awards from 2019 to 2022. These accolades reflect the department's effective and innovative efforts in ex-situ conservation, highlighting its significant impact on both national and global scales.

The Department of Wildlife Conservation

Sri Lanka

The conservation of Sri Lanka's indigenous flora and fauna is a national priority, and the Department of Wildlife Conservation (DWC) serves as the primary agency responsible for safeguarding these irreplaceable natural resources. Operating under the Fauna and Flora Protection Ordinance (FFPO), the DWC is entrusted with the long-term protection of wildlife across terrestrial and marine territories. The department manages an extensive network of 109 Wildlife Protected Areas (WLPAs)—including 40 National Reserves and 69 Sanctuaries—spanning over 12,500 km², which represents 18.9% of Sri Lanka's land area.

Beyond these designated zones, the FFPO extends legal protection to wildlife across the country, with the DWC empowered to enforce these regulations, ensuring conservation both inside and outside formal boundaries.

In addition to preserving biodiversity, the DWC's protected areas play a vital role in sustaining water resources essential for agriculture and hydropower. The network safeguards catchment areas of major rivers and over 40 reservoirs, supporting both ecological and economic stability.

Vision:
Conservation of wildlife heritage for present and future generations.

Mission:
To ensure the conservation of wildlife heritage through participatory management.

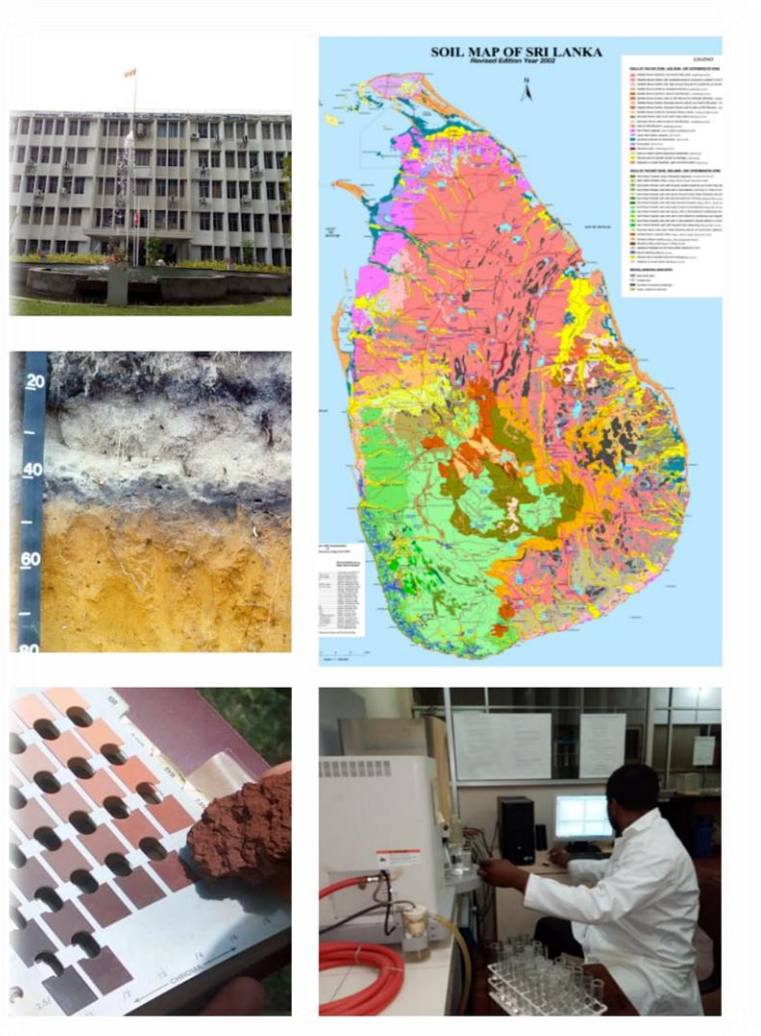
Key Objectives:

- Develop and implement national strategic plans for wildlife conservation in alignment with national and international policies.
- Secure, enhance, and manage protected areas to ensure ecosystem integrity and species sustainability.
- Classify and monitor protected areas using scientific research and regulatory tools.
- Prepare and execute recovery plans for endangered species.
- Promote and regulate sustainable ecotourism that prioritizes ecosystem conservation.
- Enforce the FFPO and related regulations to prevent illegal wildlife exploitation.
- Support and promote scientific research relevant to wildlife management.
- Enhance professional capacity through continuous staff training and development.
- Increase public participation in conservation through awareness and outreach programs.
- Engage local communities in conservation while improving livelihoods and reducing dependency on protected resources.

The Department of Irrigation, Sri Lanka

The Land Use Division of the Department of Irrigation plays a critical role in supporting evidence-based agricultural and water resource planning through comprehensive soil and land use analysis. The Division conducts reconnaissance, medium-intensity, and detailed soil surveys to evaluate land resources at multiple scales from national and provincial levels down to individual districts, projects, and farms.

Through these surveys, the Division identifies all viable land use options for a given area and produces a suite of thematic maps, including soil maps, land use maps, and land suitability maps. These outputs provide foundational data for the planning and design of irrigation projects and contribute to sustainable agricultural development by offering science-based recommendations for suitable cropping patterns and optimal land use practices.



"Gate for Integral Research towards Nation Building"

SYMPOSIUM 02 PROGRAM

At Auditorium, 19th Floor, District Secretariat Office - Colombo

Day 1: Thursday, 25th September, 2025

Inauguration Ceremony		
8:30 - 9:00 am	Registration	
9:00 - 9:10 am	Lighting of oil lamp and National Anthem	
9.10 - 9.20 am	Welcome Address	Ms. Chathuradhi Wijesinghe Director, Scientific Service, Ministry of Public Administration
9.20 - 9.30 am	Address by Secretary	Mr. S. Alokabandara, Secretary to the ministry, Ministry of Public Administration, provincial council and Local Government
9.30 - 9.45 am	Workshop overview	Mr. J.M.R. Jayasundara / Mrs Sriyani Amarasinghe President / Chair of Symposium
9.45 - 9.55 am	Official uploading the Symposium Abstract Book	
9.55 - 10.10 am	Address by Guest of Honour	Hon. Minister, Prof Chrishantha Abeysena. Minister of Science and Technology
10.10 - 10.20 am	Address by Chief Guest	Hon. Minister Dr. A.H.M.H. Abayarathna Ministry of Public Administration, Provincial council and Local Government
10.20 - 10.35 am	Where knowledge serves the nation	Mrs. H.A. Anoma Priyadarshani Director (Operation), Department of National Zoological Gardens.
10:35 - 10.45 am	Vote of thanks	Mrs. Navanjalee Lamahewa, Assistant Director, Scientific Service, Ministry of Public Administration
10.45- 11.00 am	**Tea & Poster display for Non-participants**	
11.00 - 11.30 am	Keynote speech 1	Mr. K.R. Abhayasingha Bandara Former Director, Meteorology Department.
11.30 - 12.00 noon	Review of the workshop by participants	
Symposium Session 1 – Chemistry		
12.00- 12.10 pm	Perera RGSA, Measurement Units, Standards and Services Department	
12:10 - 12:20 pm	Ranasinghe R.A.B.S., Government Analyst's Department	
12:25 - 12:35 pm	Udeshini D.R.I., Government Analyst's Department	
12:40 - 12:50 pm	Perera L.R.T., Government Analyst's Department	

12:50 - 13:30 pm	**Lunch**
13:35 - 13:45 pm	Jayawansha W.S.H.K., Government Analyst's Department
13:50 - 14:00 pm	Kulali S.,B., Government Analyst's Department
14:05 - 14:15 pm	Bandara D.M.G.C., Government Analyst's Department
14:20 - 14:30 pm	Panchami K.D.W., Government Analyst's Department
14:35 - 14:45 pm	Dahanayake L.A.W.K., Government Analyst's Department
14:50 - 15:00 pm	Seneviratne T.M.P.G.C.R, Government Analyst's Department
15:05 - 15:15 pm	Nawarathna T.K., Quality assurance, Research and Development Laboratory, Bandaranaike Memorial Ayurveda Research Institute, Nawinna, Maharagama
15:20 - 15:30 pm	Bandara W.P.A.R.D., Government Analyst's Department
15:35 - 15:45 pm	Edirisinghe E.A.B., Pharmaceutical Botany section, Bandaranaike Memorial Ayurveda Research Institute, Nawinna, Maharagama
15:50 - 16:05 pm	Devpura S.N., National Institute of Health Sciences,

Day 2: Friday, 26th September, 2025

Symposium Session 2 & 3 - Physics and Natural Science	
9:00 - 9:10 am	Tharanga K.H.G. M., National Cinnamon Research and Training Center, Department of Cinnamon Development,
9:15 - 9:25 am	Sampath B.H.D.S., Department of National Botanic Gardens
9:30 - 9:40 am	Janaki, M.D.S., National Dengue Control Unit, Ministry of Health
9:45 - 9:55 am	De Silva M.A.N., Bandaranaike Memorial Ayurveda Research Institute, Maharagama
10:00 - 10:10 am	Sarathchandra O.A.A.S., Regional Director of Health Services, Colombo
10:15–10:25 am	Madhurangi H.M.T.T., National Cinnamon Research & Training Center, Palolpitiya
10:30-10:40 am	Gunarathne G.A.M.S.S., Department of Export Agriculture, Walpita, Sri Lanka
10:45-11:50 am	Jayaratne R.K., Bandaranayaka Memorial Ayurveda Research Institute
11:55-11:05 am	Dharmadasa K.L.K., Regional Director of Health Service Office-Puttalam, Sri Lanka
11:10 - 11:15 am	Senanayaka S.M.C. Department of Forest Conservation, Baththaramulla, Sri Lanka,
11:20 - 11:25 am	Poornima M.K.D., Department of National Museums, Colombo
11:30 -11:40 pm	Bandara M.M.L.I.W., Department of National Botanic Gardens, Peradeniya
11:45 - 11:55 pm	Dissanayake, S., Public Health Department, Colombo Municipal Council, Sri Lanka
12:00 - 12:05 pm	Madhushani K.P.P., District Office, Department of Export Agriculture, Kegalle
12:10 - 12:20 pm	Wijethunga H.S., Department of National Botanic Gardens, Sri Lanka
12:25 - 12:35 pm	Weerakkodi W. G .I.S., Regional Director of Health Services Office, Matale
12:40 - 13.40 pm	**Lunch**
13.45 - 15.00 pm	**Closing Ceremony and Distribution of Awards, Certificates**
15.00 - 15:10 pm	**Vote of Thanks**

SECTION 1

Abstracts submitted by the participants of the workshop titled

"The Complete Researcher: From Design to Manuscript"

Session 01 – Chemical Sciences (Oral Presentations)

EVALUATION PANEL

- Dr.(Mr.) Namal Perera — Senior Lecturer, Sabaragamuwa University of Sri Lank
- Mr. P. G. Madawala — Former Deputy Government Analyst
- Ms. Dileepa M. Endagama — Senior lecturer, Department of Decision Sciences, University of Sri Jayewardenepura

PRESENTERS

CS1	**Assessing the Impact of Fabric Dye on DNA recovery from Bloodstained Colored Denim using Saline and Distilled water** Ranasinghe R.A.B.S -*Government Analyst's Department*
CS2	**Comparative analysis of instrumental and traditional methods for determining alcohol content in distilled liquor** Udeshini D.R.I. – *Government Analysist's Department*
CS3	**Modified Extraction Method for Bone Samples in Forensic Applications** Perera LRT - *Government Analyst's Department, Sri Lanka*
CS4	**Validation of the Alcolizer ME for Alcohol Content Analysis and Color-based Classification of Locally Brewed Beer**

	Jayawansha WSHK - *Government Analyst's Department, Sri Lanka*
CS5	**Evaluation of Coconut Toddy through Conventional Analytical Methods and Gas Chromatographic Fingerprinting for Authenticity** Kulali S - *Government Analyst's Department, Sri Lanka.*
CS6	**Development of a Reliable Analytical Method for Detecting Gold in Seized Smuggled Samples in Sri Lanka** Bandara D.M.G.C1 - *Government Analyst's Department, Sri Lanka.*
CS7	**Detection and Quantification of Aflatoxins in Dried Chillies Imported to Sri Lanka, using Liquid Chromatography with Fluorescence detection to raise awareness among public** Panchami KDW - *Government Analyst's Department, Colombo, Sri Lanka*
CS8	**Identification of Interference from Selected Polymer Products in Fire Debris Analysis using GC/MS** Dahanayake L.A.W.K. - *Government Analyst's Department, Sri Lanka*
CS9	**Establishment of a correlation between shooting distance and slug dispersion diameter using a shotgun** Seneviratne TMPGCR - *Government Analyst's Department, Sri Lanka*
CS10	**Scientific Standardization of Dhatri Churna: Establishment of Physicochemical Parameters and TLC Fingerprint Profiling** Nawarathna T.K - *Quality assurance, Research and Development Laboratory, Bandaranaike Memorial Ayurveda Research Institute, Sri Lanka*
CS11	**Forensic Analysis of Diesel Residues in Fire-Damaged Motor Vehicles: Addressing Interferences from Automotive Fluids** Bandara WPARD - *Government Analyst's Department, Colombo, Sri Lanka.*
CS12	**Differentiation of Authentic *Cedrus deodara* Wood from Market Adulterants: An Integrated Organoleptic and Phytochemical Analysis** Edirisinghe E.A.B. - *Pharmaceutical Botany section, Bandaranaike Memorial Ayurveda Research Institute, Nawinna*
CS13	**Quantitative Analysis of Aflatoxin Contamination in Commercially Available Coconut Oil in Sri Lanka by HPLC with Post-Column Derivatization** Devpura S.N. - *Department of Chemistry, University of Colombo, Sri Lanka*

Session 02 – Physical Sciences (Oral Presentations)

EVALUATION PANEL

- Ms. Dileepa M. Endagama: Senior lecturer, Department of Decision Sciences, University of Sri Jayewardenepura
- Mr. K.R. Abhayasingha Bandar: Former Director, Meteorology Department
- Dr. Gayan Illeperuma: Senior Lecturer, Department of Physics, Open University of Sri Lanka

PRESENTERS

PS1 **Evaluation of Water Conductivity Standards Traceable to Electrical Resistance for Conductivity Meter Calibration**

Perera RGSA-*Measurement Units, Standard and Services Department*

Session 03 – Natural Sciences (Oral Presentations)

EVALUATION PANEL

- Ms. Dileepa M. Endagama — Senior lecturer, Department of Decision Sciences, University of Sri Jayewardenepura
- Dr.(Mr.) I. U. Kariyawasam — Senior Lecturer, Department of Botany, University of Sri Jayewardenepur
- Dr.(Ms.) Sachini Fernando — Senior Lecturer, Department of Zoology, University of Sri Jayewardenepura

PRESENTERS

NS1 **The Impact of Land Degradation and Management Practices on Cinnamon Productivity in Sri Lanka**

Tharanga K H G M[1]*, Pabasara P K D[1], Wijeweera A A[1], Madhurangi H M T T [1], Weerasooriya SN[1],

NS2 **Distribution and Regeneration of Horsfieldia iryaghedhi in Indikadamookalana forest reserve in wet zone, Sri Lanka**

Sampath BHDS - *Department of National Botanic Gardens, Peradeniya*

NS3 **Evaluating the Predictive Capacity of Ovitrap and Prokopack-Based *Aedes* Surveillance for Dengue Outbreaks**

Janaki, M.D.S - *National Dengue Control Unit, Ministry of Health Narahenpita, Colombo 05*

NS4 ***In Vitro* Propagation of *Glycyrrhiza glabra* L. (Welmee) Through Seed Culture for Local Introduction**

De Silva M.A.N. - *Bandaranaike Memorial Ayurveda Research Institute*

NS5 **Premises-Level Distribution of Dengue Vectors in Colombo District, Western Province, Sri Lanka**

O.A.A.S.Sarathchandra - *Regional Director of Health Services, Colombo*

NS6 **n-vitro Evaluation of Derris parviflora Leaf, Bark, and Root Extracts for the Control of Cinnamon Thrips (Helionothrips annosus Wang) as Potential Botanical Insecticides**

Madhurangi H.M.T.T - *Department of Cinnamon Development*

NS7	**Applicability of CSUP (SEESUP - Sodium hypochlorite Ethanol Ethylene oxide Sterilization Under Pressure) Method for Sub Culturing Stage of the In-vitro Propagation of Cardamom** Gunarathne G.A.M.S.S-*Department of Export Agriculture*
NS8	**Assessment of microbial quality of Manibadra (Ayurvedic drug) over a considerable time period.** Jayaratne R.K - *QA and R&D Laboratory, Bandaranaike Memorial Ayurveda Research Institute*
NS9	**Laboratory Rearing of the Predatory Mosquito Toxorhynchites splendens and Evaluation of Its Feeding Efficacy on the Secondary Dengue Vector Aedes albopictus** Dharmadasa K.L.K- *Director of Health Service Office-Puttalam, Sri Lanka*
NS10	**Analysis of genetic variation of growth traits of Eucalyptus grandis in a progeny trial at Erabadda, Sri Lanka** **Senanayaka S.M.C. -** Department *of Forest Conservation*
NS11	**Herbarium, Colombo National Museum: Diversity, Digitization, and Research Potential** M.K.D.Poornima -*Department: Department of Forest Conservation*
NS12	**Development of an efficient in Vitro Propagation Protocol for Exacum walkeri Arn. ex Griseb through Seed Culture** Bandara MMLIW - *Department of National Botanic Gardens, Peradeniya*
NS13	**Targeting egg-laying Aedes mosquitoes: A gravid trap-based surveillance study in urban Sri Lanka** Dissanayake, N.W.M.S.M- *Department: Public Health Department, Colombo Municipal Council*
NS14	**Evaluation of Seedbed Potting Media for Emergence and Survival of Cardamom Seedlings** Madhushani KPP- *Department of Export Agriculture*

NS15 **Evaluation of the Rooting Performance of Chrysanthemum (Dendranthema grandiflora) Varieties in Different Propagation Media in the Gampaha District, Sri Lanka**

Wijethunga H.S - *Department of National Botanic Gardens*

NS16 **Aedes ovitrap surveillance data for dengue outbreak predictions; a case study from Matale District, Sri Lanka**

Weerakkodi W G I S -*Regional Director of Health Services Office, Matale*

NS17 **Morphological and Anatomical Markers for Authenticating Pterocarpus santalinus (Red Sanders) and its distinguishing features from common adulterants and substitutes**

Jeewandara M.P. - *Pharmaceutical Botany section ,*
Bandananaike Memorial Ayurvedic Research Institute , Nawinna ,
Maharagama

SECTION 2: Participants Abstracts of the Oral Presentation

Session 1:

Chemical Sciences

Oral presentations

CS1

Assessing the Impact of Fabric Dye on DNA recovery from Bloodstained Colored Denim using Saline and Distilled water

Ranasinghe R.A.B.S *[1], Rathnayake RWRK[1], de Silva P.G[1], Marasinghe E[1], Gamage UGST[1], Perera LRT[1], Manike P.D.S.L[2]

[1]*Department of Government Analyst's, Colombo, Sri Lanka*
[2]*KIU University, Colombo, Sri Lanka*
*bhagya.subani90@gmail.com

Introduction:
In forensic science, the successful recovery of deoxyribonucleic acid (DNA) from biological evidence such as bloodstains and body fluids is essential for suspect identification and resolution of criminal cases. However, when blood is deposited on dyed textiles such as denim, the presence of dye-related PCR inhibitors particularly indigo can interfere with DNA recovery and subsequent amplification.

Objectives:
To investigate the effect of different denim dye colors on the efficiency of DNA recovery from fabric-based bloodstains using non-destructive, indirect DNA extraction method with various solubilizing solvents.

Methods:

Human blood (50 µL) was deposited on five denim colors (blue, black, grey, light blue, white) and air-dried. Samples were collected after 24 hours (Experiment 1) and two weeks (Experiment 2). Each color was treated with either distilled water (DW) or 0.9% saline (S) (500 µL), with two replicates per treatment. Stains were solubilized for 30 minutes with periodic vortexing, and supernatants were used for DNA extraction (QIAamp DNA Investigator Kit). Additional samples were extracted without solvent at both time points. DNA was quantified using the ABI 7500 Real-Time PCR System and Quantifiler® Human DNA Kit, including standard and negative controls.

Results and Discussion:
DNA recovery was significantly affected by fabric dye intensity. Dark denim (black, dark blue) yielded lower DNA amounts, likely due to PCR inhibition from dye compounds, while light-colored fabrics (light blue, white) showed higher yields. Among solubilizing agents, 0.9% saline outperformed distilled water for most colors, likely due to better dye-DNA interaction reduction. RT values were significantly affected by denim color, as shown by two-way ANOVA. Solvent-assisted extraction improved DNA recovery over no solvent, but there was no significant difference between saline and distilled water. Extraction time (1 vs. 14 days) had no significant effect on RT values.

Conclusion:
The study shows that indirect solubilization, especially with saline, is an effective, non-destructive method for forensic DNA extraction from dyed fabrics like denim. Future research should explore environmental effects, long-term degradation, and diverse fabrics to enhance its forensic applicability.

Keywords: Denim dye inhibition, Forensic DNA Analysis, PCR Inhibition, Non-destructive Sampling

Acknowledgement:
I sincerely thank the Government Analyst, the Forensic Laboratory Team, the Ministry of Public Administration, and the Sri Lanka College of State Scientists for their support.

Comparative analysis of instrumental and traditional methods for determining alcohol content in distilled liquor

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CS2

Introduction: Alcoholic beverages comprise in diverse drink categories which contain varying amounts of ethyl alcohol. Distilled liquor is one category of those beverages produced through the distillation of a fermented sugar mixture. Accurate determination of alcohol content is essential not only for quality assurance but also for compliance with regulatory standards and taxation policies. Apparent and actual alcoholic strength are the two parameters commonly used for measuring alcohol content. The apparent alcoholic strength of liquor is measured without distilling, and this value is similar to or lower than the declared alcoholic content. Actual alcoholic content can be determined by measuring the alcohol content after distilling.

Objectives: To evaluate the efficacy of manual versus instrumental techniques for quantifying actual and apparent alcoholic strength in distilled liquors.

Methods: Seventy distilled liquor samples were analyzed in triplicate. Apparent alcohol content was measured instrumentally by direct injection of 12 mL samples into an Alcolyzer, and manually using a hydrometer in a measuring cylinder. Actual alcohol content was determined manually by distilling 100 mL samples and measuring distillate density with a pycnometer. A paired-sample t-test compared results from all methods against declared values, with statistical significance set at $p < 0.05$.

Results & Discussion: Considering the apparent alcohol content, the paired sample t-test revealed an insignificant ($p=0.239$) test result between the manual and instrumental method. Hence, parallel methods can be used to determine apparent alcohol content. Further, statistically significant ($p=0.001$) values were obtained for actual alcohol content, even though the standard deviation within the two methods was +0.1, and it lies within the tolerance limit accepted by the standards (SLS 919:2020).

Conclusions: This study confirms that both manual and instrumental methods are significant and effective for the accurate determination of alcohol content in distilled liquor, thereby either methodology ensured quality assurance and regulatory compliance.

Keywords: Alcolyzer, Pycnometer, Hydrometer, Apparent Alcohol Content, Actual Alcohol Content

Acknowledgement: The author would like to acknowledge the Government Analyst's Department for the support given to complete the above study successfully and the Ministry of Public Administration and the Sri Lanka College of State Scientists.

Modified Extraction Method for Bone Samples in Forensic Applications

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CS3

Introduction: DNA extraction is a fundamental step in forensic DNA analysis to isolate and purify DNA for high-quality STR (Short Tandem Repeat) profiling. It is especially important for bone samples in cases such as mass disasters, unidentified remains, and missing persons. Degraded bones pose challenges to obtaining high-quality DNA. This study focuses on extracting high-quality DNA from forensic bone samples within a short period. The PrepFiler™ BTA Forensic DNA Extraction kit, based on silica bead chemistry, is highlighted for its effectiveness in purifying DNA from bone samples.

Objectives: To develop an, efficient DNA extraction protocol for degraded forensic bone samples.

Methods: Thirty human bone samples from real forensic cases received at the Government Analyst's Department DNA laboratory between 2020–2024 were analyzed. DNA was extracted using two commercial kits: the QIAamp DNA Investigator kit (applied to 100 mg of bone powder) and the PrepFiler™ BTA Forensic DNA Extraction kit (applied to 50 mg of bone powder). For the QIAamp kit, the incubation step was set to an overnight duration. For the PrepFiler™ BTA protocol, the incubation step was set to 2 hours and also modified to an overnight duration. The extracted DNA yield was quantified using quantitative polymerase chain reaction (qPCR).

Results and Discussion: The highest average DNA yield was obtained using the PrepFiler BTA Forensic DNA Extraction Kit with overnight incubation, a substantial DNA yield was obtained using the two-hour incubation whereas the QIAamp method yielded comparatively lower DNA yields. Statistical analysis using Student's t-test indicated that the differences between the PrepFiler™ BTA methods and the QIAamp method were statistically significant ($P < 0.05$).

Conclusion: PrepFiler™ BTA Forensic DNA Extraction Kit which utilizes silica bead chemistry, is highlighted for its effectiveness in purifying DNA from bone samples. Notably it requires only 50 mg of bone powder input. Therefore, adopting the PrepFiler BTA kit is recommended to improve bone DNA extraction. The two-hour incubation may be sufficient for fresh samples, whereas older or more degraded samples may require overnight incubation. As a future direction, incubation times can be adjusted based on the sample's condition.

Keywords: Forensic DNA Extraction, Degraded Bone Samples, PrepFiler BTA Kit, Quantitative PCR

Acknowledgement: The support provided by the Ministry of Public Administration, the Review Committee of the College of State Scientists and the scientific staff of the Government Analyst's Department DNA laboratory is gratefully acknowledged.

CS4

Validation of the Alcolizer ME for Alcohol Content Analysis and Color-based Classification of Locally Brewed Beer

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Introduction

The Alcolizer ME is a fast, reliable, non-destructive and robust instrument used to quantify ethyl alcohol content in alcoholic beverages, expressed as alcohol by volume (ABV) % and to measure beer color in European Brewery Convention (EBC) units. Determination of ethyl alcohol content in alcoholic beverages is critical for regulatory compliance, quality control and providing consumer information. Beer color is a significant quality parameter that influences consumer perception and product uniqueness.

Objectives: The study aims to validate the Alcolizer ME for analysis of alcohol content in alcoholic beverages and to classify the locally manufactured beer based on color values.

Methods: Instrument validation was carried out with validation parameters of Limit of Detection (LOD), Limit of Quantification (LOQ), working range, linearity, and precision using laboratory prepared ethanol standard series as per laboratory validation procedure, ranging from 1% to 60% ABV for Beer, Wine and Distilled Liquor methods confirming the requirements of ISO/IEC 17025:2017. Color measurement bias for Alcolizer ME was determined using calibrated UV-Visible spectrophotometer at 430nm with potassium dichromate. All together eighty-three commercially available beer samples of pale ale (n=17), lager (n=21), strong (n=28) and stout (n=17) which were analyzed for color classification using Alcolizer ME module.

Results and Discussion: The validation results of Alcolizer ME revealed that both LOD and LOQ as1% ABV. The established working ranges were 2-12% ABV for Beer, 4-24% ABV for Wine and 10-60% ABV for Distilled Liquor. All methods exhibited excellent linearity with R2 >0.999 and relative standard deviations (RSD) below 2%. Moreover, RSDs of precision were less than 2% and the bias for color value was less than 12%. Three different classes of beer styles were identified in locally manufactured beers based on color values: pale ale and lager (6-10 EBC), Strong (11-15 EBC) and stout (171-258 EBC).

Conclusion: These findings confirmed the suitability of Alcolizer ME for quantification of alcohol content in alcoholic beverages and color of Beer. They provide a practical framework for standardization, quality control and marketing within the local brewing industry, and highlights the potential application of the instrument in identification of unknown samples in legal aspects.

Keywords: Alcoholic beverages, Alcolizer, method validation, beer color

Acknowledgement: The support provided by the Ministry of Public Administration, the Sri Lanka College of State Scientists and the scientific staff of the Government Analyst's Department DNA laboratory is gratefully acknowledged.

Evaluation of Coconut Toddy through Conventional Analytical Methods and Gas Chromatographic Fingerprinting for Authenticity

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CS5

Introduction: Toddy, a traditional alcoholic beverage, is produced by fermenting sap from palm inflorescences and is valued both for direct consumption and as a raw material for arrack. Rising demand has prompted the production of adulterated and synthetic alternatives, compromising the beverage's integrity. Conventional analytical methods used for quality control purposes exhibit significant parameter variability, rendering them unreliable for authenticating genuine toddy.

Objective: To evaluate and compare the chemical profiles of genuine, adulterated, and synthetically produced toddy in order to establish statistically significant parameters that can serve as definitive indicators for authenticating traditional coconut toddy.

Method: Genuine toddy samples were collected from four different locations within the Jaffna peninsula while synthetic toddy sample was prepared under controlled laboratory conditions. Adulterated (non-genuine) toddy samples were prepared by blending genuine toddy and synthetic toddy in different ratios. All genuine and non-genuine toddy samples were analyzed using both conventional analytical methods such as alcohol content, extract, ash, acidity and original extract and in gas chromatography the peaks obtained for n-Propyl Alcohol (nPA), acetaldehyde, ethyl acetate, acetic acid, and the unknown peaks at the retention time of 7.864, 10.366, 12.081, 15.655, 16.717 and 18.412 were marked unknown 1 to unknown 6 respectively. Out of 30 samples, 18 genuine and 12 non-genuine samples were analyzed and the data was statistically analyzed using statistical software SPSS version 27.

Results and Discussion: Highly Statistical significant differences were observed between genuine and non-genuine toddy samples for sulphated ash content, original extract, nPA, ethyl acetate, Acetic acid, unknown 1, unknown 3, unknown 5 and unknown 6 with $p<0.001$, acidity with $p=0.001$, acetaldehyde with $p=0.002$. Unknown 2 also shows significance difference among genuine and non-genuine samples with $P=0.047$ at 5% significance level. Alcohol content and Extract were significantly not different.

Conclusion: These findings show significance difference between genuine and non-genuine toddy. However, the distribution of Acetaldehyde, nPA and unknown 1 show lower median for genuine than that respect to non-genuine toddy samples. Therefore these factors can be used in the determination of authenticity of toddy. Especially nPA shows very lower median and very short interquartile range for genuine toddy is highly typical in the determination of the authentication of coconut toddy.

Key words: Genuine, non-genuine, authenticity.

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CS6

Development of a Reliable Analytical Method for Detecting Gold in Seized Smuggled Samples in Sri Lanka

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Introduction: Gold is a precious metal that has being used from ancient time. Its value as a metal remains unchanged over thousands of years due its low chemical reactivity and economical value. Because only a limited number of countries produce gold, its trade often involves cross-border movement. In recent years' gold smuggling has become a significant concern in Sri Lanka. Several semi solid samples, suspected to contain gold have been seized at the Katunayake international airport. The identification of such kind of smuggled or suspicious gold samples poses a significant challenge for relevant authorities and law enforcement agencies.

Objectives: The objective of this research is to develop a reliable analytical method for detecting gold in smuggled samples seized at airports and other high-risk entry points.

Methods: The collected twenty-eight (28) samples were systematically documented, and their initial weights were recorded. Preliminary analysis was performed using micro-X-ray fluorescence spectrometer (micro-XRF). Immediately after the micro-XRF analysis, the samples were examined under a stereo microscope and a polarized light microscope (PLM). Gravimetric measurements were then conducted, and the samples were reweighed to determine the organic content based on mass loss. A second micro-XRF analysis was subsequently performed to identify the remaining inorganic and metallic components.

Results & Discussion: All twenty-eight (28) analysed samples were found to be contaminated with starch ranging from approximately 1%–4% by weight., The gold separated from these contaminated samples was determined to be pure elemental gold rather than gold alloys.

Based on these results, finely crushed gold dust can be readily shaped or combined with common materials such as starch to alter its physical appearance. The development of this integrated method addresses the limitations of conventional inspection techniques in detecting and identifying such disguised samples.

Conclusion: This novel analytical approach combines polarized light microscopy and micro-XRF techniques in a sequential workflow specifically optimized for detecting metallic gold particles embedded within organic carrier substances, addressing challenges in forensic material analysis.

Keywords: Gold Smuggling, Micro-XRF Analysis, Starch Contamination, Suspected Metal Identification

Acknowledgement: I would like to express my sincere gratitude to the Government Analyst and the entire Forensic Laboratory Team, Government Analyst's Department, the Ministry of Public Administration and the Sri Lanka College of State Scientists.

Detection and Quantification of Aflatoxins in Dried Chillies Imported to Sri Lanka, using Liquid Chromatography with Fluorescence detection to raise awareness among public

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CS7

Introduction: Aflatoxins are potent carcinogenic and hepatotoxic compounds produced by *Aspergillus* species, commonly contaminating food products in warm, humid climates. Dried chilli, a widely consumed spice in Sri Lanka, is highly susceptible to aflatoxin contamination during production, drying, and storage. Ensuring compliance with national and international safety standards is crucial for protecting public health.

Objectives: To evaluate cumulative data on aflatoxins types (B_1 , B_2 , G_1 , G_2) in imported dried chillies and assess compliance with safety standards namely SLS, EU, and CODEX.

Methods: Forty-five imported dried chilli samples were analysed. Aflatoxins were extracted using standard R-Biopharm method and quantified using Liquid Chromatography with Fluorescence Detection (LC-FLD). The method was validated for sensitivity, accuracy, and reproducibility, and evaluated their compliance with standards namely SLS, EU, and CODEX regulator limits.

Results & Discussion: At least one family of Aflatoxins were detected in Twenty-eight out of forty-five samples (62%). Aflatoxin B_1 was present in Twenty-eight samples, B_2 in Sixteen, G_2 in four, while G_1 was not detected in any sample. Total aflatoxin levels exceeded 10 µg/kg (ppb) in fifteen samples. Five dried chilli samples showed particularly high levels, with total aflatoxin concentrations of 123, 215, 281, 258 and 537µg/kg respectively; significantly surpassing the maximum allowable limits set by SLSI and EU (10 µg/kg), and Codex standards (20 µg/kg). Aflatoxin B_1 was the dominant and most toxic variant observed. These findings indicate a significant risk of chronic aflatoxin exposure among consumers and suggest possible issues in the supply chain, including poor post-harvest handling and inadequate quality control during import.

Conclusion: A substantial proportion of imported dried chilli samples in Sri Lanka were contaminated with aflatoxins, with some posing severe health risks due to excessive levels. These results underscore the need for stringent import surveillance, regular testing, and alignment with international food safety standards to ensure consumer protection.

Keywords: Aflatoxins, Dried Chilli, LC-FLD, Food Safety, Sri Lanka

Acknowledgement: The support provided by the Ministry of Public Administration, the Sri Lanka College of State Scientists and the scientific staff of the Government Analyst's Department.

CS8

Identification of Interference from Selected Polymer Products in Fire Debris Analysis using GC/MS

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Introduction

The fire debris analysis is crucial in fire investigations to determine the presence of accelerants residues in suspected arson cases. However, this task is highly challenging due to interference from substrate materials and their pyrolysis products generated during pyrolysis and combustion. Common household polymer products such as polystyrene (PS) and low-density polyethylene (LDPE) fall into this category and their interfering compounds can mimic the chemical signatures of accelerants and therefore lead to misinterpretation of the results. This study was carried out to overcome this misinterpretation in kerosene accelerated real world fires.

Objectives: To identify the interference and data interpretation of polystyrene (PS) and low-density polyethylene (LDPE) in kerosene accelerated fires, using Gas Chromatography–Mass Spectrometry (GC/MS)

Methods: Test polymer samples included two PS products **(**white spoons and rigid polystyrene foams) and two LDPE products (shopping bags and garbage bags). A total of twelve samples were prepared, representing unheated controls, heated samples without kerosene, and burnt samples after being spiked with kerosene. Passive headspace adsorption with activated charcoal strips followed by solvent extraction was employed in accordance with ASTM E1412-19. Analysis of volatile compounds by GC/MS and data interpretation were carried out following ASTM E1618-19 guidelines.

Results & Discussion: Considering both unheated and heated PS, it was not possible to interpret as kerosene since its interfering compounds did not fit for kerosene target compounds. LDPE pyrolysis products can strongly affect for kerosene identification rather than interference comes from unheated samples. They produced similar compounds in the range of C9-C16 n-alkanes showing a distribution pattern similar to kerosene. Such similarities could result in false-positive interpretations. However, these interfering compounds consisted of a series of "doublets" for each carbon number corresponding to the alkene and the alkane. This feature helps minimize misinterpretation. However, trace amounts of kerosene may be masked by this inference, potentially leading to false negatives. Furthermore, chromatograms of samples spiked with 200 µL of kerosene did not display interfering doublets, since the spiked volume was sufficiently high to allow unambiguous identification.

Conclusion: PS interfering compounds did not interfere with kerosene identification for selected PS products and interpretation was straightforward. In contrast, LDPE was the most problematic polymer for kerosene identification and prominent "doublets" must be considered along with kerosene target compounds.

Keywords: Accelerant Identification, Fire Debris Analysis, Gas Chromatography–Mass Spectrometry (GC/MS), Polymer Interference

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CS9

Establishment of a correlation between shooting distance and slug dispersion diameter using a shotgun

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Introduction: Shotguns are the most commonly used firearms in Sri Lanka. Government analyst's department analyses many cases involving shotguns and damaged garments pertaining to shooting distance. Garments, appeared as the first target, are examined to confirm as gunshot, detect gunshot residues and estimate shooting distance. Shotgun cartridges contain multiple projectiles (slugs) causing many damages at the target. Slug dispersion at the target is influenced by several factors. Shooting distance is one factor, defined as the distance between muzzle end of the gun and the target.

Objectives: To establish a correlation between shooting distance and slug dispersion diameter.

Method: Test firing was performed at 0, 0.2, 1, 2, 4, 6, 8, 10, 12, 14, 16 and 18 m shooting distances in the indoor firing range using cotton fabric as the target, 12 - bore standard shotgun (Russian, Baikal gun, model 18EM-M, barrel - 72 cm, bore diameter – 18.2 mm, choke - F (1,0)) and 12- bore standard cartridges (Cyprus, type Olympia containing nine "SG" slugs) The diameter of the circular dispersion of gunshots were measured at different shooting distances. Data analysis was performed using linear regression.

Results & Discussion: Single damages were observed at 0, 0.2, and 1 m. Slug dispersion started at 2 m and diameter increased with further increased of the shooting distance. Linear regression model for the slug dispersion and shooting distance is $S = 0.017d + 0.0093$, ($R^2 = 0.9521$), where, d– shooting distance (m), S– slug dispersion diameter (m), 0.017 – constant for the shot gun. 0.0093 is the intercept of the graph (dispersion at contact shooting, predicted by the model).

Conclusion: R^2, 0.9521 suggested that 95% of variation in slug dispersion (Y) can be explained using the model. Therefore, the model is acceptable to be used in prediction of shooting distance. Slug dispersion diameter at 0 m and 1 m cannot be experimentally measured due to extensive destruction of the target from muzzle energy. This represents a methodological limitation, necessitating further optimization and validation of the model.

Keywords: slug dispersion diameter, shooting distance

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CS10

Scientific Standardization of Dhatri Churna: Establishment of Physicochemical Parameters and TLC Fingerprint Profiling

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Introduction: The global surge in the use of herbal medicines has underscored the urgent need for scientifically validated standards to ensure the quality, safety, and efficacy of traditional Ayurvedic formulations. *Dhatri Churna,* a classical polyherbal formulation, is widely utilized for its laxative properties and its role in detoxifying the digestive and circulatory systems. This formulation is composed of *Terminalia chebula*, *Terminalia bellirica*, *Emblica officinalis*, *Glycyrrhiza glabra* , *Senna alexandrina* , and sugar. Dhatri Churna remains insufficiently standardized from a scientific perspective, underscoring the necessity for comprehensive pharmacognostical, phytochemical, and pharmacological evaluation.

Objectives: To establish standardized physicochemical parameters and develop a Thin Layer Chromatography (TLC) fingerprint profile for Dhathri Churna, thereby enhancing its quality assurance and supporting its regulatory validation.

Methods: Six in-house batches of Dhatri Churna were formulated using authenticated raw materials according to the Ayurvedic Pharmacopoeia of Sri Lanka. Physicochemical parameters were determined, including Loss on Drying, pH, Total Ash, Acid-Insoluble Ash, Water-Soluble Extractive, and Alcohol-Soluble Extractive values, following the World Health Organization (WHO) guidelines for herbal medicines. Thin Layer Chromatography (TLC) analysis for Methanolic extracts of each batch was analyzed on Silica gel 60 F_{254} plates using Toluene: Ethyl Acetate: Formic Acid (35:15:2, v/v/v). The developed chromatograms were examined under ultraviolet light at 254 nm and 366 nm, followed by post-derivatization using 5% ethanolic sulfuric acid reagent to enhance spot visualization.

Results and Discussion: The established ranges (Mean ± 2SD) for key parameters were as follows: Loss on Drying (4.65–7.05%), pH (4.04–4.44), Total Ash (2.93–3.85%), Acid-Insoluble Ash (0.00–0.46%), Water-Soluble Extractive (65.66–71.14%), and Alcohol-Soluble Extractive (13.84–19.68%). These results confirmed formulation stability and consistency across all six batches. TLC analysis revealed reproducible chromatographic bands at characteristic Rf values, confirming the presence of specific phytochemical constituents. These findings support the establishment of a robust physicochemical and TLC profile, which can be used as a quality control benchmark for the standardization and regulatory validation of Dhatri Churna.

Conclusion: This study successfully established key quality control parameters and a reproducible TLC fingerprint profile for *Dhatri Churna*. These findings provide a scientific basis for standardizing the formulation, facilitating quality assurance, regulatory compliance, and ensuring consumer safety.

Keywords: Standardization, Quality control, Herbal drugs, physicochemical parameters, TLC fingerprint

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Forensic Analysis of Diesel Residues in Fire-Damaged Motor Vehicles: Addressing Interferences from Automotive Fluids

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CS11

Introduction: A comprehensive fire investigation is essential for determining the precise cause of a fire, whether accidental or intentional. Laboratory analysis of fire debris recovered from the scene is crucial in fire investigation, particularly in the detection of fire accelerants used to initiate and intensify fires, especially in suspected cases of arson. Motor vehicles contain a variety of flammable materials, including solid combustibles and fluids such as engine oil, brake oil, hydraulic oil and power steering oil. Although forensic scientists may collect samples appropriately from fire-damaged vehicles, interpreting the presence of ignitable liquids in these samples remains challenging due to potential interferences from plastics, rubbers and road tar residues.

Objectives: To identify diesel residues in fire debris containing various automobile fluids and to evaluate potential interferences that may affect the analysis of diesel in the presence of different types of automobile fluids.

Methods: The sampling methodology involved heated passive headspace extraction, where the headspace generated by heating the sample in a metal container allowed volatile compounds were adsorbed onto activated charcoal strips suspended within the headspace. These adsorbed compounds were subsequently extracted into acetone and analyzed using Gas Chromatography-Mass Spectrometry (GC/MS). To simulate fire incidents, *Alstonia scholaris* wooden slips were soaked with four types of automobile fluids; engine oil, brake oil, hydraulic oil and power steering oil. The presence of diesel residues in burnt samples was identified by comparing retention times of target compounds and characteristic peak patterns of diagnostic groups with those of a standard diesel reference.

Results & Discussion: The analysis identified dodecane, tridecane, tetradecane, pentadecane, hexadecane, heptadecane, and eicosane as potential interfering compounds with diesel target compounds, particularly in samples containing engine oil and brake oil. Post-burning, hexadecane, heptadecane, and eicosane showed a 100 % reduction in interference, improving the detection of diesel residues.

Conclusion: This study highlights the challenges of degradation during burning and matrix effects in detecting diesel in fire debris containing automobile fluids. It emphasizes the need for careful sampling and analysis to distinguish diesel from interfering hydrocarbons, thereby ensuring accurate forensic interpretation in fire investigations.

Keywords: Automobile Fluids, Diesel Residue Detection, Fire Debris Analysis, Gas Chromatography–Mass Spectrometry (GC/MS)

Acknowledgement: The support provided by the Ministry of Public Administration, the Sri Lanka College of State Scientists and the scientific staff of the Government Analyst's Department.

CS12

Differentiation of Authentic *Cedrus deodara* Wood from Market Adulterants: An Integrated Organoleptic and Phytochemical Analysis

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Introduction: *Cedrus deodara* (Roxb.) (Devadara), a member of the Pinaceae family, is a medicinally important tree traditionally used to treat respiratory and skin ailments. However, its populations are increasingly threatened by climate change, deforestation, and overharvesting. These pressures have led to a growing concern in the herbal medicine industry: the adulteration of authentic Devadara wood with material from other species.

Objectives: To correlate the organoleptic findings with phytochemical profiles to establish simple, practical indicators for the preliminary identification of authentic wood

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Methods: Fifteen wood samples were collected from the raw material market and raw material suppliers and evaluated based on color, texture, odor, and maturity, as indicated by growth ring patterns. Selected samples underwent sequential solvent extraction using hexane, ethyl acetate, and methanol. The following solvent systems were used for Thin Layer Chromatography (TLC): hexane: ethyl acetate (10:2) for hexane extracts, toluene: ethyl acetate (8:2) for ethyl acetate extracts, and toluene: ethyl acetate (10:4) for methanol extracts. Vanillin-sulfuric acid was used as a spray reagent for visualization.

Result and Discussion: The authentic sample and the samples collected from the market shared similar characteristics, yellowish brown color, hard and oily texture. The authentic *Cedrus deodara* exhibited a characteristically pleasant, milder odor, suggesting a divergence in volatile oil composition. Chromatographic profiling via TLC provided definitive evidence for authentication. Under UV light (365 nm), hexane extracts of authentic samples displayed distinct fluorescent spots at Rf values of 0.38, 0.49, and 0.91, while methanol extracts showed prominent fluorescent markers at Rf 0.31, 0.54, and 0.84, among others. Upon application of a spray reagent for visualization, a characteristic profile was established for the authentic wood. A critical finding was the consistent discrepancy in spot presence, number, and intensity between the authentic and market samples. These observed variations in the phytochemical fingerprint indicate that the commercial samples are adulterated with material from alternative species, underscoring the importance of such chemical analyses for ensuring the quality and authenticity of herbal products

Conclusion:

This study confirms the adulteration of market samples of *Cedrus deodara* wood. While organoleptic similarities exist, TLC analysis revealed distinct phytochemical profiles, with specific Rf values. Further analysis using GC-MS and DNA barcoding may support genetic-level authentication.

Keywords: adulteration, *Cedrus deodara* wood, Thin Layer Chromatography, fluorescence detection

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Quantitative Analysis of Aflatoxin Contamination in Commercially Available Coconut Oil in Sri Lanka by HPLC with Post-Column Derivatization

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CS13

Introduction: Coconut oil, traditionally extracted from copra, is the major edible oil used in Sri Lanka for cooking. However, copra may be contaminated by toxicogenic fungi and the subsequent production of aflatoxins, which then transfer to the final edible coconut oil product during extraction. These aflatoxins pose a serious public health threat as potent carcinogens that remain stable at high temperatures and are resistant to cooking processes. This creates an invisible danger for consumers. To understand the extent of this risk, it is essential to evaluate the ground-level situation by testing for aflatoxin contamination in both branded and unbranded coconut oils available on the local market.

Objectives: To analyze the aflatoxin content in a representative sample of coconut oils from the Sri Lankan market and compare the results against the permissible limits.

Methods: Seventy-six (76) samples including locally produced branded (40) and unbranded (36) products obtained from Sri Lankan market were extracted using immunoaffinity columns (IAC). The occurrence of AFs (B1, B2, G1, G2) in the extracts of coconut oil were determined using high-performance liquid chromatography (HPLC) with post-column derivatization. One sample *t*-test was used to determine whether the total aflatoxin level and AFB1 levels of branded and unbranded coconut oil samples were different from the SLS maximum permissible limits of 5.0 µg/kg for AFB1 aflatoxin level and 10.0 µg/kg for total level of aflatoxins.

Results & Discussion: The results depicted that out of the 36 unbranded coconut oil samples, 23 aflatoxin positive samples (63.89%) were detected and 15 (41.67%) samples exceeded the maximum permissible level set by SLS for total aflatoxin. Out of the 25 branded regular coconut oil samples, 8 aflatoxin positive samples (32.0%) were detected and 2 (8.0%) samples exceeded the maximum permissible level set by SLS for total aflatoxin. The total aflatoxin contamination in branded coconut oil products ranges from 2.00 µg/kg -15.80 µg/kg whereas the total aflatoxin contamination in unbranded coconut oil products ranges from 7.12 µg/kg - 86.10 µg/kg.

Conclusion:
In this study, all aflatoxin positive coconut oil were unbranded coconut oils. The total aflatoxin and AFB1 contamination of unbranded coconut oil was significantly higher than the branded coconut oil products and certain instances it may impose health risks to consumers.

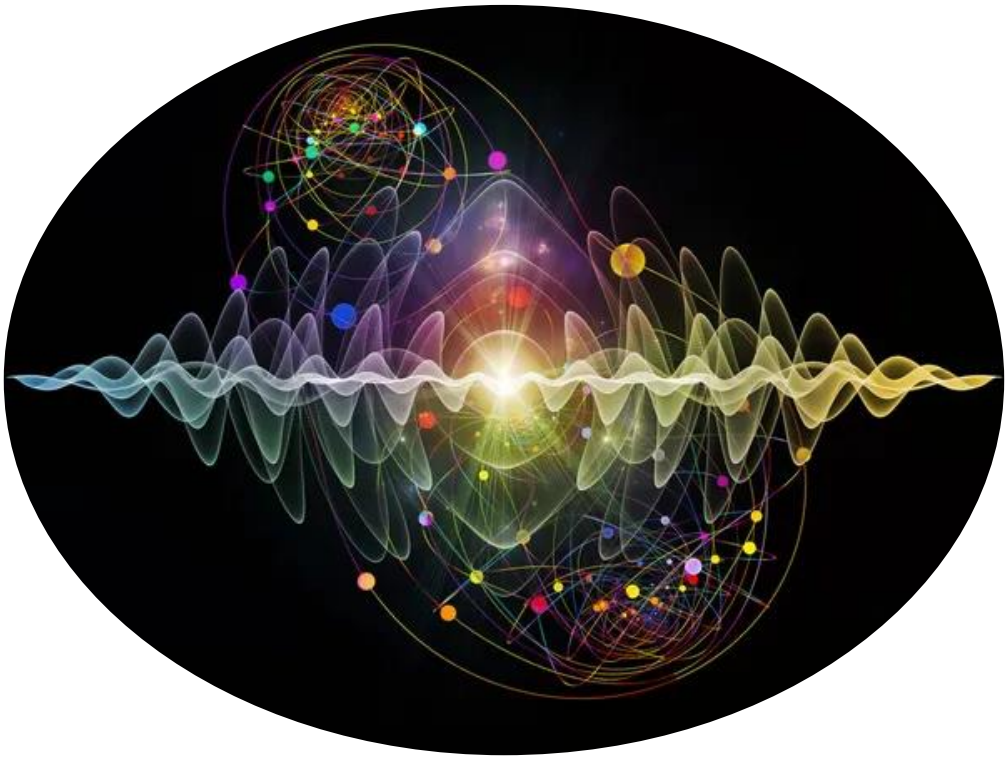
Keywords: aflatoxins, copra, immunoaffinity column, post column derivatization

Acknowledgement: I would like to express my sincere gratitude to the Ministry of Public Administration and the Sri Lanka College of State Scientists and staff of the 2National Institute of Health Sciences, Kalutara, Sri Lanka.

Session 2:

Physical Sciences

Oral presentations



Evaluation of Water Conductivity Standards Traceable to Electrical Resistance for Conductivity Meter Calibration

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NS1

Introduction: Electrical conductivity is a vital indicator of water purity, widely used in evaluating drinking water and for various laboratory and industrial applications. Conductivity meters rely on sensors with two or four electrodes, which require regular calibration to ensure accurate readings. Common calibration methods involve in-house preparation of potassium chloride (KCl) solutions or standard conductivity solutions. However, uncertainties arise due to contamination, weighing errors, and the conductivity of the base water, compromising traceability and reliability.

Objective: To improve traceability and accuracy in conductivity meter calibration by introducing an impedance-based conductivity measurement system traceable to national electrical resistance standards.

Methods: A custom-designed four-electrode conductivity cell was developed and integrated with an impedance measurement setup. By dissolving known quantities of KCl in distilled water, various conductivity levels were generated. The test meter and the impedance-based system simultaneously measured the same solution. Calibration results were analyzed for agreement, repeatability, reproducibility, and uncertainty.

Results: The results showed close agreement between the conventional standard solution method and the impedance-based approach across a range of conductivity values. The proposed system exhibited good repeatability and reproducibility, with measurement uncertainties within acceptable limits. Cross-checking with commercial standard solutions confirmed their reliability as well. These findings validate the performance of the developed system for calibration purposes.

Conclusion: The custom conductivity cell and impedance system provide accurate, repeatable, and traceable measurements for conductivity meter calibration. This method ensures traceability to national resistance standards and offers a robust alternative to traditional solution-based calibration methods, enhancing confidence in water quality measurements.

Keywords: Conductivity cell, Conductivity meter calibration, Standard conductivity solution, Electrical conductivity, Electrical resistance standard

Acknowledgement: The support provided by the Management of the Measurement Units, Standards and Services Department, the Sri Lanka Scientific Service, the Ministry of Public Administration, and the Sri Lanka the College of State Scientists dually acknowledge.

Session 3:

Natural Sciences

Oral presentations

NS1

The Impact of Land Degradation and Management Practices on Cinnamon Productivity in Sri Lanka

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Introduction: The Cinnamon (*Cinnamomum verum* J.Presl) commonly exists as a monocrop in Sri Lanka. About 9.21% of the total area under cinnamon in the Galle district is reported as non-productive. Land degradation (LD) refers to the loss of a soil's potential productivity. To manage such land, it is necessary to evaluate the LD level and its effects on cinnamon Dry Bark Yield (DBY). There is no evidence of a specific method for assessing LD levels on-site in Cinnamon Land and the impact on DBY.

Objective: This paper aims to provide a comprehensive assessment of LD levels in cinnamon cultivation areas and to evaluate the impact of LD on DBY and key soil chemical properties.

Methodology: Field observations and soil samples were collected from 90 cinnamon-growing fields, covering 220 hectares across nine districts (Galle, Matara, Hambantota, Kalutara, Gampaha, Colombo, Rathnapura, and Kegalle) from 2017 to 2022. The observed fields were ranked into five LD levels (1-5 levels) based on plant health and on-field soil condition. An Ordered Logistic Regression analysis was performed between LD and four independent variables, such as the steepness of the land % (Slope), the application of a soil conservation method (SC), Plant Vacancy Percentage (PVP), and the Age of the plantation. A General Linear Model (GLM) analysis was conducted to determine how LD and other cultural practices—such as Pruning (1-5 levels), disease shoot pruning (DSP; 1-5 levels), post-harvest pruning (PHTP; 1-5 levels), fertilizer application (FT; 1-2 levels), and Dolomite application (Dolomite; 1-2 levels)—as well as soil chemical properties (Soil pH, Electrical Conductivity, total nitrogen, and Exchangeable Potassium) affect cinnamon Dry Bark Yield (DBY).

Results & Discussion: The result revealed a significant relationship between LD levels and Slope (P=0.0045). As the slope increases, the probability of being in higher LD categories rises. Other predictors, including SC, PVP and Age, did not show a significant impact on LD. The GLM (pseudo-R^2 = 0.49, P = 0.013) results show that Dolomite has a significant (P = 0.026) impact on DBY, and PHTP also has a positive and significant (P = 0.049) impact on DBY. The soil chemical parameters did not significantly influence cinnamon yield ($p > 0.05$). The overall model was also not statistically significant (F = 1.10, p = 0.4281), explaining only 41% of the variability in yield.

Conclusion: Specific management practices like proper pruning and dolomite application play a crucial role in improving yield. Future research with larger sample sizes and long-term studies is recommended to understand better the complex factors governing cinnamon productivity.

Keywords: Cinnamon, Soil Degradation, Pruning, Slope

Acknowledgment: The support given by the Sri Lanka Scientific Service, Ministry of Public Administration and Sri Lanka College of State Scientists and all the staff members of National Cinnamon Research and Training Center, Thihagoda are acknowledged.

Distribution and Regeneration of *Horsfieldia iryaghedhi* in Indikadamookalana forest reserve in wet zone, Sri Lanka

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NS2

Introduction

Endemic *Horsfieldia iryaghedhi*, a plant of the family Myristicaceae, is sparsely distributed in lowland wet and intermediate forests in Sri Lanka, categorized as Vulnerable (VU) in the National Red List of Sri Lanka (2020).

Objective: The study aims to determine distribution and regeneration of *H. iryaghedhi* in the Indikadamookalana Forest Reserve (IFR).

Method: Field surveys were conducted in five 20 m × 20 m plots each, in the IFR at three elevation levels; 50–150 m, 150–250 m, and 250–350 m. The number of plants and diameter at breast height (DBH) were recorded for each plot. Statistical analysis included one-way ANOVA, Tukey's HSD test, the variance-to-mean ratio and Chi-square test.

Results & Discussion

The study recorded the highest abundance of *H. iryaghedhi* at the low: 570 plants/ha, followed by 300 plants/ha at high and 250 plants/ha at mid elevation. The abundance of *H. iryaghedhi* in the lowest elevation was statistically significant when compared to both mid and high elevations. The distribution pattern of *H. iryaghedhi* is uniform at low and mid compared to clump at high elevation. DBH class distribution of plants shows a perfect reverse J-shaped curve at low elevation with a balance regeneration, while bell shape at mid elevation indicating a prevalent condition restricting regeneration with a past favorable event resulting a group of plant flourishing. An irregular reverse j-shaped curve at high elevation with high abundance of immature plants indicate rejuvenating regeneration occurring successfully.

Conclusion: The abundance of *H. iryaghedhi* varies across the elevation with a clumped distribution in high elevation. The high elevation shows recent regeneration, while low elevation indicates a stable regenerating population, when compared to the older stand structure exhibited by mid elevation.

Key Words: Abundance, Distribution, Regeneration, *Horsfieldia iryaghedhi*

Acknowledgement: Department of National Botanic gardens, Department of Forest, Sri Lanka Scientific Service, Ministry of Public Administration and Sri Lanka College of State Scientists dually acknowledged.

NS3

Evaluating the Predictive Capacity of Ovitrap and Prokopack-Based *Aedes* Surveillance for Dengue Outbreal

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Introduction: Dengue fever is a rapidly spreading mosquito-borne viral disease in Sri Lanka. Findings of entomological techniques can be utilized to forecast dengue outbreaks. The limited predictive accuracy of traditional entomological surveillance in Sri Lanka creates an urgent need for improved methodologies. This study directly addresses this need by exploring novel tools to forecast outbreaks from existing data, in line with WHO recommendations for proactive control.

Objectives: This study aims to evaluate the effectiveness of Prokopack aspirator and ovitrap methods for monitoring *Aedes* mosquito population trends over time, investigate the relationship between *Aedes* prevalence and dengue incidence, and climatic factors.

Methods: This study was conducted from November 2021 to May 2022 in three selected Medical Officer of Health (MOH) areas in Colombo district namely, CMC-D1, Nugegoda and Kolonnawa. The selected entomological techniques were performed in randomly selected households in accordance with the standard operating procedures (SOPs) of the National Dengue Control Unit. Monthly, adult mosquitoes were collected from 40 households in each MOH area using Prokopack aspirators, and eggs were collected from 100 households in each MOH area in indoor and outdoor using ovitraps. Entomological indices such as female mosquitoes per surveyed house (F/SH), female mosquitoes per *Aedes* positive house (F/PH), adult house index (AHI), adult density (AD), resting ratio (RR), ovitrap index (OI) and egg density index (EDI) were calculated to assess mosquito density and prevalence. Monthly entomological indices were assessed using Pearson's correlation analysis to identify the relationships with meteorological data and dengue incidences.

Results and Discussion: The indices generated from Prokopack aspirator method, including F/SH, AD and RR showed significant strong positive correlation with number of dengue cases with one month lag ($r=0.87$, $P=0.022$, $r=0.86$, $P=0.027$ and $r=0.87$, $P=0.022$) respectively. The EDI: an ovitrap based index showed significant strong positive correlation with number of dengue cases with one month lag ($r=0.88$, $P=0.022$). Significant positive correlations were observed between all adult indices and the monthly mean of minimum temperature (Tmin) ($P<0.05$). In contrast, only EDI exhibited a significant positive correlation with Tmin. ($r=0.89$, $P<0.05$). No statistically significant relationships were found between adult and ovitrap indices and monthly means of maximum temperature, rainfall, or number of rainy days per month.

Conclusion: Present findings suggest that adult and ovitrap surveillance methods can be used as tools for dengue outbreak forecasting, especially the indices; F/SH, AD, RR, and EDI demonstrated the greatest potential as reliable predictors for future dengue outbreak forecasting. `

Key words: Dengue fever, *Aedes* surveillance, outbreaks forecasting, Propack Aspirator, Ovitrap

Acknowledgement: The support given by the Sri Lanka Scientific Service, Ministry of Public Administration and Sri Lanka College of State Scientists. This research was conducted as part of a larger study and was supported by a grant from the National Research Council (NRC 19-065)

NS4

In Vitro Propagation of *Glycyrrhiza glabra* L. (Welmee) Through Seed Culture for Local Introduction

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Introduction: *Glycyrrhiza glabra* L. (liquorice), commonly known as Welmee in Sinhala, is a medicinally important shrub of family Fabaceae with wide-ranging therapeutic properties and high commercial value in the pharmaceutical, cosmetic, and food industries. Despite its extensive use in Ayurveda, *G. glabra* is not cultivated in Sri Lanka, and the entire demand is met through imports, leading to substantial economic costs and increasing the risk of false identification with *Abrus melanospermus* Hassk. (Ela Olinda) from the same family. Establishing local propagation protocols for *G. glabra* is therefore vital to ensure sustainable supply and authenticity in herbal medicine.

Objectives: This study aimed to develop an effective *in vitro* propagation protocol for *G. glabra* using seed culture, with the objectives of identifying the most suitable seed pretreatment method for *in vitro* germination and optimizing media conditions for shoot proliferation.

Methods: Five different seed pretreatments were tested, including soaking, thermal and mechanical scarification, and a control Seeds were cultured on Murashige and Skoog (MS) basal medium, and early growth parameters were evaluated over a 28-day period. Following germination, explants were obtained from *in vitro*-grown seedlings. Nodal cuttings were taken as explants and were cultured in MS medium supplemented with three plant growth regulators (PGRs): BAP (6-Benzylaminopurine), IAA (Indole-3-acetic acid), and NAA (Naphthalene acetic acid). All experiments used a completely randomized design and were analyzed with a one-way ANOVA in MINITAB 17.0.

Results & Discussion: Results indicate that all the treatments except overnight soaking, achieved over 90% germination, suggesting that seed dormancy was already overcome. Hot water treatment showed the fastest germination (3.1 days), greatest seedling height (5.3 cm), and highest number of leaves (3.9), although differences were not statistically significant. Unexpectedly, the control medium without PGR produced the most vigorous growth: 5.49 cm shoot length, 1.89 shoots per explant, and 13.0 leaves per explant. Treatments with growth regulators induced basal callus formation and significantly reduced shoot proliferation.

Conclusion: The *in vitro* propagation of *Glycyrrhiza glabra* L. can be effectively achieved using untreated seeds that have naturally overcome dormancy, along with PGR free MS medium. Further studies are needed to optimize conditions for plant regeneration from the callus, which could potentially enhance the multiplication rate and overall plant yield.

Keywords: *Glycyrrhiza glabra*, seed pretreatments, *in vitro* propagation, shoot multiplication

Premises-Level Distribution of Dengue Vectors in Colombo District, Western Province, Sri Lanka

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NS5

Introduction
Colombo is the most dengue-affected district in Sri Lanka, with 11,348 cases reported in 2024. The high degree of urbanization and population density in Colombo makes dengue control efforts particularly challenging.

Objectives
The study aims to identify and categorize premises based on their potential to support dengue vector breeding and distribution of *Aedes* vector populations across different types of premises.

Methodology
Premises were classified into categories such as residential, commercial, government institutions, religious places, schools, other educational centers, construction sites, private institutions and factories in dengue high risk localities in Battaramulla, Kaduwela, Kolonnawa, Maharagama, Nugegoda, Rathmalana, and Dehiwala MOH areas. Entomological surveys were carried out to investigate the dengue mosquito vector larvae in each site from July 2024 to December 2024. Collected samples were identified to the species level. Descriptive statistics and Chi-squared test were used to analyze the data.

Results
A total of 3,973 premises (3,800 houses and 173 institutions) were inspected, of which 417 were found positive for *Aedes* larvae. *Aedes* larvae were most prevalent in other educational centers (tuition centers and universities) (n=7, 85.7%) and government institutions (n=26, 65.4%). *Ae. aegypti* was most prevalent in factories (n=9, 80%) and construction sites (n=36, 68.75%), while *Ae. albopictus* was predominantly found in private institutions (n=10, 100%) and commercial sites (n=1 100%). However, the association between vector presence and premises type was not statistically significant ($p>0.05$). The chi-squared values for different premises types were as follows: commercial sites ($df = 16$, $\chi^2 = 0.386$), construction sites ($df = 35$, $\chi^2 = 0.422$), factories ($df = 8$, $\chi^2 = 0.342$), government institutions ($df = 25$, $\chi^2 = 0.408$), other educational centers ($df = 6$, $\chi^2 = 0.321$), religious places ($df = 44$, $\chi^2 = 0.430$), schools ($df = 21$, $\chi^2 = 0.400$), and private institutes ($df = 9$, $\chi^2 = 0.350$).

Conclusion
This study reveals widespread *Aedes* mosquito presence across various premises types in dengue high-risk areas in Colombo. Although no significant association was observed between vector presence and premises type, the higher prevalence in institutions, underscores the need to enhance awareness, strengthen institutional monitoring, and strengthen entomological surveillance for comprehensive area-wide vector control.

Keywords: Dengue, *Aedes*, Premises, Institutions, Entomological surveys

Acknowledgement: The valuable support extended by the field officers attached to the MOH offices under the Colombo Regional Director of Health Services, Sri Lanka Scientific Service,

NS6

In vitro Evaluation of *Derris parviflora* Leaf, Bark, and Root Extracts for the Control of Cinnamon Thrips (*Helionothrips annosus* Wang) as Potential Botanical Insecticides

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Introduction: Cinnamon thrips cause severe damage to immature leaves, leading to seedling and shoot death, while in mature bushes they result in abnormal growth and reduced yield. Although synthetic insecticides are commonly used, their application contradicts the principles of organic farming.

Objectives: This study investigates *Derris parviflora* (Kalawel), a plant with known piscicidal properties, as a potential eco-friendly alternative for managing cinnamon thrips. It aims to identify the most effective plant part, form, and concentration against nymphs under *in vitro* conditions.

Methods: Leaf, bark, and root materials of *D. parviflora* were collected from natural habitats in Kamburupitiya, Sri Lanka. Both fresh and dry forms of the samples were ground and soaked in distilled water for three days. The resulting filtrates were used to prepare 1%, 10%, 20%, and 50% concentrations. Batches of first-instar nymphs were then treated with these extracts alongside control solutions—distilled water and Imidacloprid. Insect mortality was recorded to calculate percentage mortality and to estimate LC_{50} values using probit analysis. A three-factor factorial ANOVA was employed to assess treatment effects.

Results and Discussion: Root extracts exhibited significantly lower LC_{50} values (<0.10%) compared to leaf (13–20%) and bark (16–19%) extracts ($P = 0.001$). Fresh material performed significantly better than dry forms ($P = 0.001$). The 1% solution of fresh root extract resulted in 100% insect mortality, comparable to the synthetic insecticide. Plant part, form, and concentration showed significant main effects ($P \leq 0.001$), with only plant part and concentration interaction significant. The three-factor interaction was highly significant ($P = 0.000$), emphasizing the combined influence on insecticidal activity.

Conclusion The study demonstrates that *D. parviflora* root extracts are highly effective against cinnamon thrips. Using fresh plant material processed through a 3-day soaking method enhances insecticidal activity compared to dry forms. Future research should focus on *in-vivo* experiments under field conditions to evaluate efficacy, optimize concentrations, and determine appropriate application frequencies of this botanical.

Keywords: *Derris parviflora*, Cinnamon thrips, '*Kalawel'*, biopesticide, Organic pest management, sustainable agriculture, eco-friendly pest control

Acknowledgement:

Grateful acknowledgment is extended to the Sri Lanka Scientific Service, the Ministry of Public Administration, and Sri Lanka College of State Scientists for their invaluable support

Applicability of CSUP (SEESUP - Sodium hypochlorite Ethanol Ethylene oxide Sterilization under Pressure) Method for Subculturing Stage of the *In vitro* Propagation of Cardamom

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NS7

Introduction:

Cardamom *(Elettaria cardamomum)* is a commonly used valued spice crop. The conventional method for sterilization of glassware and Murashige and Skoog (MS) media involves the use of autoclaving to sterilize prior to culturing. CSUP technique is a low-cost method, where sodium hypochlorite (NaOCl) is used to sterilize glassware and culture media. Our previous study has revealed that 5% sodium hypochlorite (NaOCl) also can be used as the alternative to the conventional sterilization technique for the *in-vitro* propagation of Cardamom at seed germination stage.

Objectives:

The aim of this study is to compare the suitability of CSUP sterilization method with the conventional method for subculturing stage of the *in vitro* propagation of Cardamom and to compare the growth parameters of Cardamom at subculturing stage using CSUP sterilization method with conventional sterilization method.

Methods:

Cardamom seedlings were used as explant and four concentrations (T1-7%, T2-10 %, T3-15% and T4-5%) of NaOCl as treatments prepared using commercially available NaOCl. CSUP sterilization method with four concentrations of NaOCl as treatments were compared with conventional method (T0-control). Data were analyzed using SAS statistical software. A one-way Analysis of Variance (ANOVA) was conducted to determine the significance of differences and treatment means were separated using the Duncan's Multiple Range Test (DMRT) at 5% significance level. Shoot length (cm), number of shoots, number of leaves and amount of non-contaminated samples of each treatment were collected as data.

Results & Discussion:

Compared to the control treatment, the highest values for average shoot length (cm), average number of shoots, average number of leaves and survival rate were observed from the treatment T3, while T4 recorded the lowest.

Conclusion:

Compared to the conventional method (T0), treatment T3 demonstrated superior performance across all evaluated parameters, indicating that better suitability of 15% concentration from the commercially available NaOCl for the CSUP sterilization as a cost effective and viable alternative for *in vitro* propagation of Cardamom at subculturing stage. Treatments T4 consistently performed poorly, suggesting a lack of efficacy at this stage.

Keywords: Cost effective, Sodium hypochlorite Ethanol Ethylene oxide Sterilization Under Pressure (CSUP), conventional, alternative, alternative surface sterilization methods, micropropagation

Acknowledgement:

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Assessment of microbial quality of Manibadra (Ayurvedic drug) over a considerable time period.

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NS8

Introduction: Manibadra is a well-known traditional Ayurvedic powder formulation, used for treating skin, urinary, spleen, respiratory, and other health conditions. It contains *Embelia ribes*, *Emblica officinalis*, *Terminalia chebula*, *Operculina turpethium*, and sugar as ingredients. Microbial contamination is very common in this product due to its sugar content which can lead to health hazards. Despite these concerns, proper storage instructions are currently not indicated on the packaging. This study was conducted to emphasize the importance of specifying appropriate storage conditions on the product label, particularly refrigeration, to reduce microbial contamination and maintain the safety and quality of the formulation.
Objective: To evaluate the microbial quality of Manibadra over an extended storage period under refrigerated conditions.
Method: Pure raw materials were selected following initial microbial screening (WHO). The formulation was prepared in-house under Good Manufacturing Practices (GMP). Standard microbial parameters, including Total Bacterial Count (TBC), Total Yeast and Mold Count (TYMC), and the presence of specific pathogenic bacteria (*Escherichia coli*, *Salmonella* spp., *Shigella* spp., and *Enterobacteria* spp.), were analyzed according to WHO guidelines. Samples were packaged in rigid, opaque, airtight containers and stored under two conditions: room temperature and refrigeration at 4°C. Microbial analyses were conducted monthly over a five-month period.
Results & Discussion: TYMC (6 × 103–2.8 × 10^4 CFU/mL) and TBC (1.2 × 10^4 –2.5 × 10^4 CFU/mL) increased steadily at room temperature, while remaining low or relatively constant under refrigeration (TYMC: 6 × 103–8 × 103 CFU/mL; TBC: 1.2 × 10^4 –1.3 × 10^4 CFU/mL) (based on WHO standard limits). Refrigeration had a statistically significant effect on reducing microbial counts compared to room temperature ($P < 0.05$), becoming evident from the second month and continuing through the five-month period. No pathogenic bacteria were detected in any of the samples over the study period. Due to limitations in refrigeration access, alternative preservation methods would be valuable. This short study offers preliminary insights, and longer-term research is needed for a more comprehensive understanding.
Conclusion: Refrigerated storage significantly reduces bacterial growth in Manibadra compared to room temperature. Including storage instructions on the product label is crucial to ensure microbial stability, safety, and quality of this medicinal preparation over time.
Key words: Manibadra, Ayurvedic medicine, microbial quality, refrigeration,

Acknowledgement: The author gratefully acknowledges the support of the Department of Ayurveda, Bandaranayake Memorial Ayurveda Research Institute, the Ministry of Public Administration, and the Sri Lanka College of State Scientists for their support.

NS9

Laboratory Rearing of Predatory Mosquito *Toxorhynchites splendens* and Evaluation of Its Feeding Efficacy on Dengue Vector *Aedes albopictus*

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Introduction: *Toxorhynchites* mosquitoes, known as elephant mosquitoes, are non-blood-feeding. Their adults consume sugary substances like nectar, while larvae are predatory, feeding on other mosquito larvae. This makes them suitable biological control agents that can enhance the existing vector management strategies and reduce dependency on chemical pesticides.

Objectives: The objectives were to rear *Toxorhynchites splendens colony* under laboratory conditions in Sri Lanka, to determine the feeding efficacy of *Toxorhynchites splendens* larvae on *Aedes albopictus larvae and t*o identify a suitable adult diet under laboratory conditions.

Methodology: *Toxorhynchites splendens* larvae were collected from Weralugama (Kuliyapitiya MOH area) and Kalimulla (Mahawewa MOH area) and reared in laboratory conditions and the length of the life stages were monitored. *T. splendens* larvae (n=30) from each colony were tubed individually and *Aedes albopictus* larvae were introduced daily to assess feeding efficacy of different larval stages. To find a suitable adult diet, F1 (n=30) and F2 (n-30) adults from Kalimulla were tested for sugar and bee honey preference over a 60-minute period. Data were analyzed using SPSS, ANOVA, and descriptive statistics performed.

Results and Discussion: Egg hatch rate of *T. splendens* (F1) was 72.45% in Weralugama and 74.48% in Kalimulla colonies. Mean larval and pupal durations (days) in Weralugama were: L1-3.65, L2-9.9, L3-16.5, L4-35.59, pupae-4.45; in Kalimulla: L1-4.53, L2-8.43, L3-18.35, L4-36.66, pupae-4.61. The L4 stage was the longest in both colonies, marking a critical growth phase before pupation. Adult females lived longer than males, reaching 68 days in Kalimulla verses 58 days in Weralugama. Adult longevity ranged 2-46 days (males) and 2-58 days (females) in Weralugama, and 2-51 days (males) and 2-68 days (females) in Kalimulla. Feeding efficacy on *Ae. albopictus* larvae by *T. splendens* was: Weralugama total-86.33 (L1-7.2, L2-11.67, L3-19.61, L4-47.85); Kalimulla total-97.37 (l1-8.48, L2-10.68, L3-23.8, L4-54.41). Predation peaked at L4. Bee honey (mean adult *Toxorhynchites*=17) was significantly preferred over 10% sugar (mean adult *Toxorhynchites*=5.5) in both F1 (ANOVA, $F=42.481$, $p<0.001$) and F2 ($F=40.151$, $p<0.001$) generations in Kalimulla.

Conclusion ;*Toxorhynchites splendens* demonstrated adaptability to laboratory rearing and effective larval predation supporting its potential for biological control of dengue vector. District entomology laboratories are recommended to conduct further research under laboratory and field conditions.

Keywords: *Toxorhynchites splendens, Aedes albopictus,* dengue, bio-control agent, bee honey

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Genetic variation of growth traits of *Eucalyptus grandis* in a progeny trial at Erabadda, Sri Lanka

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NS10

Introduction: *Eucalyptus grandis* is important timber species in both forest plantations and home gardens in Sri Lanka's tropical uplands. Present study was carried out in Erabadda research plot (2.8 Ha) of Badulla district, Sri Lanka. The study area contains seven different seed sources of *E. grandis*, which were belong in to seventy-two provenances. In this study, several growth parameters, such as diameter at breast height (DBH), Height of the tree and volume of the trees were determined at the age of 16 years, which can be consider as an optimum age for harvesting according to the literature. These findings will be useful for the future improvements of *E. grandis* in Sri Lanka.

Objectives: The objective of this study is to analyze the genetic variations in the *E. grandis* trial, established in Erabadda, Sri Lanka, in 2007 to explore breeding options suitable for Sri Lankan climatic conditions.

Methods: All trees of 2nd generation *E. grandis* trail at Erabadda, were assessed at approximately 16 years age, for height and DBH. The software package DataPlus was used to pre-processing of data. The REML procedure in GENESTAT statistical software was used to analyze Heritability, Phenotypic correlations, Selection of seed sources and families. Growth parameters assessed to evaluate variations among seed sources, families, and individual trees. Additionally, genetic parameters related to growth estimated and breeding options were explored.

Results and Discussion: At 16 years of age, the trees in the trial had an average individual DBH of 20.08 cm, height of 24.48 m, and volume of 309.62 dm^3 per tree. the highest DBH, height and tree volume was recorded in Seed Production Area Kinigama (SPA) Kinigama seed source. Second highest was recorded in Seedling seed orchard (SSO) Erabadda seed source. Although, the deference in-between maximum to minimum value is low in SPA Kinigama compared with SSO Erabadda.

Conclusion: The SPA Kinigama and SSO Erabadda proved significantly superior to unimproved sources for volume growth. Therefore, it suggests the selection of best seeds and breeding from above mentioned two best seed sources in Sri Lanka.

Key Words: *Eucalyptus grandis*, Seed sources, DBH, Height, Volume, Heritability, Genetic variations.

Acknowledgment: Acknowledged Mr. Dr. K.M.A Bandara and his research team (Project No: BD/TB/*E. grandis*/2008/02), who established the second-generation *E. grandis* trail at Erabadda. The support given by the Sri Lankan Scientific Service, Ministry of Public Administration and Sri Lanka college of State Scientists dually acknowledged.

Herbarium, Colombo National Museum: Diversity, Digitization, and Research Potential

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NS11

Introduction: The Herbarium of the Department of National Museums (DNM), Colombo, Sri Lanka, preserves an extensive natural historical botanical record. Established in 1975, the Herbarium of DNM originated from specimens collected during the Ceylon Flora Project (initiated in 1968) and houses angiosperms, ferns, mosses, and algae, reflecting the ecological and floristic diversity of the island. Despite its significance, the collection had not been systematically categorized or digitized, which limited its research potential and accessibility.

Objectives: The main objective of this study was to categorize, analyze and digitize the herbarium collection to describe its taxonomic and ecological diversity, while to identify gaps for future collection and research.

Method: Specimens collected from 1968–2024 were digitized with taxonomic, collection, and locality data, alongside high-resolution photographs. They were categorized into major plant groups and analyzed by families and climatic zones. Distribution patterns across time, taxa, and regions were examined using descriptive statistics, with linear regression assessing temporal trends and Chi-square tests evaluating group representation.

Results & Discussion:

The DNM herbarium comprises 2,963 of herbarium specimens, dominated by dicotyledons (69%, mainly Euphorbiaceae), followed by monocots (13%, largely Poaceae), ferns (7%, mainly Pteridaceae), mosses (4%), and algae (6%), with no gymnosperm specimens, though wet-preserved gymnosperms are included within wet collection. Chi-square analysis revealed significantly uneven taxonomic and specimen distributions, with a strong wet-zone bias (55%) and underrepresentation of dry-zone taxa. Two major collection phases were identified: the *Flora of Ceylon* project (1968–1979) and post-1980 museum contributions, with renewed collection and digitization since 2020. Regression analysis indicated no consistent temporal growth ($R^2 = 0.091$, $p > 0.05$), with peaks linked to specific projects. Notably, 98.5% of the collection has been digitized, with the remainder in progress, reflecting alignment with global herbarium trends and steady progress toward full digital integration.

Conclusion:

The herbarium should prioritize field collections in underrepresented climatic zones and plant groups such as gymnosperms, pteridophytes, bryophytes, and algae, while reorganizing specimens under the APG classification to maintain taxonomic accuracy and global relevance. Strengthening collaborations with academic and conservation institutions, alongside digitization and public outreach, will enhance its role as a key resource for biodiversity monitoring and conservation awareness in Sri Lanka.

Keywords: Natural history collection, herbarium data, digitization, biodiversity.

Acknowledgement: The support given by the Sri Lanka Scientific Service Board, Ministry of Public Administration and Review Committee of Sri Lanka College of State Scientists (SLCSS) dually acknowledged.

NS12

Development of an efficient in Vitro Propagation Protocol for Exacum walkeri Arn. ex Griseb through Seed Culture

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Introduction: Endangered, endemic *Exacum walkeri*, a species belongs to family Gentianaceae, is at high risk of extinction due to its narrow habitat specificity, limited distribution, and poor seed germination naturally.

Objective: To develop an efficient *in vitro* protocol for *E. walkeri* for conservation and mass propagation through seed culture.

Methods: Seed pods of *E. walkeri* collected from natural populations in the Horton plains National Park, Sri Lanka were surface sterilized using two concentrations (10% and 20%) of sodium hypochlorite for 20 minutes, seeds cultured aseptically on 25% and 50% Murashige and Skoog (MS) basal media and recorded germination rates. Subsequently, seedlings were transferred to full-strength MS medium supplemented with 0, 1.0, and 2.0 mg/L concentrations of 6-Benzyl Amino Purine (BAP) and their growth was measured.

Results: Surface sterilization with 20% NaOCl significantly reduced contamination compared to 10% NaOCl (100% vs. 20%, Fisher's exact test, $p=0.0007$). Seed initiation was success in 25% MS media (Mann–Whitney U test, $p=0.466$) while 1.0 mg/L BAP gave optimal seedling growth compared to the control (ANOVA - $F=5.46$, $p<0.05$).

Conclusion: This demonstrates an efficient in vitro propagation protocol for conservation of *E. walkeri*, with 20% NaOCl surface sterilization and 25% and 50% MS media performed equally for seed germination, while BAP at 1.0 mg/L is a cost-effective option for seedling multiplication.

Keywords: *Exacum walkeri*, Micropropagation, seed culture, *ex situ* conservation, horticultural biotechnology

Acknowledgement: Department of National Botanic gardens, Department of Wildlife Conservation, Sri Lanka Scientific Service, Ministry of Public Administration and Sri Lanka College of State Scientists duly acknowledged.

Targeting egg-laying *Aedes* mosquitoes: A gravid trap-based surveillance study in urban Sri Lanka

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NS13

Introduction: Dengue fever is a persistent public health issue in Sri Lanka, especially in urban areas like the Colombo Municipal Council (CMC), which reported 3,954 cases in 2024 and 2,559 cases up to June 2025. *Aedes aegypti* and *Aedes albopictus* are the primary vectors of dengue. Current adult mosquito collection tools are labour-intensive, creating a need for efficient alternatives such as gravid traps that passively attract egg-laying females.

Objectives: To evaluate the effectiveness of gravid traps in capturing adult *Aedes* mosquitoes for the first time in Sri Lanka and to compare their performance with existing Prokopack aspirators while identifying operational challenges in the local context.

Methods: From October 2024 to March 2025, 480 gravid traps were deployed across 160 randomly selected households in two high-risk Medical Officer of Health areas (D3 and D4) within the CMC. Adult female *Aedes* captures were quantified using Gravid Trap Index (GI) and houses positive for *Aedes* were calculated using Gravid Trap House Positivity Index (GTHI). Mosquito ccollections using Prokopack aspirators and ovitraps were also conducted. Community acceptance and operational feasibility of the traps were assessed. Differences between trap methods were analyzed using paired t-tests, and correlations between entomological indices and dengue cases were assessed using Pearson's correlation.

Results & Discussion: Gravid traps showed consistently low GI and GTHI values. The highest GI value was 2.1% in December 2024 in D3, while the GTHI was 5.0% in D4 in November and December 2024. No significant correlation was observed between GTHI and reported dengue cases ($r \approx -0.09$, $p > 0.05$). Prokopack aspirator collections outperformed gravid traps significantly (paired t-test, $t = -13.13$, $p < 0.001$) AHI values ranged from 12.5% to 20%. Ovitrap surveillance recorded high ovitrap positivity indices ranging from 10.0% to 50.0%, with a peak in January 2025 in D3. Despite ovitraps confirming the presence of egg-laying females, gravid trap yields were poor. Each household deployment (three traps) of gravid traps required 10–15 minutes, but community resistance was noted due to low capture rates. Factors like lure degradation, alternative oviposition sites, and mosquito behavior may explain underperformance. Enhancements such as adding CO_2 emitters, LED light, improved hay infusions, and fine mesh covers are recommended.

Conclusion: While operationally feasible, gravid traps demonstrated limited effectiveness in capturing adult *Aedes* mosquitoes in urban Colombo compared to standard Prokopack aspirators.

Keywords: Gravid traps, Entomology surveillance, Urban vector control, Mosquito behaviour

Acknowledgement: We acknowledge the support F&F NIPPON LANKA ENTERPRISES (PVT) LTD, DAMPILLAWA for providing 500 gravid traps and consultation through the Ministry of Health Sri Lanka and Sri Lanka Scientific Service, Ministry of Public Administration and Sri Lanka College of State Scientists.

NS14

Evaluation of Seedbed Potting Media for Emergence and Survival of Cardamom Seedlings

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Introduction:-Cardamom (*Elettaria cardamomum*), known as the "Queen of Spices," is an economically important crop cultivated in the central hill country of Sri Lanka. Despite its high value, nursery management faces challenges due to poor germination rates, delayed seedling emergence, and low survival percentages. As rhizome propagation declines, seed propagation has become essential. Therefore, selecting suitable seedbed potting media is critical to enhance seedling emergence, establishment, and survival.

Objectives:-The objective of this study was to evaluate the effect of different seedbed potting mixtures on emergence, survival, and median emergence time (MET) of cardamom seedlings, with the goal of identifying the most effective seed bed potting medium for nursery establishment.

Methods:-The experiment was conducted at the Central Nursery and Farm of the Department of Export Agriculture, Gasnawa, Sri Lanka, during the period of March 2025 to June 2025. A Completely Randomized Design (CRD) with four treatments and three replicates was employed. The treatments included: T1 (sand), T2 (sand + soil + cow dung + coir dust in a 1:1:1:1 ratio), T3 (sand + cow dung in a 1:1 ratio), and T4 (sand + coir dust in a 1:1 ratio). Each seedbed was sown with 1400 seeds. Data on median emergence time (MET), emergence percentage, and survival percentage were collected and analyzed using analysis of variance (ANOVA). Treatment means were compared by Tukey's HSD test (5% level) for MET and emergence percentage, and by Duncan's Multiple Range Test (DMRT) for survival percentage, using SAS OnDemand for Academics (version 9.4).

Results & Discussion:-Median Emergence Time, T50, was not significantly different among treatments ($p > 0.05$). In contrast, there is a significant difference in emergence percentage, where T2 and T4 were significantly higher than T3 ($p < 0.05$), likely due to improved aeration and moisture retention from coir dust and organic amendments. Emergence percentage of T1 was intermediate and not significantly different from the other treatments. Survival percentage also differed significantly ($p < 0.05$), where T1 and T2 showed the highest means, T3 was the lowest, and T4 showed intermediate results. T2 performed best due to its balanced, fertile substrate, while T4 improved germination through aeration and moisture retention but showed reduced survival from limited nutrients.

Conclusion:-Median emergence time, T50, was not significantly affected by seedbed media, but emergence and survival percentages differed. T1 showed intermediate emergence yet maintained high survival, while T2 combined high emergence with strong survival, making it the most effective seedbed potting medium for cardamom nursery establishment.

Keywords: Emergence percentage, Survival percentage, Median Emergence Time (MET), Nursery management, Seedbed media

Acknowledgement: The support given by the Sri Lanka Scientific Service Board, Ministry of Public Administration and Sri Lanka College of State Scientists (CSSL) duly acknowledged.

NS15

Evaluation of the Rooting Performance of Chrysanthemum (*Dendranthema grandiflora*) Varieties in Different Propagation Media in the Gampaha District, Sri Lanka

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Introduction: Chrysanthemum is herbaceous perennial belonging to the family Asteraceae, extensively cultivated as a potted ornamental plant and as a cut flower. In Sri Lanka, commercial production is concentrated in the upcountry regions where cooler conditions favor growth and flowering. However, successful commercial cultivation has been reported under average annual temperatures of 27–28 °C in Tamil Nadu, India. (TNAU Agritech Portal, India). Due to the similar climatic conditions prevails in the Gampaha District in Sri Lanka, evaluating the root performance of chrysanthemum in this region is of practical importance for expanding its cultivation beyond the traditional upcountry areas.
Objectives: This study aims to compare rooting performance of different chrysanthemum varieties across commonly used propagation media and identify the best performing propagation media for each chrysanthemum variety for Gampaha greenhouse conditions.
Method: The experiment was conducted at the Gampaha Botanic Garden. Stem cuttings of three chrysanthemum (*Dendranthema grandiflora*) varieties such as White, Magenta, and Yellow were used as planting material. The cuttings of each variety were established in three different propagation media: (i) coir dust alone, (ii) sand alone, and (iii) a mixture of coir dust, sand, and red soil. Each treatment consisted of seven replicates, arranged according to a Randomized Complete Block Design (RCBD). Root growth parameters, including average root length and average number of roots, were recorded at five-day intervals over a two-month period following planting. The collected data were analyzed using Minitab Statistical Software.
Result and Discussion: The collected data were analyzed by One Way Analysis of Variance (ANOVA). For Chrysanthemum White, ANOVA indicated a significant effect of propagation medium on root length ($p < 0.05$), whereas no significant effect was observed for the number of roots. Mean comparisons revealed that the sand medium significantly enhanced root length compared to the coir dust–sand–red soil mixture, while coir dust exhibited intermediate performance. For Chrysanthemum Magenta, ANOVA showed no significant differences ($p > 0.05$) among the three-propagation media for either root length or number of roots. For Chrysanthemum Yellow, ANOVA revealed a significant effect of propagation medium on both root length and number of roots ($p < 0.05$). Mean comparisons indicated that the sand medium was the most effective, followed by the coir dust–sand–red soil mixture, while coir dust alone was the least effective medium.
Conclusion: The findings indicate that, sand is the most suitable propagation medium for rooting performance of chrysanthemum cuttings. The mixture of coir dust, sand, and red soil provided moderate suitability, while coir dust alone was the least effective medium for root development.
Key Words: Chrysanthemum, Root performance, Coir dust, Sand, Red soil

Acknowledgement: The authors acknowledge the Department of National Botanic Gardens, Sri Lanka, the Scientific Service, Ministry of Public Administration, and Sri Lanka College of State Scientists for their support.

NS16

Aedes Ovitrap Indices for Dengue Outbreak Predictions; A Study From Matale District, Sri Lanka

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Introduction- In Sri Lanka, dengue is a common arboviral disease widespread in urban and semi-urban areas characterised by high human populations, high vector density, and the coexisting virus (dengue patients). The risk can be assessed, and dengue outbreaks can be predicted early with the use of entomological methods.

Objectives- The objective of the study is to evaluate the efficacy of ovitrap-based indices for dengue vector surveillance and to determine the correlation between ovitrap yield and climatic parameters.

Methods- The study was conducted in the Matale Municipal Council area for 6 months from January 2025 to June 2025. A total of Fifty Ovitraps were placed (01 indoor and 01 outdoor) in 25 randomly selected households monthly. After 5 days, ovitraps were collected, and the eggs in each ovitrap were enumerated and reared up to the larval stage separately for identification. For both indoors and outdoors, the Ovitrap index (OI), the mean number of eggs per trap, egg hatch rate and larval density per container were determined. Monthly notified dengue cases for the MOH area were obtained from the Ministry of Health, Sri Lanka. Meteorological data were obtained from the Department of Meteorology. The association of OI with dengue cases and climatic parameters were analysed using Pearson's correlation using Minitab 21 software.

Results & Discussion- Maximum OI recorded for indoors and outdoors were 12 and 16 in March and April respectively. Among the total 2585 *Aedes* eggs, the highest numbers in indoors and outdoors were recorded in February (n=320) and April (n=490) respectively. Two-month lag number of dengue cases showed significant positive correlation with indoor ovitrap index (r=0.832, p= 0.040), indoor larval density in container (r=0.899, p=0.015) and indoor total eggs (r=0.956, p=0.003). Total number of indoor eggs showed significant negative correlation with the total rainfall (mm) (r=-0.94, p<0.05) and number of rainy days per month (r=-0.87, p=0.023) which suggest the decreased potency of mosquitoes to breed indoors during rainy period.

Conclusions-The dengue outbreak can be predicted to occur after two months of observing high ovitrap indices, allowing health authorities a lead time of several weeks to implement vector control measures. Continuous ovitrap surveillance data can be used as a warning tool for early preparedness and timely vector control in dengue high-risk areas.

Keywords: *Aedes* eggs, dengue, early warning, ovitrap index

Acknowledgement: The authors grateful for the Ministry of Health, Sri Lanka, and the Department of Meteorology for providing data support and Sri Lanka Scientific Service, Ministry of Public Administration and Sri Lanka College of State Scientists.

NS17

Morphological and Anatomical Markers for Authenticating *Pterocarpus santalinus* (Red Sanders) and its distinguishing features from common adulterants and substitutes

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Introduction: *Pterocarpus santalinus* Linn. f is a well-known medicinal plant belonging to the family Fabaceae**,** commonly referred to as Rath handun in Sri Lanka and Red Sanders in English. This species is endemic to India and is currently considered endangered due to high demand and illegal harvesting. Red Sanders wood plays a significant role in the preparation of Ayurvedic medicines in Sri Lanka.. It is known for its astringent and cooling properties and is a common ingredient in various skincare formulations.

In Sri Lanka, *P. santalinus* is rare**,** with a limited number of plants found mainly in the southern dry zones of the island. The species requires strong sunlight and does not tolerate overhead shade**,** making its cultivation difficult in certain regions. As a result, the country's demand is largely met through imports from India**.** Due to its high value, there is a known issue of deliberate adulteration and substitution with similar-looking wood materials. Common adulterants and substitutes include wood species are *Acacia chundra* (Rath Kihiriya), *Myroxylon balsamum* (Kattakumanjal), *Caesalpinia bonduc* (Pathagi), *Pterocarpus indicus* (Wal Ehela), *Pterocarpus marsupium* (Gammalu), and *Adenanthera pavonina* (Madatiya). A major challenge currently faced by drug manufacturers is the difficulty in accurately identifying genuine raw materials**,** as many adulterants and substitutes closely resemble *P. santalinus* in appearance.

Objective: The aim of this study is to establish morphological and anatomical characteristics that can reliably distinguish genuine *P. santalinus* from its adulterants and substitutes.

Methods: Authentic wood samples were collected from various locations and at different maturity stages for anatomical analysis. Organoleptic studies were conducted following WHO guidelines**,** and permanent slides were prepared using a counterstain permanent slide method for detailed anatomical examinations.

Results and Discussion: Key distinguishing features of *P. santalinus* include, reddish-brown heartwood with lighter longitudinal streaks, diffuse-porous wood structure with large to moderate pores, paratracheal parenchyma forming eye-shaped structures associated with vessels, solitary or short multiple vessels filled with reddish deposits and uniseriate ray parenchyma. These anatomical markers are unique to *P. santalinus* and serve as reliable identifiers to differentiate it from common adulterants and substitutes.

Conclusion:

The findings of this study provide essential guidelines for the identification of authentic raw materials in the Ayurvedic drug industry

Key words: Rath handun, *Pterocarpus santalinus*, adulterant, substitute, morphology

Acknowledgement: We wish to extend our sincere gratitude to the Sri Lanka College of State Scientists (SLCSS) and the Scientific Service, Ministry of Public Administration for their invaluable support and significant contribution to this work.

SECTION 3

Selected abstracts from the non-participant members of the SLCSS, workshop titled "The Complete Researcher: From Design to Manuscript".

PRESENTERS

NP1 **Assessment of Aflatoxin Contamination in Imported Raw Maize Entering Sri LankaWijendra WAS-*Department of Molecular Biology, Medical Research Institute, Sri Lanka***

W.M.P.B.K. Warnasooriya - Department of Government Analyst's

NP2 **An Analytical Examination of Key Features in Handwriting Analysis**

Premachandra, W.A.I.D - *Department of Government Analyst's*

NP3 **Breeding biology and nesting behavior of the Malabar pied hornbill (Anthracoceros coronatus) in captivity at the National Zoological Gardens, Dehiwala**

Priyadarshani A -*Department of National Zoological Gardens*

NP4 **Clinical Evaluation of a MATLAB Based Digital Digitizer for 2D Co-60 Radiotherapy in Low-Resource Settings**

Ruvinda K.K.D.L. - *National Cancer Institute – Maharagama*

NP5 **Climate Trends in Sri Lanka (1982–2024): Combined ERA5 and CHIRPS Analysis of Temperature and Precipitation**

J.S.D.S. Premathilake - *Department of Meteorology*

Abstracts of the Poster Presentations

NP1

Assessment of Aflatoxin Contamination in Imported Raw Maize Entering Sri Lanka

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Introduction: Maize is a key dietary staple in Sri Lanka, with large quantities imported annually for food production. However, aflatoxin contamination in maize has emerged as a significant global food safety concern. Aflatoxins (AFs), including AFB_1, AFB_2, AFG_1, and AFG_2, are highly toxic and carcinogenic secondary metabolites primarily produced by *Aspergillus flavus* and *A. parasiticus*. Among them, aflatoxin B1 is the most hazardous and is classified as a Group 1 human carcinogen, highlighting the importance of monitoring aflatoxin levels in imported maize to protect consumer health.

Objective- This study aimed to evaluate the occurrence and levels of total aflatoxins (AFB_1, AFB_2, AFG_1, AFG_2) and AFB_1 in raw maize imported into Sri Lanka in 2024, using both national and EU safety limits.

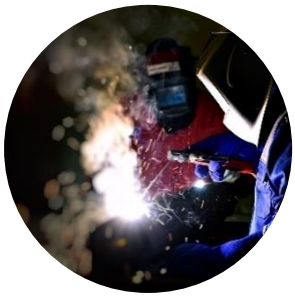
Method: Twenty-seven imported maize samples were analyzed using analysed using an immunoaffinity column clean-up followed by Liquid Chromatography with Fluorescence Detection (LC-FLD). In Sri Lanka, the maximum permissible limit for total aflatoxins (AF_{Total}) in all food is 30 µg/kg, as stipulated in the Labelling and Miscellaneous Regulations (LMR), 1993. For the current study, more stringent regulatory thresholds established by the European Union (EU) for maize (10 µg/kg for AF_{Total}; 5 µg/kg for AF_{B1}) were adopted as reference benchmarks.

Results and Discussion: Out of 27 maize samples tested, 4 were free of detectable aflatoxins. Of the 23 contaminated samples, 16 (69.6%) exceeded the EU limit for AF_{Total}, with concentrations ranging from 2.4 to 67.1 µg/kg. Similarly, 18 samples (78.3%) exceeded the EU threshold for AFB_1, with levels between 2.4 and 58.8 µg/kg. The mean contamination levels recorded were 25.5 ± 3.9 µg/kg for AF_{Total} and 22.1 ± 3.5 µg/kg for AFB1. Based on Sri Lanka's regulatory limit of 30 µg/kg for AF_{Total}, 8 samples (34.8%) exceeded the permissible level. High contamination in imported maize may be attributed to poor post-harvest handling, humid bulk-storage conditions, and prolonged transportation in exporting countries, all of which favor fungal growth and aflatoxin accumulation. The findings highlight the limitations of Sri Lanka's current aflatoxin regulations, which apply a general limit for all foods rather than maize-specific thresholds.

Conclusion: A considerable proportion of imported maize exceeded the EU and Sri Lankan aflatoxin safety limits, indicating health risks. Findings stress the need for cereal-specific aflatoxin limits, stricter monitoring, and stronger food safety policies to protect public health.

Keywords: Imported raw maize, total aflatoxin, aflatoxin B_1, *Aspergillus* species, food safety

Acknowledgement: I sincerely thank the Government Analyst Department, the Food Laboratory Team, the Ministry of Public Administration, and the Sri Lanka College of State Scientists for their support.



NP2

An Analytical Examination of Key Features in Handwriting Analysis

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Introduction: Handwriting is a complex and highly skilled activity, governed by three fundamental principles: no two individuals write exactly the same; even the same person cannot replicate their handwriting identically each time; and a person cannot exceed their inherent skill level. Every writer demonstrates natural variation in his writing. So that no two writing samples by the same writer will be exactly the same. A forensic document examiner (FDE) must distinguish between natural variation and fundamental differences to assess a document's authenticity accurately.

Objective: This study presents an overview of the characteristic features in handwriting analysis.

Method: Video Spectral Comparator (VSC) and Stereo microscope were used to examine the handwriting, and signatures under various light conditions and at appropriate magnification levels.

Results and Discussion: In forensic document examination, the questioned material must be compared with known samples, referred to as specimens. The exact quantity required may vary depending on the case, and this is usually determined by the FDE during the preliminary examination. Handwriting identification is based on characteristic features which are divided into two categories: class characteristics and individual characteristics. Important features considered in handwriting analysis include writing capability, speed, slant, spacing, proportion, letter formation, and unique individual characteristics. Other features may also be assessed in combination with these primary ones.

Writing capability and speed are particularly significant in determining line quality. When attempting to disguise handwriting, a writer may deliberately alter the slant, while changes in letter size usually retain the original proportional relationships. Most individual characteristics in handwriting are subconscious, unique to the writer, and difficult to suppress or alter. The features of a questioned writing are evaluated based on the range of variation and key characteristics observed in the specimen handwriting. If the differences in the questioned are found to be fundamental or within natural variation, the authenticity is determined accordingly.

Conclusion: A FDE should conduct examinations accurately, thoroughly, and with complete objectivity, using scientific methods to uncover identifying details/findings. The examiner ensures that the results are reliable, reproducible and admissible in court. The FDE's reports are serve as a powerful tool, enabling the expert witness to present findings clearly and assist the court in reaching a proper verdict.

Keywords: FDE, natural variation, fundamental differences, characteristics features

Acknowledgement: - I would like to express my deepest appreciation to Forensic Document Examination Division in the Government Analyst's Department, the Ministry of Public Administration, and the Sri Lanka College of State Scientists.

NP3

Breeding biology and nesting behavior of the Malabar pied hornbill (Anthracoceros coronatus) in captivity at the National Zoological Gardens, Dehiwala

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Introduction- Breeding biology of the Malabar pied hornbill (Anthracoceros coronatus) in captivity has not been systematically studied in Sri Lanka. This study documents nesting, breeding biology, and behavioral patterns of a captive pair at the National Zoological Gardens, Dehiwala.

Objectives- To investigate nesting characteristics, breeding behavior, and chick rearing success of the Malabar pied hornbill in captivity.

Methods- One breeding pair was observed from nest selection until fledging. Nest dimensions, sealing behavior, incubation, and chick rearing were recorded. Food provision by the male was monitored, including types and frequency of items delivered.

Results & Discussion-The nest cavity measured 0.75 × 0.45 × 0.45 m, with a rounded entrance of 22.5 cm. Sealing behavior began in early March, and female incarceration occurred on 13 March. Two eggs were laid, of which one chick successfully fledged after 106 days of female incarceration. Food provided by the male included fruits, insects, and small vertebrates. Grapes were delivered most frequently during the pre-hatching phase. Parental care was evident, but one chick died within ten days post-hatching. Findings confirm that natural behaviors such as nest sealing, male provisioning, and prolonged female incarceration occur under captive conditions.

Conclusions: The study demonstrates that the Malabar pied hornbill exhibited its natural breeding biology in captivity when suitable nesting structures and food provided. However, chick survival rates may be low, warranting further investigation into nutritional and environmental factors influencing reproductive success.

Keywords: breeding biology, captivity, hornbill behavior, nesting, chick survival

Acknowledgement: The authors gratefully acknowledge the staff of the National Zoological Gardens, Dehiwala, the Ministry of Public Administration, and the Sri Lanka College of State Scientists for their support.

NP4

Clinical Evaluation of a MATLAB Based Digital Digitizer for 2D Co-60 Radiotherapy in Low-Resource Settings

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Introduction: In many resource-limited clinical settings, radiotherapy centers continue to rely on 2D Co-60 treatment planning. Physical digitizers, once essential for patient anatomy input into Thera plan planning system. The loss of a physical digitizer at the National Cancer Institute Maharagama highlighted the need for affordable alternatives. A MATLAB-based digital digitizer was developed and clinically implemented, enabling reliable import of patient anatomy into treatment planning workflows and ensuring continuity of radiotherapy services.

Objectives: To evaluate clinical reliability of developed cost-effective MATLAB-based digitizer for clinical use in Co-60 treatment planning.

Method: The tool was developed in MATLAB and integrated with existing 2D treatment planning systems. Its workflow begins by defining the CT image scale using a 10 cm reference distance, followed by setting the image origin. The external body contour is delineated first, followed by internal organs and target volumes. The tool converts marked coordinates into a digital dataset compatible with the planning system. System's Geometric Accuracy is validated. To evaluate clinical accuracy, 10 CT slices were used to delineate body contours, target volumes, and organs at risk. Using both Eclipse and the developed tool, contoured organ and target volumes were compared for position and volume accuracy. The median Euclidean distance error was calculated for each organ and target, with a predefined acceptance criterion of ≤2 mm. Errors within this threshold were considered a pass, exceeding it a fail.

Results: The positional accuracy of all organs met the acceptance criteria, achieving a 100% pass rate. The mean median Euclidean distance error was 0.63 mm. The mean contoured organ volume percentage difference between the Eclipse system and the developed tool was 1.34% for organs and 0.83% for targets.

Discussion: The digital digitizer demonstrated excellent geometric accuracy and organ contour agreement with the Eclipse system. With 100% of organs meeting the acceptance criteria and minimal volume differences. This system has been successfully used for the 2D Co-60 treatment planning of over 500 patients.

Conclusion: The digital digitizer provides a reliable, cost-effective alternative to physical digitizers, ensuring accurate and continuity of 2D Co-60 treatment planning in resource-limited settings.

Keywords: Digital digitizer, Co-60 radiotherapy, mean Euclidean distance error, Resource-limited settings, Radiotherapy Treatment planning.

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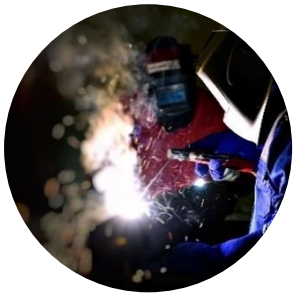

NP05

Climate Trends in Sri Lanka (1982–2024): Combined ERA5 and CHIRPS Analysis of Temperature and Precipitation

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Introduction: Sri Lanka, as a tropical island nation, is highly vulnerable to climate change and variability, particularly in terms of temperature and precipitation extremes. Trends in long-term surface temperature and rainfall are crucial for climate adaptation, water resource management, and disaster risk reduction.
Objectives: Estimate long-term temperature and precipitation trends in Sri Lanka using combined ERA5 and CHIRPS datasets, illuminating climatic variability during the past four decades.

Methods: Here, I analyzed ERA5 reanalysis 2 m temperature data (1982–2024) and CHIRPS satellite-based precipitation data (1982–2024) to determine long-term climatic trends over Sri Lanka. Analysis was performed on a 0.25° × 0.25° spatial resolution with Sri Lanka-specific sub setting to capture the regional climate signal. Data were time-averaged to monthly and annual means, and spatial means over latitude and longitude were determined. Mann-Kendall trend tests combined with Theil-Sen slope estimation were employed to estimate the direction, significance, and magnitude of trends detected.

Results & Discussion: Results indicate a statistically significant increasing trend in Sri Lanka's annual mean 2 m temperature, with a Mann-Kendall trend of "increasing" ($p < 0.0001$) and a Theil-Sen slope of ~0.012 °C/year, indicating a steady warming over the past four decades. Annual precipitation also exhibits a significant positive trend, with CHIRPS precipitation at ~5.94 mm/year ($p < 0.001$). The concurrence of CHIRPS trends strengthens the robustness of the observed increase in precipitation in reanalysis data. The findings reveal progressive warming alongside intensifying rainfall over Sri Lanka, which has the potential to exacerbate climate-related disasters, such as floods, landslides, and heat stress.
Conclusions: The study demonstrates the value of merging reanalysis data sets for regional climate studies and underscores the importance of trend detection in climate monitoring and policy-making. The results provide a baseline for future climate projections, hazard assessment, and adaptation planning in Sri Lanka. The approach also offers a replicable framework for use in other tropical regions with limited high-resolution observational networks.

Keywords: Climate change, Temperature trends, Precipitation variability, Sri Lank, ERA5 & CHIRPS

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