APFAN in association with
Curtin University and ChemCentre

TECHNICAL PROGRAM

APFAN PT6 International Workshop on

"Regional Leadership in Food Analysis for Safety, Trade, and Innovation"

Wednesday 30th September to Friday 2nd October 2026
Venue: Building 500 Theatrette, Curtin University Bentley Campus, Perth, Western Australia

WELCOME TO PERTH, WESTERN AUSTRALIA

Dear Participant,

We welcome you to Perth, the capital of Western Australia, and Australia's sunniest city. Perth offers a vibrant blend of natural beauty and modern city life, from stunning beaches to the beautiful Swan River and Kings Park, one of the world's largest inner-city parks. Explore dynamic neighbourhoods, enjoy world-class food and wine, discover Aboriginal and European culture, and take advantage of exciting outdoor adventures and cultural events. You can explore Perth through Elizabeth Quay, Fremantle, Northbridge, or Rottnest Island, where you can snap a selfie with the famous 'quokka'. Or, you can enjoy a Swan River cruise and spot kangaroos on Heirisson Island. Perth has everything, from the Perth Hills, with its natural bushland and scenic views, to the renowned wine region of the Swan Valley all the way to the coast with stunning beaches with pure white sand.

APFAN, the Asia Pacific Food Analysis Network, was formed in 1989 and has a mission to serve the needs of food analysts in their dual roles to achieve food quality, food safety and good nutrition and to promote food trade in the Asia Pacific region. The goal of the current APFAN project is to provide laboratories in the Asia Pacific region access to inexpensive Proficiency Testing (PT) trials in order to assess their performance compared to their peers. Many thanks go to the organizations and individuals who have contributed to the success of the APFAN project so far; Charoen Pokphand Group (CP), PT. Indofood CAP Sukses Makmur Tbk, Institute of Nutrition, Mahidol University (INMU), SGS (Thailand) Ltd, the Philippine Food and Nutrition Research Institute (FNRI), Kimia Malaysia, and the University of the South Pacific, for the preparation of the PT1-6 test materials. We are pleased to advise that Curtin University will distribute the PT7 materials free of charge to the Perth Workshop participants.

Curtin University is an innovative, global university known for its high-impact research, strong industry partnerships and commitment to preparing you for jobs of the future.
Curtin is a vibrant, future-focused university ranked in the top 1% of universities worldwide, where ideas and cultures combine to create a place of enthusiasm, endeavour and achievement.

ChemCentre is Western Australia's leading provider of specialised chemical and forensic science services. ChemCentre provides chemical and forensic science services for a safe and prosperous Western Australia. Its mission is to provide excellence and innovation in chemical & forensic science, emergency response and research to support the administration of justice and a safe and prosperous WA.

Geographically, Perth is widely celebrated as the most isolated capital city in the world and so a special appreciation is given for our delegates from 16 countries around the Asia Pacific region who have made the effort to travel all the way to Western Australia. APFAN, Curtin University and ChemCentre look forward to welcoming you to this event as we realize our goal to improve the proficiency and capabilities of food and agriculture testing laboratories in the Asia Pacific region, enabling participants to improve their methodologies and adopt a more uniform approach to regional food analysis.

We also give a very special 'Thank You' to our Sponsors. Without their support, this event would not be possible. Please support our Sponsors as they support us.

Yours sincerely

ORGANISING COMMITTEE:	Stewart Jones	APFAN
	Ranil Coorey	Curtin University
	Manjree Agarwal	ChemCentre
	Ferdie Ferrante	RACI / APFAN
	Weeraya Karnpanit	Curtin University

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APFAN PT6 WORKSHOP

Perth, Western Australia 2026

TECHNICAL PROGRAM

Day 1 - Standards & Foundations

Monday, 30th September 2026

TIME	TITLE	SPEAKER
8:00 am - 9:00 am	Registration	**Registration Desk**
9:00 am - 9:05 am	Welcome to Whadjuk Country, the traditional land of the Whadjuk Nyungar people.	
9:05 am - 9:10 am	Opening Prayer	
9:10 am - 9:15 am	Welcome and Opening; **Opening Ceremony & Welcome** Introductions, workshop objectives, and recognition of regional collaboration in food analysis and testing.	Hon. Minister Jackie Jarvis???
9:15 am - 9:20 am	Welcome Speech Curtin	
9:20 am - 9:25 am	Welcome Speech ChemCentre	
9:25 am - 9:30 am	Workshop Introduction	**Stewart Jones** Coordinator APFAN, Australia
9:50 am - 10:00 am	Group Photo	All Participants
9:45 am – 10:00 am	'Cole-Parmer Morning Tea' on the first day, as well as the opportunity to give a 15-minute presentation on the first day, prior to the morning tea.	
10.00 - 10.30 am	**COLE-PARMER MORNING TEA**, sponsored by Cole-Parmer	
SESSION 1: Session 1: ISO/IEC 17025:2017 – Management Systems Moderator: xxxxx		
10:30 am - 10:55 am	Building effective training and assessing systems for laboratory personnel	**Naomi Aitken** NATA Education & Advisory Services, Sydney, NSW, Australia.
10:55 am - 11:20 am	Strengthening Laboratory Quality: A Stepwise Training and Competency Verification System	**Leah C. Dajay** Service Laboratory Group, Department of Science and Technology – Food and Nutrition

TIME	TITLE	SPEAKER
		Research Institute, Taguig, Philippines
11:20 am - 11:45 am	Managing Human Resources Risks in the Solomon Islands National Public Health Laboratory	**David Tenavao Ho'ota** National Public Health Laboratory, Ministry of Health and Medical Services, Prince Philip Highway, Honiara, Solomon Islands
SESSION 2: Session 2: ISO/IEC 17025:2017 – Technical Systems Moderator: xxxx		
11:45 pm - 12:15 pm	Ensuring the validity of results under ISO/IEC 17025:2017: Reference Materials, Uncertainty, Traceability and Proficiency Testing	**Richard Brittain** RHB and Associates Legal and Technical Consulting Services
12:15 pm - 12:30 pm	Question and Answer Session	**Moderator**
12.30 pm - 1.15 pm	**LUNCH** **POSTER VIEWING**	
SESSION 3: Session 3: Advances in Food Composition & Nutrition *Moderator:*		
1:15 pm - 1:45 pm	Selenium and Iodine in Human Nutrition: From Food Analysis to Nutritional Status	**Ujang Tinggi** Griffith University, School of Pharmacy and Medical Sciences, Gold Coast, Queensland, Australia
1:45 pm - 2:15 pm	Nutrient composition of Thai freshwater and marine fish across cooking methods	**Konpong Boonyingsathit** Institute of Nutrition, Mahidol University, Salaya, Phuthamonthon, Nakhon Pathom 73170 THAILAND
2:15 pm - 2:45 pm	Nutritional Value of Traditional Rice Varieties of Sarawak	**Margaret Abat** Department of Agriculture Sarawak, Agriculture Research Centre Semongok, Km 20, Borneo Heights Road, 93250 Kuching, Sarawak, Malaysia
2:45 pm - 3:15 pm	High Performance Liquid Chromatographic - Ultraviolet (HPLC-UV) Determination of Kavalactones and Flavokavains in Selected Fiji Kava Cultivars	**Jeremaia Koroijiuta** Institute of Applied Sciences, Center for Sustainable Futures, University of the South Pacific
3.15 pm - 3.45 pm	**AFTERNOON TEA**	
3:45 pm - 4:15 pm		
Session 4: PT6 Results & PT7 Distribution **Moderator:**		
	KAVA tasting session	Fiji Islands participants

TIME	TITLE	SPEAKER
4:15 pm - 4:45 pm	Advancing Metrological Traceability in Toxic Element Analysis of Rice Through Proficiency Testing	**Alleni T. Junsay** Department of Science and Technology, Industrial Technology Development Institute (DOST-ITDI), National Metrology Laboratory of the Philippines
	Beyond the z-score: Multivariate analysis to enhance proficiency testing evaluation of heavy metals in homogenized orange matrix	**Vu Van Du** Reference Testing and Agrifood Quality Services Center (RETAQ), Ministry of Agriculture and Environment, Hanoi, Vietnam
	Making Better Use of Proficiency Testing to Improve Laboratory Competence	**Thùy, Hồ Trần Ngọc Quyên** QUALITY ASSURANCE AND TESTING CENTER 3, 49 Pasteur Street, Sai Gon Ward, Ho Chi Minh City, Vietnam.
	PT6 Kava results	**Stewart Jones**
	Distribution of the PT7 Material material(s) – Fishfood sponsored by Ravi, Curtin University - Instructions to participants	Stewart Jones
4:45 pm - 5:00 pm	Question and Answer Session	**Moderator**
5:00 pm - 5:15 pm	**BREAK**	
	Announcement and presentation of the 2026 APFAN Howard Bradbury Award	**Stewart Jones** Coordinator APFAN
5:30 pm - 6:30 pm	APFAN General Meeting and election of new APFAN Committee	
6.30pm – 7:30 pm	Pizza night	
6:30 pm	**CLOSE OF DAY 1**	

Day 2– Food Safety & Sustainability

Thursday 1st October, 2026

TIME	TITLE	SPEAKER
8:00 am - 9:00 am	Registration	
Session 5: Residues & Toxins in Food Products Moderator: xxxxx		
9:00 am - 9:30 am	Mycotoxin Sampling: Impact of Sampling Procedures on Analytical Results	**Bruce Chen** Symbio Laboratories, Brisbane, Queensland, Australia
9:30 am - 10:00 am	Multi-Mycotoxin Analysis in Baby Food: Comparing LLE and QuEChERS using LC-MS/MS	**Suwiton** Research and Development, PT Saraswanti Indo Genetech, Bogor, Indonesia
9:30 am - 10:00 am	Turanose as a Novel Chemical Marker for Detection of Honey Adulteration using qNMR Spectroscopy	**Wisuwat Thongphichai** Institute of Nutrition, Mahidol University, Salaya, Phutthamonthon, Nakhon Pathom 73170, Thailand
9:30 am - 10:00 am	Performance Evaluation of Philippine Laboratories for Cypermethrin Residue Analysis in Mango	**Abigail Grace H. Bion** Department of Science and Technology, Industrial Technology Development Institute (DOST-ITDI), National Metrology Laboratory of the Philippines, Taguig City, Philippines 1631
	Dietary Exposure to Sunset Yellow and Tartrazine among Filipinos	**Rose Elaine P. Guilaran** Department of Science and Technology - Food and Nutrition Research Institute, Taguig City, National Capital Region 1633 Philippines
	Health risk assessment of mercury in locally consumed aquatic biota in Fiji Islands.	**Sofia B Shah** Department of Biological and Chemical Sciences, SAGEONS, USP, and Department of Pure Sciences, CETVET, FNU, Suva, Fiji Islands
10 minute talk	Sponsor presentation - John Morris Group	**Jelica Strauch** John Morris Group
10:00 am - 10:15 am	Question and Answer Session:	**Moderator**
10.15 am - 10.45 am	**MORNING TEA**	

TIME	TITLE	SPEAKER
Session 6: Food Microbiology & Emerging Pathogens Moderator:		
10:45 am - 11:15 am	Tracking Performance of Malaysian Laboratories Through Salmonella Typhimurium Proficiency Testing (2021–2025)	**Mohd Yaman bin Idris** MyKIMIA Proficiency Testing Provider, Department of Chemistry Malaysia, Petaling Jaya, Selangor, Malaysia MYI:
	Transforming Nonconformities into Best Practices: A Philippine Microbiological Laboratory's Journey	**Christine Eden C. Sevilla** Service Laboratory Group, Department of Science and Technology – Food and Nutrition Research Institute, Taguig, Philippines
	Kinetic verification and statistical benchmarking of an ultra-rapid *Salmonella* molecular assay	**Willery Yeo** Biomolecular Laboratory, LPPOM MUI, Bogor, West Java, Indonesia.
	Microbiology Test Kits in the Solomon Islands Food Safety System	**Kim Elaine Irofufuli** National Public Health Laboratory, Ministry of Health and Medical Services, Prince Philip Highway, Honiara, Solomon Islands
11:15 am -11:30 am	Question and Answer Session	**Moderator**
Session 7: Indigenous & Underutilised Foods Moderator:		
11:30 am -12:00 pm	Rekindling local production of makmok (*Tacca leontopetaloides*) starch in the Marshall Islands	**Tebeio Tamton** Land Grant – Cooperative Research and Extension, College of the Marshall Islands, Majuro Atoll, Republic of the Marshall Islands
12:00 pm - 12:30 am	Characterization of high-value components in newly developed Pakistani olive fruit cultivars	**Farooq Anwar** Institute of Chemistry, University of Sargodha, Sargodha-40100, Pakistan
	Antioxidant Potential and Phytochemicals of an Indigenous Desert Lime (*Citrus glauca*) in Australia	**Wisuwat Thongphichai** Institute of Nutrition, Mahidol University, Salaya, Phutthamonthon, Nakhon Pathom 73170, Thailand
12:30 pm - 1:15 pm	**LUNCH** **POSTER VIEWING**	
1:15 pm - 1:45 pm	Nutritional and Chemical Evaluation of Culturally Significant Indigenous Foods in Fiji:	**Alicia Alfina Bano**

TIME	TITLE	SPEAKER
	Abelmoschus manihot (Bele) and Seawater-Fermented Coconut Flesh (Kora)	Department of Applied Sciences, Institute of Applied Sciences, Suva, Fiji Islands
1:45 pm - 2:15 pm		**xxxxxxxx** xxxxxxxx
2:15 pm - 2:45 pm		**xxxxxxxx** xxxxxxxxx
2:45 pm - 3:00 pm	Question and Answer Session	**Moderator**
3.00 pm - 3.30 pm	**AFTERNOON TEA**	
Session 8: Sustainable Futures & Climate Impacts Moderator: Stewart Jones		
3:30 pm - 3:40 pm	Sponsor presentation	**xxxxxxxRobbie and Rishi** xxxxxxxxCole-Parmer Australia Pty Ltd??
3:40 pm - 4:00 pm	Company Introduction By Sponsor	**xxxxxxxx** xxxxx
4:00 pm - 4:10 pm	Company Introduction by Sponsor	**xxxxxPetero Vatu / John Sanday** xxxxxxxKava Korporesen Pte Ltd (Kavakorp)
4:10 pm - 4:15 pm	Question and Answer Session	**Moderator**
4:15 pm - 4:20 pm		**xxxxxxGeorge Joseph** xxxxxxBoard Member, AOAC International
4:20 pm - 4:30 pm		**Vincent Lal** President AOAC SWP Section
4:30 pm - 4:40 pm		**Vincent Lal** President AOAC SWP Section
4:40 pm - 5:00 pm		**Takara Fort** Secretary AOAC SWP Section
5:00 pm - 6:00 pm	**BREAK**	
6:00 pm - 9:00 pm	Conference Dinner, sponsored by Business Events Perth	**Name** Business Evenets Perth
9.00 pm	**CLOSE OF DAY 2**	

Day 3 Capacity Building & Future Directions

Friday, 2nd October, 2026

TIME	TITLE	SPEAKER
8:00 am - 9:00 am	Registration	
SESSION 9: Session 9: Capacity Building & Regional Initiatives Moderator: xxxx xxxx		
9:00 am - 9:30 am	Equipment Calibration and Challenges Faced in the South Pacific Region	**Vasenai Lewanikoro** Institute of Applied Sciences, Center for Sustainable Futures, University of the South Pacific, Suva, Fiji
9:30 am - 10:00 am	Sustaining Accredited Laboratories in Fiji: Instrumentation, Human Resources, and Trade Risks	**Mereoni T. Degei** Institute of Applied Sciences, Centre for Sustainable Futures, The University of the South Pacific, Suva, Fiji
10 minutes	Sponsor presentation - NEAS	**Naomi Aitken** NEAS
10.00 am - 10.30 am	**MORNING TEA**	
10:30 am - 11:00 am		**xxxxx** xxxxxxxx
11:00 am - 11:30 am		**xxxxxxxx** xxxxxxxxx
11:30 am – 12:00 pm		**xxxxxx** xxxxxx
12:00 pm - 12:15 pm	Question and Answer Session	**Moderator**
12:15 pm - 1:15 pm	**LUNCH** **POSTER VIEWING**	
1:15 pm - 1:30 pm	ACTIVITY: HEADS 'N TAILS	
SESSION 10: Session 10: Food Safety and Food Trade Moderator:		
1:30 pm - 2:00 pm	The role of compliance and supply planning in food safety trade	**Maryda Kheng** Department Logistics and Procurement, Khmer Beverages Co., Ltd, Phnom Penh, Cambodia
2:00 pm - 2:45 pm	A Regional Pacific Kava Standard for Quality, Safety, and Market Growth	**Hannie Tjong** Pacific Island Standards Committee (PISC) Secretary
	Strengthening Food Safety Surveillance: Molecular Analysis of GM Elements in Malaysia	**Noor Shafriza Zainal Azmia** GMO Section, Biotechnology Division, Department of

TIME	TITLE	SPEAKER
		Chemistry Malaysia, Petaling Jaya, Selangor, Malaysia
2:45 pm - 3:15 pm		
3.15 pm - 3.45 pm	**AFTERNOON TEA**	
3:45 pm - 3:55 pm		
3:55 pm - 4:05 pm		
SESSION 11: Session 11: Food Science and Technology Session		
	A Study of Furan in Selected UVB Irradiated Mushrooms and Risk Assessment of Furan	**Kunchit Judprasong** Institute of Nutrition, Mahidol University, Salaya, Phutthamonthon, Nakhon Pathom 73170, Thailand
	Impact of Hydrothermal Treatments, Physicochemical Characterization of Tahitian Chestnut (Inocarpus fagifer) in Fiji	**Shaba Alzina** College of Engineering and Technical Vocational and Education & Training, Suva, Fiji Islands
	Formulation and Sensory Assessment of Gluten-Free Cassava Noodles	**Ashmin Prasad** School of Agriculture Geography Environment Oceans and Natural Sciences, the University of the South Pacific, Fiji Islands
	Mango Seed Waste as a Renewable Source for Functional Food and Nutraceutical Innovation	**Sayma Akhter** School of Science, Edith Cowan University, Perth, Western Australia
	Development of African Catfish Patties Fortified with Chicken Eggshell Powder	**Ellan Joy T. Mandario-Lor** College of Fisheries and Aquatic Sciences, Mindanao State University-General Santos, City,South Cotabato,Philippines;
SESSION12: Session 12: Session 12: Analyses for Tourism Moderator		
	Comparative evaluation of qPCR and dPCR for porcine detection in gelatine	**Willery Yeo** Biomolecular Laboratory, LPPOM MUI, Bogor, West Java, Indonesia
	Methanol in ethanol	
4:05 pm - 4:15 pm	Prize Presentation(s) for the best Student Oral and Poster presentations.	**xxxx** xxxx

TIME	TITLE	SPEAKER
4:15 pm - 4:25 pm		**Stewart Jones** Coordinator APFAN
4:25 pm - 4:35 pm	Closing Ceremony	**Name** orgn
4:35 pm - 4:40 pm	Closing Prayer	**Kim Irofufuli** National Public Health Laboratory, Solomon Islands
	Closing Ceremony & Next Steps Summary of outcomes, distribution of PT7 materials, and announcement of PT7 (2027) focus areas.	
4:40 pm	**CLOSE OF DAY 3 and Close of Workshop**	

Optional Pre- and Post- Workshop Activities

Tuesday 29th September

Tours of the ChemCentre will be held at selected times during the day on Tuesday 29th September. Please contact Dr Manjree Agarwal on magarwal@chemcentre.wa.gov.au for more information.

Saturday 3rd October, 2026

9:00 am – 1:00 pm	Half day tour of Perth and its beaches (limited numbers)
9:00 am – 5:00 pm	Day Tour to Pinnacles (at participants' expense)

ABSTRACTS - ORAL PRESENTATIONS

Ensuring the validity of results under ISO/IEC 17025:2017: Reference materials, Uncertainty, Traceability and Proficiency Testing

Dr Richard Brittain LLB
Principal Solicitor and Notary Public
RHB and Associates Legal and Technical Consulting Services

Ensuring the validity of results is one of the general requirements of competence for testing and calibration laboratories accredited to ISO/IEC 17025:2017.

Valid results provide the basis for the acceptance and/or recognition (including mutual recognition) of testing and calibration results from third party providers and sources. In turn valid results enable geographically distributed networks of public and private providers of testing and calibration facilities and services to support national, regional and international measurement systems and programs; and the metrological, regulatory and trade infrastructure that they facilitate.

Proficiency testing is one of the principal means of ensuring the validity of results. In the field of food analysis it is based on the deployment of traceable reference materials with appropriate uncertainty in proficiency testing regimes/programs designed to ensure the validity of test results in food analyses in a particular field/area or type of analysis.

Key to the efficacy of proficiency testing regimes/programs in ensuring the validity of test results in food analysis is an understanding and appreciation of the key features, characteristics, elements and requirements of proficiency testing. These include: reference materials, traceability, measurement uncertainty and error normalisation ratios i.e. E_n ratios.

This paper outlines the key features of proficiency testing, required to ensure the validity of test results in food analysis.

Managing human resources risks in the Solomon Islands National Public Health Laboratory

David Tenavao Ho'ota

[a]National Public Health Laboratory, Ministry of Health and Medical Services, Prince Philip Highway, Honiara, Solomon Islands
Email: dhoota@sig.gov.sb

Managing human resource (HR) risk in the Solomon Islands National Public Health Laboratory (NPHL) can be challenging at times and requires the ability to mitigate vulnerabilities that are unique to our job market. Vulnerabilities such as brain drain, geographic isolation, and constrained access to technical training. Core HR challenges centre on staff/talent acquisition and retention, resulting in compromised workplace safety and the inability to maintain effective performance management systems that support fair compensation and benefits to staff. This usually results in compromising staff health and wellbeing, further exacerbating the already precarious HR situation.

Key HR risks in Solomon Islands laboratories include talent retention and brain drain**,** loss of skilled laboratory scientists and technicians to better-paying private/international sectors and overseas migration. The NPHL lost its quality assurance manager (QAM) to the Asian Development Bank (ADB) in 2024; some of our medical laboratory technicians have migrated to the Federated States of Micronesia (FSM), etc. Competency gaps have also arisen due to restricted access to training caused by limited finances and geographic isolation. Weak or non-existent staff occupational health and safety (OHS) systems can increase staff exposures to biological, chemical, or radiation hazards which, if combined with inconsistent enforcement or supply of personal protective equipment, will definitely put laboratory personnel at risk. These challenges can also lead to workforce fatigue, high stress levels and isolation, especially for laboratory workers operating under understaffed conditions with limited funding support.

In response, the NPHL has come up with some mitigation and management strategies by initiating and implementing the effective upgrade of Laboratory posts and pay levels. And formulating targeted retention allowances. The NPHL is currently planning to create a Key Technical Person Allowance (KTP allowance) for laboratory staff that have attained Level 5(key technical person), via International Accreditation New Zealand (IANZ). A key technical person, Level 5; is a designated laboratory scientist that has been formally assessed and endorsed by IANZ as competent to authorise, sign off, and release official test results, calibration results and reports for an accredited organisation. It is anticipated that if and when the laboratory scientist loses his or her accreditation KTP level (KTP-level 5), the KTP allowance will likewise be withdrawn. There will also be other competitive benefits, like provision of transport or transport allowances, bonuses, etc., that may or may not be linked to a laboratory scientist's performance level. It is an uphill battle to retain staff given the competition that is out there for skilled and ISO 17025-trained manpower in the laboratory space. Nevertheless, it is critically important that the NPHL continues to implement staff development programmes that offer training, mentorship, and career advancement opportunities, coupled with feedback mechanisms such as surveys, appraisals and one-on-one meetings that can understand laboratory staff needs and address their concerns promptly.

Rekindling local production of makmok (*Tacca leontopetaloides*) starch in the Marshall Islands

Tebeio Tamton[a] & *Dr Adedayo Ogunmokun*[a]

[a]Land Grant – Cooperative Research and Extension, College of the Marshall Islands, Majuro Atoll, Republic of the Marshall Islands.

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Ṃakṃōk is the traditional name of Polynesian arrowroot (*Tacca leontopetaloides*) in the Marshall Islands, that has edible floury starch that can be traditionally produced through extraction from mature tubers (Murai *et al*.,1958). A research by Spennemann (1992) stated that it is widely regarded as an indigenous famine food in the Republic of the Marshall Islands (RMI). It is commonly known as Polynesian arrowroot (*Tacca leontopetaloides*), the crop normally grows well on tropical islands, including RMI. Within RMI, previous research and reports indicate that it was a popular source of starch up to the 1940s (Spennemann, 1994) but then became unpopular and underutilised, as food preferences shifted to imported and introduced crops like cassava, sweet potatoes and others. Little is known about the importance of makmōk starch or its use as food, except among people in the outer islands, particularly elderly people with experience in farming, harvesting and processing the crop. There is also limited data and information on its feasibility for mass production and trade in local and global markets.

The purpose of this research is to collect data and information on recent production that incorporate traditional knowledge to improve the safety and suitability of the end-product for human consumption. A further aim is to promote the re-introduction of makmōk starch to local communities, given its rich history on the RMI and health benefits as a food source. However, one of the major focuses is to identify critical steps in the process flow that require intervention for food safety and optimization with the use of kitchen appliances, given the labor-intensive nature of the traditional production methods. Last but not the least, this research could encourage current and emerging entrepreneurs to produce and promote acceptance of the starch as an important source of income, particularly for marginalised community members, such as unemployed youth and women or single mothers.

Reference

Murai, M., Pen, F., Miller, C. D, 1958. *Some Tropical South Pacific Island Foods - description, history, use, composition, and nutritive value.* [Online]
Available at: chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.ctahr.hawaii.edu/oc/freepubs/pdf/B-110.pdf
[Accessed 5 October 2022].

Spennemann, D. H. R., 1992. Arrowroot production in the Marshall Isalnds: past, present, and future. *New Zealand Journal of Crop and Horticultural Science,* 20(1), p. 97.

Spennemann, D. H. R., 1994. Traditional arrowroot production and utilization in the Marshall Islands. *Journal of Ethnobiology,* 14(2), pp. 211-234.

The role of compliance and supply planning in food safety trade

Maryda Kheng
Department Logistics and Procurement, Khmer Beverages Co., Ltd, Phnom Penh, Cambodia
maryda.kheng@khmerbeverages.com

Food safety and international trade require effective integration of quality assurance systems, regulatory compliance, and supply chain management to ensure product integrity and regulatory adherence. In increasingly complex global supply chains, organizations must continuously manage risks while maintaining consistent food safety and trade requirements.

This presentation examines the integration of compliance and supply planning functions in strengthening food safety performance within food industry operations. Based on practical experience in quality assurance, compliance monitoring, and supply planning, it highlights how structured coordination between these functions enhances traceability, risk-based decision-making, and regulatory compliance across the supply chain.

Key elements include supplier compliance management, inventory and demand planning, documentation control systems, cross-functional communication, and implementation of preventive and corrective risk-based approaches. The alignment of these functions contributes to improved operational control, reduced supply chain disruptions, and strengthened food safety consistency.

Furthermore, the integration of compliance frameworks with supply planning processes supports food chain security, operational efficiency, and sustainable food trade. This approach also reinforces continuous improvement and promotes a proactive food safety culture aligned with industry and regulatory expectations.

References

1. ISO/IEC 17025:2017, *General requirements for the competence of testing and calibration laboratories*.

Kinetic verification and statistical benchmarking of an ultra-rapid *Salmonella* molecular assay

Willery Yeo[a]
[a]Biomolecular Laboratory, LPPOM MUI, Bogor, West Java, Indonesia.
WY: willery.yeo@halalmui.org

Ensuring food safety requires balancing extreme analytical sensitivity with operational speed, particularly when implementing ISO 16140-3 verification standards. While standard ISO 16140-3 verification confirms laboratory competence for routine testing, high-urgency public health mandates requiring a total workflow turnaround under 8 hours present significant operational hurdles. This study presents a holistic protocol bridging ISO 16140-3 verification and custom method validation under ISO/IEC 17025 to evaluate system robustness, determine the safest minimum enrichment time (< 6 hours), and reduce diagnostic latency for Salmonella spp.

The experimental design utilized challenging food matrices spiked at a low fractional recovery level (<10 CFU) with cold-stressed Salmonella spp. (48 h at 4°C), with initial inoculum levels verified using ISO 7218 enumeration principles. To model Probability of Detection (POD) kinetics across hourly enrichment time-course intervals (1-6 hours), binary presence/absence data were analyzed using Firth's Penalised Maximum Likelihood Estimation (PMLE) and complementary log-log regression modeling. This kinetic statistical mapping mathematically established the minimum enrichment time threshold (tPOD95%) required to achieve a 95% probability of detection.

Building upon this kinetic benchmark, whole-method validation was executed across multiple food matrices. Analytical sensitivity, specificity, and robustness were evaluated in accordance with ISO 11781:2025, while assay precision and workflow error rates were determined through statistical analysis. Adhering to statistical validation criteria for zero-acceptance sampling of false positive and false negative rates, benchmarking across 60 fractional spiked samples and 60 blank samples demonstrated 0% false negative and 0% false positive rates, confirming a <5% error rate at a 95% confidence level. Ultimately, this framework provides laboratories with a defensible statistical benchmark to achieve accredited pathogen screening within a strict <8-hour total operational workflow.

References

1. ISO, "ISO 16140-3:2021: Microbiology of the food chain — Method validation — Part 3: Protocol for the verification of reference methods and validated alternative methods in a single laboratory" International Organization for Standardization, (2021).
2. ISO, "ISO 7218:2024: Microbiology of the food chain — General requirements and guidance for microbiological examinations" International Organization for Standardization, (2024).
3. ISO, "ISO 11781:2025: Molecular biomarker analysis — Requirements and guidance for single-laboratory validation of qualitative real-time polymerase chain reaction (PCR) methods" International Organization for Standardization, (2025).

Selenium and Iodine in Human Nutrition: From Food Analysis to Nutritional Status

Ujang Tinggi
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Selenium and iodine are essential trace elements with tightly interconnected metabolism: selenium-dependent deiodinase enzymes are required to activate thyroid hormone. A deficiency in either element can exacerbate the effects of the other. Both nutrients are unevenly distributed in soil and water, leading to substantial geographic variation in dietary intake and, subsequently, in population health outcomes. These health outcomes range from hypothyroidism due to iodine deficiency to impaired immune function and an increased risk of cancer associated with selenium deficiency. Food is the main source of selenium and iodine. The bioavailability of both elements from the diet is influenced by their chemical forms, interactions with other dietary components, and individual physiological factors. This means that measured dietary content does not always translate directly into absorbed, usable nutrients. This talk presents an integrated view of selenium and iodine, including their physiological roles, food sources, and analytical methods for quantifying them in food to assess population nutritional status. Key analytical challenges include developing reliable, validated methods for accurate detection of elemental concentrations and using appropriate standard reference materials for quality control and assurance. Studies and findings of dietary status surveys demonstrate how analytical data inform public health policy, fortification strategies, and supplementation guidance. The talk concludes with emerging directions in analytical method development and ongoing gaps in global surveillance data for food composition databases.

Building effective training and assessing systems for laboratory personnel

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ISO/IEC 17025:2017 Clause 6.2 requires laboratories to determine the competence requirements for personnel and to ensure that those affecting the results of activities are competent to perform them. In practice, many laboratories treat this requirement as a documentation exercise, relying on generic job descriptions and one-off sign-off checklists that do little to detect skills decay or the risk created when experienced staff leave. Genuine competence assurance depends on a connected pipeline: understanding how staff learn, training them well, assessing that training properly, and maintaining competence over time.

This presentation draws on NEAS's experience delivering a dedicated Training & Assessing Staff Competence course to laboratory personnel across Australia, a two-day program that has quickly become one of the most sought-after in the current curriculum. The course, and this session, work through five connected topics: the nature and risks of staff competence itself; adult learning theory and how it shapes effective instruction, drawing on cognitive load theory and models of how adults acquire skill; workplace training design and delivery, including structured approaches to identifying training gaps and building and delivering training that sticks; workplace assessment, covering assessment principles, rules of evidence, and methods for gathering defensible proof of competence rather than mere attendance; and maintaining competence over time through monitoring, retraining, and scheduled or triggered re-assessment.

Drawing on experience delivering this program across a wide range of laboratory types and sizes, the session will identify common failure points across each stage of the competence pipeline and share a structured, practical approach that attendees can adapt within their own organisations. The aim is to move laboratories from viewing personnel competence as a Clause 6.2 compliance obligation to treating it as a connected capability system that supports accreditation, staff retention, and the reliability of results.

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Characterization of high-value components in newly developed Pakistani olive fruit cultivars

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Olive (*Olea europaea* L.), is an emerging crop in Pakistan and its cultivation is expanding, with over 10 million acres of potential land identified for growth, driven by its high nutritional and nutraceutical value. The olive industry in Pakistan is a rapidly growing and profitable sector due to their increasing demand for oil and functional food production. Although some initial research has focused on the proximate composition of Pakistani olive cultivars, there is currently a lack of comprehensive evaluation of their biochemical attributes. Our research group is conducting experimental trials aiming to explore high-value components profile of some newly developed olive cultivars from Pakistan with the main purpose to explore their nutraceutical attributes. In the present research, the fruits of newly developed olive cultivars such as Ottobratica, Coratina, Picual, Koroneiki, Arbequina, Gemlik, BARI Zaitoon-1, and BARI Zaitoon-2 were harvested locally and analyzed for high-value components using advanced chromatographic techniques. Moreover, antioxidant and antimicrobial activities of phenolic-enriched olive fruit extracts were studied supported by molecular docking investigation. HPLC and GC-MS metabolites profiling and biological studies of Pakistani olive cultivars indicated the presence of appreciable amounts of antioxidant and antimicrobial compounds such as phenolic acids, oleuropein, hydroxytyrosol, tyrosol, quercetin, oleic acid, and α-tocopherol. The tested olives also contained significant levels of organic acids (tartaric, malic, oxalic, and citric acids), and natural sugars (glucose, fructose). Based on the phytonutrients profile, and biological attributes, our findings revealed that Pakistani olive cultivars have a strong potential for the development of novel functional foods and nutraceuticals.

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Mycotoxin Sampling: Impact of Sampling Procedures on Analytical Results

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Mycotoxins are toxic secondary metabolites produced by fungi that can contaminate a wide range of food and feed commodities, including cereals, nuts, spices, and animal feed ingredients. Unlike many chemical contaminants, mycotoxins are not uniformly distributed throughout a lot because fungal growth occurs in localized areas influenced by moisture, temperature, grain damage, and storage conditions. As a result, contamination often occurs in "hot spots," making representative sampling one of the most critical factors in obtaining reliable analytical results.

This presentation examines the impact of sampling procedures on mycotoxin testing outcomes and highlights why sampling is often the largest contributor to overall measurement uncertainty, frequently exceeding uncertainties associated with sample preparation and instrumental analysis. The presentation reviews the principles and requirements of Codex Alimentarius sampling plans, including lot definition, collection of incremental samples, preparation of aggregate samples, sample reduction, homogenisation, and laboratory testing. The consequences of poor sampling practices are discussed, including non-representative test portions, poor analytical reproducibility, false-negative and false-positive results, product recalls, food safety incidents, regulatory non-compliance, financial losses, and trade disruptions.

Through practical examples and Codex-based guidance, the presentation demonstrates how representative sampling improves confidence in analytical results and supports informed food safety, regulatory, and commercial decisions. The key message is that reliable mycotoxin testing begins with proper sampling, as the quality of the analytical result can never exceed the quality of the sample collected.

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Multi-Mycotoxin Analysis in Baby Food: Comparing LLE and QuEChERS using LC-MS/MS

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Mycotoxin contamination in infant nutrition, particularly baby biscuits, represents a critical food safety concern due to their potential carcinogenic and immunosuppressive effects. Analytical laboratories require high-throughput and sensitive methods to monitor these contaminants efficiently, especially to ensure compliance with stringent international regulations such as those established by the European Union (EU) for infant food safety. This study presents a comprehensive validation comparing traditional liquid-liquid extraction (LLE) and the modern QuEChERS technique for the simultaneous determination of multiple mycotoxins in baby food using LC-MS/MS.

Samples of baby food were processed using two fully validated protocols: an established LLE procedure and a streamlined QuEChERS method. The analysis targeted aflatoxins (B1, B2, G1, G2), ochratoxin A, and deoxynivalenol (DON). Performance parameters including limit of quantitation (LOQ) and recovery were evaluated in accordance with international quality standards.

The results demonstrated significant improvements in sensitivity with the QuEChERS method across most analytes. For aflatoxin B1, the LOQ decreased from 0.82 µg/Kg with LLE to 0.01 µg/Kg with QuEChERS, with recovery ranges of 83.63-119.01% and 90.47-107.93%, respectively. Aflatoxin B2 showed an LOQ of 0.2 µg/Kg for LLE and 0.02 µg/Kg for QuEChERS, with recoveries between 79.63-97.39% and 93.12-109.8%. Aflatoxin G1 and G2 achieved LOQs of 0.84 and 0.2 µg/Kg using LLE with recoveries 80.80-97.55% and 85.96-101.22%, which were significantly lowered to 0.02 µg/Kg using QuEChERS for both with recoveries 106.26-118.68% and 100.13-118.07%. For deoxynivalenol, the QuEChERS method provided a superior LOQ of 9.84 µg/Kg with recoveries of 60.27-77.21%, compared to the LLE LOQ of 19.67 µg/Kg and recoveries of 93.84-101.91%. Ochratoxin A achieved an LOQ of 0.0398 µg/Kg with LLE and 0.05 µg/Kg with QuEChERS, with respective recovery ranges of 75.33-94.25% and 67.4-83.87%. Overall, the QuEChERS protocol demonstrated superior operational efficiency, showing a notable reduction in solvent usage and preparation time while meeting the rigorous detection thresholds required for infant food.

The study concludes that the validated QuEChERS method is a highly effective alternative to traditional LLE for routine multi-mycotoxin screening. This approach provides a cost-effective and environmentally friendly solution for high-throughput laboratories. The implementation of this method ensures robust monitoring of mycotoxin levels in baby food, thereby enhancing consumer safety and supporting international trade compliance with global regulations.

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Advancing Metrological Traceability in Toxic Element Analysis of Rice Through Proficiency Testing

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Accurate measurement of toxic elements in food is crucial for safeguarding public health, ensuring regulatory compliance, and facilitating national and international trade. This study presents the establishment and implementation of accuracy-based proficiency testing (PT) schemes for toxic elements arsenic (As), cadmium (Cd), and lead (Pb) in rice, a key Philippine food commodity. Coordinated by the National Metrology Laboratory of the Philippines (NMLPhil), the PT schemes were designed to evaluate the analytical performance and metrological competence of participating laboratories. Reference values were determined using SI-traceable measurement procedures, thereby ensuring metrological comparability and reliability of results. Laboratory performance was assessed using z'-scores, most laboratories showed good performance in determining total arsenic (71 %), cadmium (90 %), and lead (68 %). These findings indicate generally reliable capability with opportunities for further improvement, highlighting the value of proficiency testing schemes in ensuring comparability, strengthening metrological traceability, supporting continual quality improvement, and enhancing the credibility and trustworthiness of food safety monitoring within the Philippine National Quality Infrastructure.

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A Regional Pacific Kava Standard for Quality, Safety, and Market Growth

Presented by: Hannie Tjong, Pacific Island Standards Committee (PISC) Secretary

The Pacific Regional Kava Standard project marks a major milestone in regional cooperation and reflects a shared commitment to strengthening and safeguarding the kava industry. The project consists of three phases with the aim of producing a voluntary, harmonised kava standard and facilitating its use across Pacific Islands countries. The project is a regionally endorsed initiative of the Pacific Island Standards Committee (PISC) designated as the Pacific regional standards body by Pacific Islands Forum Trade Ministers.

Kava holds deep cultural significance and represents a major economic asset for Pacific Island countries, with the global market projected to grow from approximately A$2.1 billion in 2023 to A$7.3 billion by 2032. Despite this opportunity, inconsistent quality, fragmented regulations, and increasing competition from non-traditional producers threaten the region's market share, product integrity, and cultural heritage.

The Pacific Regional Kava Standard seeks to address these challenges by defining minimum performance expectations and technical specifications that ensure consistent quality and sustainable production practices. This protects authentic Pacific Kava from substitution and fraud, supports market access and regulatory compliance, strengthens consumer confidence, and lays the groundwork for a regional Geographical Indication. Importantly, the regional standard is designed to complement existing national standards and the Codex Alimentarius framework rather than replace them.

Delivery of the project is structured into three phases. I) building regional support and developing the formal PISC project proposal, ii) drafting and publishing the Pacific Regional Kava Standard through PISC's consensus-based processes, iii) supporting implementation of the adopted standard and conformity assessment scheme pilot to facilitate uptake in domestic and export markets.

Thirty two experts across government, academia, consumer organisations, and the private sector from twelve Pacific Island countries—Fiji, Samoa, Tonga, Vanuatu, Niue, New Zealand, Kiribati, Tuvalu, Solomon Islands, Papua New Guinea, New Caledonia and Australia — form the Technical Committee. An agreed near, medium and long-term workplan has been developed by the committee.

This oral presentation will provide an overview of the workplan and progress to date

Turanose as a Novel Chemical Marker for Detection of Honey Adulteration using qNMR Spectroscopy

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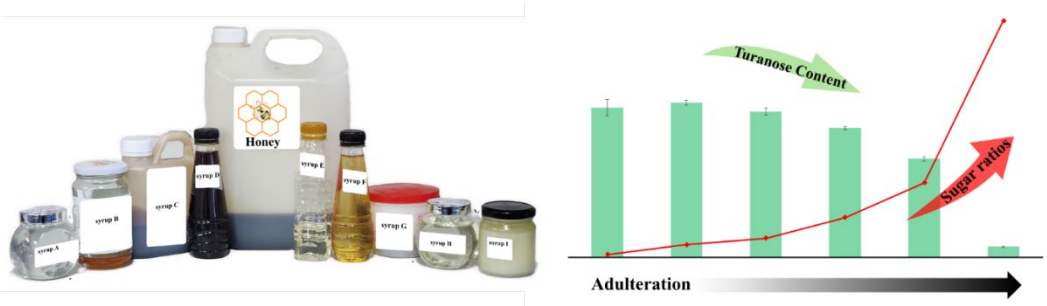
Honey is a natural product resulting from the diligent work of honeybees. It is positioned as a premium syrup, achieving a much higher price than other syrups due to its rarity, rich flavor, and health benefits. This high value has incentivized widespread honey adulteration, resulting in the introduction of substandard quality honey to the market. Such adulteration potentially has long-term negative health effects and undermines consumer trust. Although domestic and international organizations specify moisture, fructose, glucose, and sucrose contents for the authentication of natural honey, these parameters alone are sometimes insufficient for detecting honey adulteration. Thus, this study proposes turanose (Tur), one of the rare sugars exclusively found in natural honeys, as a novel chemical marker to detect honey adulteration. An authentic honey was adulterated with 2-50% of various commercial syrups, namely glucose syrup, maltose syrup, golden syrup, high fructose syrup, corn syrup, cane syrup, rice syrup, inverted sugar, and molasses. The sugar contents, including glucose (Glu), fructose (Fru), sucrose (Suc), maltose (Mal), and their ratios to turanose, were investigated in these adulterated honeys using quantitative nuclear magnetic resonance spectroscopy (qNMR). The results shown that turanose content significantly decreased from 2.86% to 1.50% (w/w) in relation to the adulteration levels. In addition, the ratios of Glu:Tur, Fru:Tur, Suc:Tur, and Mal:Tur in adulterated honey were significantly higher than those of authentic honey. These results indicate the potential of turanose and its sugar ratios as effective marker for honey adulteration, thereby enhancing the reliability of honey authentication methods.



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Nutrient composition of Thai freshwater and marine fish across cooking methods

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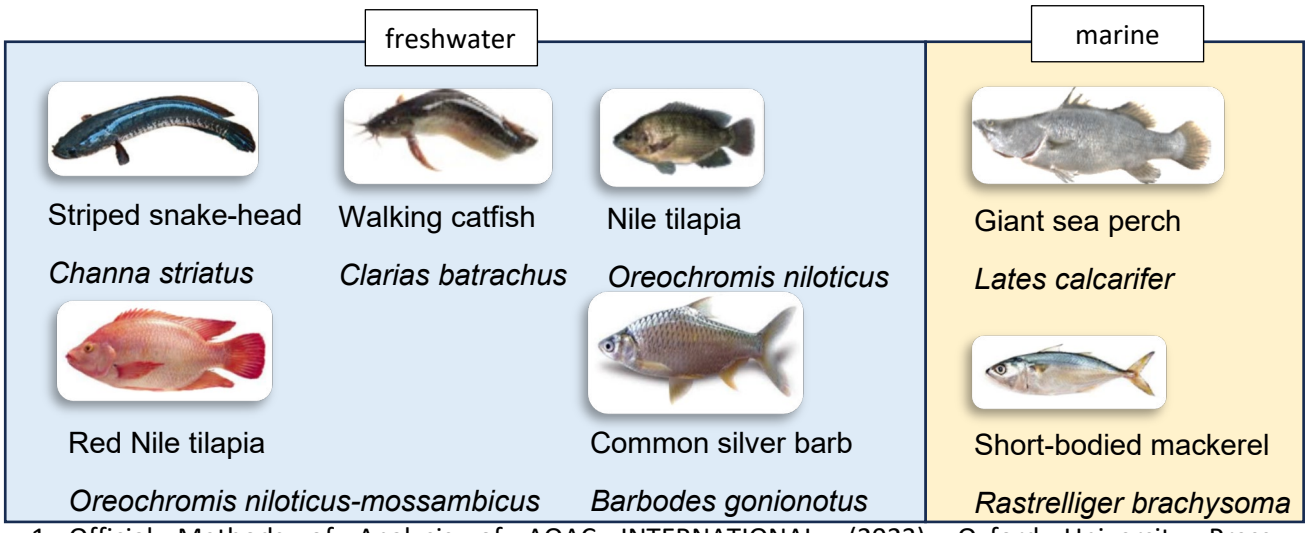
Fish are important sources of high-quality protein and essential micronutrients; however, comprehensive nutrient composition data for commonly consumed fish species in Thailand remain limited. This study determined the nutrient composition of seven commonly consumed fish species (five freshwater and two marine species) prepared as raw, boiled, fried, and grilled samples. Proximate composition, fatty acids, minerals, and vitamins were analyzed using standard AOAC (2023) methods. Protein content ranged from 17.6 to 33.9 g/100 g edible portion (EP). Striped snakehead, giant sea perch, and short-bodied mackerel consistently ranked among the highest-protein species across preparation methods. Short-bodied mackerel exhibited a favorable nutritional profile, combining high protein and omega-3 fatty acid contents (up to 0.6 g/100 g EP) with moderate total fat levels (2.5-10.0 g/100 g EP). It also provided substantial amounts of vitamin A (8.2-27.9 µg RAE/100 g EP), niacin (4.4-5.0 mg/100 g EP), iron (1.4-1.5 mg/100 g EP), and zinc (1.0-1.6 mg/100 g EP) in cooked fish. Calcium content ranged from 10.6 to 603.1 mg/100 g EP, with fried common silver barb exhibiting the highest concentration (603.1 mg/100 g EP). Cooked Common silver barb was also distinguished by its high vitamin B2 (0.1-0.3 mg/100 g EP) and vitamin B12 (7.0-13.0 µg/100 g EP) contents. These findings provide updated nutrient composition data for commonly consumed fish species in Thailand and contribute to food composition databases. These data support dietary assessment, nutrition research, and the development of evidence-based dietary recommendations.



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A Study of Furan in Selected UVB Irradiated Mushrooms and Risk Assessment of Furan

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Furan is an organic compound that has been classified as a possible carcinogen. Previous studies have shown that heat treatments can produce furan, such as in canned foods. However, this irradiation can induce reactions that produce undesirable volatile compounds, such as furan. The objective of this study was to investigate the formation and emergence of furan in UVB irradiated mushrooms [Enokitake mushrooms (*Flammulina velutipes*), Bhutan oyster mushroom (*Pleurotus sajor-caju* (Fr.) Singer), and Lung oyster mushroom (*Pleurotus pulmonarius*)] and subsequent cooking, and to assess the potential food exposure risk to Thai consumers. A method for analyzing furan using headspace solid-phase micro-extraction gas chromatography mass spectrometer/triple quadrupole (HS-SPME GC-MS/TQ) was developed and validated according to AOAC guideline. The result showed acceptable linearity, precision, and recovery. The results revealed increased levels of furan in Bhutan oyster and Lung oyster after irradiation, with statistically significant differences ($p < 0.05$). Furthermore, increased levels of furan were detected after cooking, particularly stir-frying. The amounts were statistically significantly different ($p < 0.05$) from that of before cooking. Risk assessment using the Margin of Exposure (MOE) and consumption data from the National Bureau of Agricultural Commodity and Food Standards (ACFS) showed that the MOE values of furan in all cooked mushrooms were within the safety range. Therefore, consuming mushrooms irradiated with UVB and cooked under these experimental conditions is unlikely to pose a risk to public health and sensitive group such as children or patients with chronic diseases. The findings of this study suggest that UVB irradiation of Bhutan oyster, Lung oyster and enokitake mushroom for 60 minutes can significantly increase vitamin D2 but does not pose potential health risk of furan to general consumers.

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Beyond the z-score: Multivariate analysis to enhance proficiency testing evaluation of heavy metals in homogenized orange matrix

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Abstract

Single-analyte z-scores classify proficiency testing (PT) results, but they provide limited diagnostic information about why warning or action signals occur. This study re-evaluated one PT round for Pb, Cd, As, and Hg in a homogenized orange matrix by combining ISO 13528-compatible performance statistics with process-descriptive laboratory metadata.

Across 27 laboratories, 86 of 97 reported laboratory–analyte results were satisfactory ($|z| \leq 2$), with eight action signals and three warning-level results concentrated in a limited number of laboratory–analyte combinations. ICP-based submissions had lower mean absolute z-scores than AAS-based submissions in this dataset (mean $|z| \approx 0.76$ versus ≈ 2.24), although the AAS mean was strongly affected by high-impact outliers and the platform comparison was confounded with digestion strategy, calibration practice, matrix compensation, and laboratory execution. Reported QA/QC breadth was not a direct performance metric: the correlation between QC Score and $|z|$ was weak and non-monotonic ($r \approx 0.14$).

Youden plots, PCA, HCA, correlation heatmaps, and network visualization were used as exploratory displays of paired errors and co-reported workflow features. Together, these analyses placed PT performance signals in relation to combinations of instrument platform, sample preparation, matrix-control practice, test-portion mass, and reported QA/QC implementation. The metadata-aware interpretation is therefore best used to prioritize follow-up laboratory review and make PT feedback more actionable, not to assign definitive root causes to individual laboratories.

Keywords: ISO/IEC 17043:2023; heavy metals; homogenized orange matrix; proficiency testing (PT); PCA; HCA

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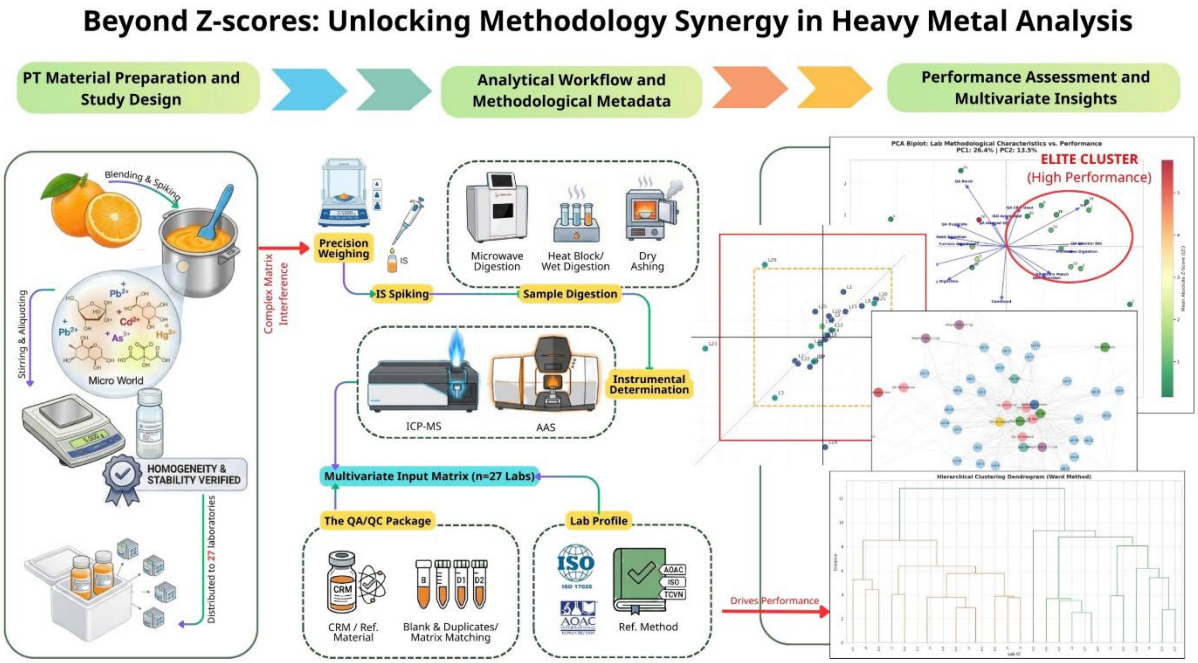

Tracking Performance of Malaysian Laboratories Through *Salmonella Typhimurium* Proficiency Testing (2021–2025)

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Foodborne pathogens such as *Salmonella spp*. present persistent threats to public health and the global food supply chain. To ensure robust national microbiological quality assurance, the Department of Chemistry Malaysia via MyKIMIA PTP conducts regular proficiency testing (PT). This abstract synthesizes a five-year retrospective review (2021–2025) of laboratory performance for *Salmonella typhimurium* detection. MyKIMIA PTP evaluating 394 total submissions which 60 to 88 participating laboratories annually. Results showed an acceptable rate of 98%, consistently staying above the 96% benchmark. This sustained excellence proves the existence of a highly competent, stable, and resilient analytical framework within Malaysia laboratories. Focusing only two main food matrices such as black pepper and desiccated coconut for proficiency testing analysis. The scientific consensus driving this precision relies heavily on standardized methods, with most top-performing laboratories utilizing FDA-BAM Chapter 5 or ISO 6579 methodologies. Success rates demonstrated absolute consistency across diverse sample assignments.

However, in 2024 and 2025, laboratories performance dropped to 97% and 98% success rates compared to 100% success rate in 2021 and 2022 for black pepper and desiccated coconut matrices. Closing the performance gap requires addressing two distinct, rare outliers identified across the reports. First, strengthening aseptic techniques and preparing test items separately within biosafety cabinets to prevent cross-contamination and false-positive results. Second, strict administrative adherence to commencement dates to maintain PT item stability and preserve the integrity of the proficiency testing evaluation. By addressing these elements, MyKIMIA PTP remains committed to elevating laboratory competence and safeguarding public health.

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Performance Evaluation of Philippine Laboratories for Cypermethrin Residue Analysis in Mango

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Mangoes are among the Philippines' most loved fruits, valued locally and internationally for their distinctive flavor and nutritional benefits. However, the widespread use of pesticides such as cypermethrin in mango production raises critical concerns regarding food safety, public health, and export compliance. Ensuring that mangoes meet both national and international safety standards demands accurate testing and consistent analytical performance across chemical testing laboratories. Currently, the Philippines faces challenges in achieving these goals due to limited access to local reference materials and proficiency testing (PT) schemes for pesticide residue analysis. These gaps may lead to inconsistent laboratory results, reduced consumer trust, and diminished global competitiveness. This study evaluates the performance of Philippine chemical testing laboratories in detecting cypermethrin residues through a PT scheme implemented by the National Metrology Laboratory of the Philippines (NMLPhil). Laboratory performance was assessed using z'-scores, with eight (8) laboratories participating. Results showed that 75% of the laboratories achieved acceptable performance, none received warning signals, and 25% fell within the unacceptable range. These findings highlight the need for continuous capacity building, method harmonization, and strengthened traceability within the national food safety testing network. The implementation of accuracy-based PT schemes not only enhances laboratory credibility but also safeguards consumer health, promotes confidence in locally produced mangoes, and supports the Philippines' competitiveness in global trade through improved measurement reliability.

Keywords: proficiency testing, pesticide residue, cypermethrin, food safety, metrology

Nutritional Value of Traditional Rice Varieties of Sarawak

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Sarawak is endowed with its own traditional rice varieties, many with good eating quality and perceived health benefits. The good eating quality of these traditional varieties is likely due the nutritional compositions and attributes, distinctive to rice grown in Sarawak's local climatic conditions. Among the most well-known varieties are Bario, Bajong, Biris, Bubok, Mamut, Saga and Wai. However, despite growing popularity, their detailed nutritional information is limited. Samples of the seven traditional varieties were collected throughout Sarawak and analysed for their amylose content, nutritional and proximate compositions, and metal contaminants. Samples of glutinous rice and modern varieties were also collected and analysed for comparison. The average amylose contents for Bario, Bajong, Biris, Bubok, Mamut, Saga and Wai are ranging from 23% to 33%. A rice variety with amylose content between 25% and 30% are widely preferred for consumption, and popular for dishes where distinct and separate grains are desired. The average amylose content of the modern rice varieties is 25% while for glutinous rice varieties is 4.35%. The selected traditional rice varieties contain considerable amount of phosphorus, potassium, magnesium and manganese then the sampled modern rice varieties. The traditional varieties also content substantial amount of calcium, iron, zinc, protein, fat and fibre contents, comparable with the glutinous and modern rice varieties. The total fat contents of the selected rice varieties were ranging from 0.67 g/100 g to 1.5 g/100 g, which is likely due to the nutrient rice bran and germ remain intact. The average crude protein contents of Bario, Bajong, Bubok, Mamut, Saga and Wai were between 8.53% and 10.29%, slightly higher than glutinous and modern rice varieties of 8.45% and 8.02%, respectively. The high protein content in certain traditional rice varieties may provide an option to those who concern about their protein intake or to compare it against other grains. The crude fibre contents of the traditional rice varieties were between 0.96% to 1.57%, comparable with the glutinous rice but higher than the average modern rice varieties of 0.74%. The high crude fibre content may improve with the digestive system. The metal contaminants such as arsenic, cadmium and lead were detected in some samples but are well below the maximum permitted levels. The initial findings of this study are important in our efforts to promote and commercialise the selected traditional rice varieties. Further information such as phytochemical compounds, anti-oxidant capacity, glycaemic index and genomic study of the selected traditional rice varieties are crucial for details description and varietal identification of the varieties.

Impact of Hydrothermal Treatments, Physicochemical Characterization of Tahitian Chestnut (*Inocarpus fagifer*) in Fiji

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The current study evaluated using quantitative study to test the impact of hydrothermal treatments on the functional properties of Tahitian chestnut (*Inocarpus fagifer*) flour. Six respective chestnut flour samples were produced using hydrothermal treatments, blanching, prolonged boiling, high-pressure treatment and fermentation. The properties such as bulk density, Carr Index, and Hausner ratio were found to be in the ranges of 3.81–5.037 and 64.7-97.7, respectively. The moisture content of chestnut flour was highest in sample 6 (S)-fermented for five days at a ratio of 1:3, and the lowest in the high-pressure treatment sample (S4). The fat content ranged from 5.4% to 9.3%; the highest was observed in the high-pressure treatment (S4). The oil absorption capacity (OAC) of flour ranged from 0.187 to 1.656 g/ml, with the highest in Sample 4 and the lowest in Sample 2, compared with the control. Water absorption capacity (WAC) ranged from 2.60 g/ml to 3.53 g/ml. The highest swelling power, 14.240, was observed in sample 4, and the lowest in sample. The gel consistency of sample 6 was the highest, suggesting that chestnut flour may be more suitable for food systems that require swelling. This study will provide knowledge on functional properties of chestnut flour for value addition in food system.

Transforming Nonconformities into Best Practices: A Philippine Microbiological Laboratory's Journey

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Measurement uncertainty and method verification remain the most challenging requirements of the ISO/IEC 17025:2017, particularly for laboratories with limited resources and evolving quality systems. For several years, these areas have been the main sources of recurring nonconformities during accreditation assessments and internal audits in our laboratory.

Recognizing these challenges, the laboratory has embarked on a journey towards improvement and excellence. Through staff capability development, strengthened technical competence, comprehensive documentation, and continual monitoring, we progressively transformed these former weaknesses into organizational strengths.

Today, the laboratory is recognized not just for sustained compliance with ISO/IEC 17025:2017 requirements, but also with setting a standard among laboratories. Building on this experience, capability development of other testing laboratories through technical trainings and mentoring are being conducted to promote knowledge sharing and contribute to a culture of quality among the Philippine microbiological laboratories' community.

The presentation aims to encourage laboratories, esp. from developing countries to view accreditation findings not merely as compliance issues but as opportunities for technical growth, continuous improvement, and organizational excellence.

Strengthening Laboratory Quality:
A Stepwise Training and Competency Verification System

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Establishing a robust culture of compliance and accuracy in food analysis requires continuous technical enhancement aligned with international standards such as ISO/IEC 17025. To ensure data reliability and issuance confidence in food and nutrition testing, the Service Laboratory Group (SLG) of the Department of Science and Technology – Food and Nutrition Research Institute (DOST-FNRI) implemented a structured, in-house training and competency evaluation framework.

The program comprised targeted, face-to-face training modules focusing on core laboratory competencies: (1) Quality assurance and quality control (QA/QC) fundamentals, incorporating internal quality controls, control charting and proficiency testing; and (2) Internal equipment calibration and verification, covering good weighing practices, balance verification, and pipettor maintenance with actual demonstrations. Pre- and post-test assessments, along with participant feedback, were statistically analyzed using paired t-tests and Cohen's d effect sizes to evaluate knowledge retention and skill acquisition across multi-unit laboratory personnel (*N = 39 to 43)*.

Statistical evaluation demonstrated significant competency growth across modules. In the QA/QC training, mean test scores improved significantly from 8.4 to 9.8 points (+16.6% increase, $t = 5.56, p < 0.001$), yielding a large effect size (Cohen's $d = 0.88$) and reduced score variance. The calibration and equipment verification module yielded a mean score increase from 8.5 to 13.8 points (+72.8% increase, $t = 13.74, p < 0.001$), demonstrating a very large training impact (Cohen's $d = 2.10$), with 40% of participants achieving perfect score. Participant evaluations averaged between 4.82 and 4.95 out of 5.00, reflecting high operational relevance and instruction clarity.

The stepwise training framework effectively bridged theoretical QA/QC principles and hands-on laboratory verification practices at DOST-FNRI. The learning and development intervention successfully reinforces analyst competence, maintains ISO accreditation, strengthens alignment to continuing professional development and up-skilling and sustains high-quality analytical infrastructure for food and nutrition research.

Strengthening Food Safety Surveillance: Molecular Analysis of GM Elements in Malaysia

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The growing adoption of genetically modified (GM) crops and food products worldwide has increased the demand for effective monitoring strategies to ensure food safety and regulatory compliance. Real-time polymerase chain reaction (PCR) provides a reliable and sensitive molecular approach for detecting and identifying GM elements across diverse food matrices. This study evaluated the effectiveness of real-time PCR for detecting common genetically modified (GM) elements, including the Cauliflower Mosaic Virus 35S promoter (P-35S), nopaline synthase promoter (P-NOS), nopaline synthase terminator (T-NOS), pat, bar, cry1Ab, ctp2-cp4epsps, and nptII, in raw materials and processed food products available in the Malaysian market. Between 2020 and 2025, this study analysed 1,668 raw material and processed food samples derived from soy, maize, cotton, and papaya that were submitted by law enforcement agencies and non-governmental organizations. Results showed that 505 samples (30%) tested positive for at least three GM elements, namely P-35S, T-NOS, and ctp2-cp4epsps. The presence of these elements was confirmed in soy and maize samples using taxon-specific markers, including the soybean lectin gene and specific markers for maize, cotton, and papaya. Our findings demonstrate high specificity and a low limit of detection (0.01–0.1%), confirming real-time PCR as a reliable and essential tool for regulatory authorities in verifying food authenticity and ensuring compliance with GM food regulations. As the ASEAN Food Reference Laboratory (AFRL), the Department of Chemistry Malaysia (KIMIA Malaysia) serves as a regional centre of excellence in strengthening food safety surveillance through the development, harmonization, and standardization of molecular protocols for GM food detection. Through the application of sensitive and consistent real-time PCR methods, AFRL supports regional laboratory capabilities, promotes regulatory compliance, facilitates secure trade, and enhances consumer confidence in food authenticity and safety.

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Formulation and Sensory Assessment of Gluten-Free Cassava Noodles

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Gluten intolerance can significantly impact an individual's quality of life, as it prevents them from enjoying foods made from wheat, barley, and rye[1]. Therefore, there is an ongoing search for suitable alternatives using other starchy root crops. In this study, cassava flour obtained from an indigenous starchy root crop was used to develop gluten-free noodles that are both nutritious and culturally relevant for Fiji and the Pacific region. These cassava-based noodles offer a healthy alternative to traditional wheat-based instant noodles. Nine different gluten-free noodle formulations were prepared by adjusting the amount of xanthan gum and brine water in cassava flour. These formulations were evaluated based on appearance and texture. Among them, three formulations, T3 (cassava flour combined with warm brine water and xanthan gum), T5 (xanthan gum dispersed in cold water and mixed with cassava flour), and T6 (cassava flour combined cold brine water and xanthan gum) stood out for their characteristic noodle appearance and texture. The sodium content varied between 7.19 and 11.31 mg/g, protein ranged from 13.62 to 23.97 mg/g, dietary fibre from 8.08 to 10.78%, and carbohydrate content from 29.96 to 53.33%. Swelling capacity tests showed that T5 had the highest water absorption at 319.5%, while tensile testing indicated that T3 produced the strongest noodle strands. Sensory evaluations revealed that formulations T5 and T6 were most preferred, with overall scores comparable to those of conventional wheat-based noodles. These findings highlight the potential of cassava-based gluten-free noodles as a popular staple in the Pacific, appealing across different age groups, and suitable for expansion into global markets.

Gluten-free cassava noodles

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High Performance Liquid Chromatographic -Ultraviolet (HPLC-UV) Determination of Kavalactones and Flavokavains in Selected Fiji Kava Cultivars

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Kava (*Piper methysticum*) is a cornerstone crop for Fiji's agricultural economy and cultural heritage, with significant growing international commercial interest. To secure market access and safeguard consumer safety, reliable analytical methods are needed to quantify active bioactive constituents – the six major kavalactones responsible for physiological effects – and distinguish desirable noble cultivars from non-noble varieties marked by elevated levels of flavokavains A and B. This study evaluated the development and validation of an HPLC-UV isocratic analytical protocol at the IAS-CSF-USP Fiji laboratory for the simultaneous determination and chemotypic profiling of major kavalactones (KL) and flavokavains (FK) across selected prominent Fiji kava cultivars.

Dried roots, rhizomes and basal stem samples from selected Fijian cultivars were processed using an optimised Soxhlet extraction procedure. Chromatographic separation was achieved on a Reverse-Phase C18 column using isocratic elution with UV detection. The analytical method was validated according to international standards (ISO/IEC 17025/AOAC guidelines) for linearity, selectivity, precision (repeatability and intermediate precision), limits of detection and quantification (LOD/LOQ), recovery and measurement uncertainty.

The validated method showed strong linearity ($R^2>0.995$) for all target analytes, with mean recoveries ranging from 90% to 110% and precision (%RSD) consistently under accepted threshold. Application of the method to selected Fijian cultivars successfully resolved distinct chemical fingerprints (kavalactone codes) and allowed clear quantification of flavokavain content and rations (FK/KL), confirming the noble chemical profile of the analysed local varieties.

The validated HPLC-UV method offers a robust, reproducible, and accessible tool for characterisation, cultivar identification, and quality verification of Fiji Kava. Implementing this capacity within the Pacific region supports regulatory compliance, protects brand integrity and kava authenticity for Fijian kava exports, screens kava quality for incoming kava imports and aligns with international standards such as the Codex Alimentarius.

Keywords: Kava (*Piper methysticum*), Fiji Cultivars, Kavalactones, Flavokavains, Chemotype Profiling, HPLC-UV, Isocratic, Method Validation

Equipment Calibration and Challenges Faced in the South Pacific Region

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Abstract

Equipment calibration plays a vital role in ensuring the accuracy, reliability and traceability of measurement results, supporting laboratory quality and compliance with international standards. At the Institute of Applied Sciences (IAS), Centre of Sustainable Futures (CSF), The University of the South Pacific (USP), equipment calibration services are provided for internal laboratories, government agencies, and private industries, including manufacturing facilities throughout Fiji. The Equipment Calibration unit is also expanding its regional support with calibration services planned for the Republic of the Marshall Islands later this year.

Current calibration services include temperature verification of thermometers, cold storage equipment, rooms and freezer trucks, incubators, oven, autoclaves, water bath and pH meter probes as well as mass calibration of analytical and precision balances. These services improve the quality and reliability of laboratory measurements and support laboratories and industries in maintaining confidence in their testing and monitoring results.

The laboratory's calibration capability has been strengthened through specialized training undertaken at the Measurement Standards Laboratory (MSL), New Zealand. This training has enhanced in-house expertise, enabled a wider range of calibration services and reduced reliance on external providers for selected calibrations.

Despite these achievements, several challenges remain such as temperature calibration limits, lack of dedicated space for calibration and interruptions in calibration services when Reference Standards are sent overseas for calibration. This presentation will explore measures that are being put in place to support this and future opportunities that the IAS, CSF, USP Laboratory is currently exploring to strengthen equipment calibration services in Fiji and the region.

Mango seed waste as a renewable source for functional food and nutraceutical innovation

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Abstract

Mango (*Mangifera indica* L.) is one of the most widely cultivated tropical fruits globally, with production reaching 61 million tonnes in 2021/22. However, mango processing generates substantial quantities of waste, with 35-60% of the fruit discarded as by-products, producing more than 20 million tonnes of agro-industrial waste annually. Mango seeds constitute a major portion of this waste stream, and their kernels account for 45-75% of seed weight. In recent years, mango kernels have emerged as a promising source of bioactive compounds with potential applications in functional foods and nutraceuticals. Despite growing interest, knowledge of how cultivar and maturity stage influence mango kernel phytochemical composition remains fragmented, hindering the selection of optimal kernels for functional food and nutraceutical development. This systematic review synthesised recent evidence to address this knowledge gap. More than 70 bioactive compounds were identified across 66 cultivars, including phenolic acids, flavonoids, and xanthones. Considerable variation in phytochemical profiles was observed among cultivars, with Ramkela at the immature green stage and Sensation at the ripe stage exhibiting the greatest diversity of reported bioactive compounds. Immature green kernels had the highest total phenolic content and a greater diversity of phenolic compounds than ripe kernels. Across the reviewed studies, mango kernel extracts also demonstrated strong antioxidant capacity and antimicrobial activity against several major foodborne pathogens, including *Bacillus cereus*, *Listeria monocytogenes, Staphylococcus aureus, Escherichia coli, Pseudomonas aeruginosa*, and *Salmonella Typhimurium*. Overall, the findings highlight mango seed waste as a renewable and underutilised source of high-value bioactive compounds, providing a strong scientific basis for developing innovative functional foods and nutraceuticals while supporting waste valorisation and circular bioeconomy initiatives.

Sustaining Accredited Laboratories in Fiji: Instrumentation, Human Resources, and Trade Risks

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Abstract

Accredited laboratory services are an essential component of Fiji's national quality infrastructure, supporting food safety assurance, environmental monitoring, and the certification of agricultural and fisheries exports. Demonstrating technical competence through ISO/IEC 17025 accreditation enables laboratories to meet international requirements and maintain confidence in analytical results. However, sustaining accredited laboratory services in Fiji and other small island developing states remains challenging due to limitations in technical capacity, human resources, and financial sustainability. Major challenges include the maintenance of analytical equipment and lack of local instrumentation Technicians that affects laboratory testing services and maintaining accreditation for the affected tests.
This presentation examines how gaps in instrumentation support and skilled human resources affect the sustainability of Fiji's laboratory services and their role in supporting trade and regulatory decision-making. It highlights practical approaches to strengthen laboratory resilience and sustaining reliable laboratory services. It will also provide recommendations on a risk-based approaches to prioritize investments, strengthen laboratory capability, minimize disruptions to testing and ensure that laboratories continue to support food safety, environmental protection, and sustainable economic development in Fiji and the Pacific region.

Key words:

ISO/IEC 17025 Accreditation, Laboratory Sustainability, Quality Infrastructure, Instrumentation Maintenance, Technical Capacity, Human Resources, Risk-Based Approach, Sustainable Pacific Laboratory Services

Making Better Use of Proficiency Testing to Improve Laboratory Competence

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Food testing laboratories routinely participate in proficiency testing (PT) to demonstrate technical competence and fulfil accreditation requirements. Beyond performance assessment, PT also provides valuable technical information to support method evaluation, quality improvement and risk-based quality management. Obtaining meaningful value from PT requires informed decisions throughout the participation process, from selecting PT programmes that are fit for their intended purpose to effectively interpreting and applying PT information for continual improvement.

This presentation introduces a practical framework for making better use of PT by considering fitness for purpose as a guiding principle throughout the participation process. Drawing on experience from food proficiency testing programmes, it discusses practical considerations before, during and after PT participation, enabling laboratories to make more informed technical decisions and obtain greater value from PT.

Practical examples derived from food proficiency testing programmes will illustrate how different approaches used in establishing assigned values, standard deviations for proficiency assessment (SDPA) and evaluation criteria can influence the intended use and fitness for purpose of PT programmes, helping laboratories select programmes that are appropriate for their technical objectives. The presentation will also demonstrate how information contained in PT reports—including statistical summaries, method comparisons and technical comments—can support technical review, method evaluation and quality improvement. In addition, longitudinal analyses of PT participation data will demonstrate how historical PT information can support performance review, continual improvement and risk-based planning of future PT participation.

By applying a fitness-for-purpose approach throughout the PT participation process, laboratories can make better use of proficiency testing as a practical tool to support the continual improvement of laboratory competence.

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Antioxidant Potential and Phytochemicals of an Indigenous Desert Lime (*Citrus glauca*) in Australia

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Citrus is the most exported fruit from Australia. However, relying solely on the cultivation of commercial citrus is challenging due to various causes, including fungal diseases, pests and climate change. Thus, exploring alternative *Citrus* species is a solution for long-term sustainability. The desert lime (*Citrus glauca*) is a native lime species that has been used in traditional cuisine, dating back to the era of Australia's First Nations, known for its juicy fruit with a strong, sharp citrus flavor. It shows superior tolerance to pests, salinity, and extreme climates, allowing it to survive and thrive across Australia. Despite these features, the utilization and scientific investigation of *C. glauca* are still limited. Thus, this study aims to its the potentials. *C. glauca* fruits at various ripening stages were evaluated for their total phenolic content (TPC), total flavonoid content (TFC), and antioxidant activities using DPPH and ABTS assays. The results showed that the TPC and TFC of *C. glauca* fruits depend on their ripening stages. The unripe fruit showed the highest TPC and TFC at 52.57±4.41 mg GE /g FW and 2.24±0.33 mg CE/ g FW, respectively, while the overripe *C. glauca* revealed the lowest TPC and TFC. *C. glauca* fruits in every ripening stage also possess antioxidant activity. Among ripening stages, the highest DPPH scavenging activity of 5.95±0.25 mg Trolox equivalent per gram of fresh weight (mg TE/g FW) was obtained from unripe fruit, while overripe fruits showed the highest ABTS scavenging activity of 2.20±0.28 mg TE/g FW. These findings highlight the potential of desert limes as a raw material for commercialization in the functional food, cosmetic, and pharmaceutical industries.

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Development of African Catfish Patties Fortified with Chicken Eggshell Powder

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Abstract:

This study investigated the effects of incorporating different levels of chicken eggshell powder (CESP) on the microbiological stability and sensory attributes of African catfish (*Clarias gariepinus*) patties during refrigerated storage. Specifically, the study evaluated the suitability of CESP as a calcium-rich functional ingredient by assessing total plate count (TPC) and consumer sensory acceptability. Four formulations were prepared: T1 (0% CESP, control), T2 (0.75% CESP), T3 (1.5% CESP), and T4 (3.0% CESP). Patties were stored at 4 ± 1 °C and evaluated on storage days 0, 10, 20, and 30.

Microbiological analysis demonstrated a gradual increase in TPC across all treatments during storage, reflecting the expected microbial progression over time. However, no significant differences ($p > 0.05$) were observed among treatments at any sampling interval, indicating that CESP incorporation did not adversely affect the microbiological quality of the patties. Sensory evaluation showed no significant differences ($p > 0.05$) in color, aroma, and texture among treatments throughout the storage period. Significant differences ($p < 0.05$) were detected only in taste and overall acceptability on Day 0, with the control treatment receiving the highest mean scores. Nevertheless, all formulations remained within acceptable sensory limits throughout storage. Notably, patties containing 3.0% CESP exhibited sensory acceptability comparable to the control by the end of the storage period, demonstrating that higher levels of CESP can be incorporated without compromising product quality.

These findings indicate that chicken eggshell powder is a promising calcium-rich, value-added, and sustainable functional ingredient for African catfish patties. Its incorporation enhances the product's nutritional potential while maintaining acceptable microbiological safety and sensory quality during refrigerated storage.

Keywords: *African catfish (Clarias gariepinus); chicken eggshell powder; calcium fortification; functional food; microbiological quality; sensory evaluation; refrigerated storage.*

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Dietary Exposure to Sunset Yellow and Tartrazine among Filipinos

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Sunset yellow (SY) and tartrazine (TZ) are among the most widely used synthetic food colourants in beverages and processed foods. Continuous monitoring of their occurrence is essential to support dietary exposure assessment (DEA) and ensure compliance with food safety standards. This study validated a high-performance liquid chromatography (HPLC) method for the simultaneous determination of SY and TZ in selected foods and applied it to generate occurrence data for a refined DEA of the Philippine population. Method validation followed AOAC International performance requirements by evaluating linearity, sensitivity, accuracy, and precision. Excellent linearity was achieved for both analytes ($r^2 \geq 0.9987$). Limits of detection and quantification ranged from 0.0024–0.0109 µg/mL and 0.0080–0.0365 µg/mL, respectively. Recoveries ranged from 97.40–102.65% for SY and 91.03–100.18% for TZ, while repeatability showed relative standard deviations below 2%, confirming satisfactory analytical performance. The validated method was applied to commercially available products identified through a screening-level DEA. Sunset yellow concentrations ranged from 0.19–18.26 mg/kg in water-based beverages and 9.32–12.40 mg/kg in pre-cooked pastas, while tartrazine concentrations ranged from 0.44–58.42 mg/kg in water-based beverages and 5.44–24.25 mg/kg in pre-cooked pastas. All measured concentrations complied with the Codex General Standard for Food Additives (GSFA) maximum levels. Refined dietary exposure estimates were generated using occurrence data and nationally representative food consumption data from the 2018–2021 Expanded National Nutrition Survey. Although children exhibited higher exposure on a body-weight basis than adults, the highest estimated daily intakes (EDIs) among high consumers were 0.41 mg/kg bw/day for SY and 1.32 mg/kg bw/day for TZ, corresponding to only 10.25% and 13.20% of the respective JECFA acceptable daily intakes (ADIs) of 4 and 10 mg/kg bw/day. The validated HPLC method proved suitable for routine monitoring of synthetic food colourants and generated reliable occurrence data for refined dietary exposure assessment. The measured concentrations complied with GSFA maximum levels, while estimated dietary exposures remained well below the respective ADIs, indicating no safety concern associated with current exposure to sunset yellow and tartrazine from the evaluated food categories in the Philippine population. These findings support evidence-based food safety risk assessment and regulatory decision-making.

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Comparative evaluation of qPCR and dPCR for porcine detection in gelatine

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Industrial gelatine processing causes severe genomic fragmentation and yields matrices rich in cross-linked peptides that act as potent PCR inhibitors, creating a substantial hurdle for standard molecular authentication and routine halal testing. To address these challenges under regulatory compliance, this study utilizes the DNA extraction framework established by the Indonesian National Standard, SNI 9278:2024, which operates on a silica spin column-based principle. This method effectively denatures the gelatine matrix and isolates low-molecular-weight target DNA away from co-extracted peptide fractions to deliver template DNA suitable for downstream molecular or halal testing applications.

Building on this extraction framework, the study presents a head-to-head comparative validation demonstrating how quantitative real-time PCR (qPCR) operates under the current SNI 9278:2024 standard, alongside digital PCR (dPCR) adapted to the same core SNI principles. In this workflow, dPCR is introduced as a proposed technology upgrade, serving as a robust qualitative confirmatory tool or a highly sensitive substitute instrument capable of outperforming standard qPCR, particularly at ultra-low copy numbers. Following a structured validation framework restricted to analytical sensitivity (LoD95%), the performance of both platforms was evaluated across a diverse variety of challenging commercial gelatine derivative samples. Methodological verification was executed in strict accordance with the qualitative validation criteria outlined in the newly established ISO 11781:2025 standard, German Federal Office of Consumer Protection and Food Safety (BVL) guidelines, and the digital MIQE (dMiQE) guidelines. The results establish a highly sensitive, legally defensible qualitative dPCR halal testing model that complements and upgrades the standard regulatory workflow mandated by SNI 9278:2024 for complex, highly processed ingredients.

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Health risk assessment of mercury in locally consumed aquatic biota in Fiji Islands.

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This study explores and contributes to existing knowledge on total Hg (THg) in aquatic biota data in the Fiji Islands. The THg concentrations were quantified in opportunistically available local fish species, canned fish, fish steak, and invertebrates using Cold Vapor Atomic Absorption Spectroscopy (CVAAS). Average THg levels were found in the order of invertebrates < fish species < canned fish < fish steak. This pattern of a clear trend of THg biomagnification in foraging guilds (herbivores < omnivores < carnivores), was supported by significant differences between sample means, where average THg levels of 1.31 ± 2 (0.03 – 7.05) mg/kg dw were recorded in fish liver. The present study found that the highest THg levels of 0.61 ± 0.2 mg/kg in Longface emperor (Lethrinus olivaceus), exceeding both the World Health Organization (WHO) and Environment Protection Agency (EPA) food safety guidelines of 0.5 and 0.3 mg/kg respectively.

Human health risk assessments revealed that 95 % of the fish species analyzed had THg concentrations equal to or below the 0.15 ug/g ww threshold, thus classified as the best choice with three weekly servings by US Food and Drug Administration (FDA/EPA). Based on the estimated daily intake (EDI), majority of the fish samples in this study pose no significant human health risk and could be considered safe for consumption. However, continuous monitoring and assessments are needed to generate more comprehensive data on Hg levels in aquatic biota and to reduce human exposure to methylmercury (MeHg). Such initiatives contribute to the achievement of Sustainable Development Goal (SDG) -14 and support the implementation of the Minamata Convention (MC) on Hg.

Microbiology Test Kits in the Solomon Islands Food Safety System

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Food safety in the Solomon Islands is increasingly threatened by emerging pathogens such as Salmonella enterica, Listeria monocytogenes, Escherichia coli, and Staphylococcus aureus. The tropical climate, reliance on imported foods, and limited infrastructure amplify risks of contamination and outbreaks. To address these challenges, national-level testing coordinated through the National Public Health Laboratory (NPHL) is essential for ensuring reliable detection and response.

Rapid microbiology test kits provide practical tools for strengthening national food safety systems. Chromogenic substrate kits confirm contamination by producing colour changes specific to bacteria such as coliforms, *E. coli*, and *Salmonella*. Film-based kits like 3M Petrifilm confirm microbial loads by providing standardized counts of bacteria, yeast, and moulds. Lateral flow immunoassay kits, such as Salmonella Reveal 2.0, confirm the presence of specific pathogens through rapid visual results. Immunodisk kits, including the Staph Express Disk, confirm targeted organisms such as *Staphylococcus aureus*.

The testing workflow at the NPHL coordinates these complementary methods. Film-based and chromogenic kits establish contamination profiles and indicator organisms, while lateral flow immunoassays and immunodisk kits provide pathogen-specific confirmation. Results are consolidated within the NPHL to ensure consistency, reliability, and compliance with international standards. This workflow strengthens national capacity to detect, respond to, and prevent foodborne outbreaks while reinforcing laboratory systems.

Integrating microbiology test kits into NPHL operations enhances laboratory systems by standardizing protocols, building technical capacity through training, improving data management for testing and reporting, ensuring compliance with AOAC and ISO standards, and supporting policy frameworks for food safety regulation and enforcement. Challenges remain, including cold-chain dependence in tropical climates, cost constraints for advanced kits, training needs to avoid false positives and negatives, validation requirements for credibility, and the need for policy integration into national food safety strategies.

By embedding microbiology test kits into its operations, the NPHL strengthens laboratory systems, enhances outbreak preparedness, and builds public confidence in food systems. Positioned as the national testing laboratory for food microbiology, the NPHL ensures that food safety in the Solomon Islands is both resilient and internationally recognized.

Nutritional and Chemical Evaluation of Culturally Significant Indigenous Foods in Fiji: *Abelmoschus manihot* (Bele) and Seawater-Fermented Coconut Flesh (Kora)

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Diet-related illnesses and food insecurity are increasing throughout the South Pacific. While indigenous food systems offer a sustainable solution, data regarding the precise nutritional profiles and chemical properties of traditional Fijian foods remain limited. This study examines two culturally significant indigenous food resources: *Abelmoschus manihot* (Bele), a nutrient-rich green leafy vegetable, and Kora (or Kota), a traditional fermented condiment prepared by wrapping grated coconut flesh in banana leaves and submerging it in seawater.

The objective of this study was to establish a comprehensive nutritional and physicochemical baseline for these foods using data parameters comparable to the Pacific Islands Food Composition Tables. Specifically, it compares young versus mature Bele leaves, and evaluates the impact of fermentation duration (1 week vs. 2 weeks) and water type (traditional seawater vs. controlled artificial seawater) on the chemical profile of Kora. Proximate analysis was conducted to determine moisture, ash, crude protein, dietary fibre, total carbohydrates, and total energy content. Physical assessments monitored pH and titratable acidity to track fermentation progress. Furthermore, bioactive compounds were quantified using spectrophotometric assays for total phenolic content (TPC) and overall antioxidant capacity.
Proximate analysis of fresh Bele leaves demonstrated high nutrient retention, showing a dry matter crude protein content ranging from 18.5–24.2 g/100g and a total dietary fibre content ranging between 1.8–6.1 g/100g depending on leaf maturity. in the case for Kora, the traditional 2-week seawater fermentation resulted in a distinct physicochemical shift, with pH dropping from an initial 6.2–6.5 down to 4.1–4.4, accompanied by a corresponding increase in titratable acidity. The total phenolic content and antioxidant activity differed significantly between the natural coastal seawater fermentation and the controlled artificial seawater treatment.

This study provides crucial quantitative data to validate the nutritional value of Fijian indigenous diets. Documenting these chemical baselines lay the groundwork for future research into how seawater fermentation impacts the human gut microbiome and how traditional preservation strategies can be scaled to mitigate regional food insecurity.

ABSTRACTS - POSTER PRESENTATIONS

Analysis of Sugar Composition in 13 Cultivars of Kava Plant (*Piper methysticum*) from Fiji Using HPLC-RID and HPLC-ELSD

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Kava (*Piper methysticum*) is a culturally and economically significant plant in the Pacific Islands, traditionally consumed for its calming effects. While its phytochemical profile has been extensively studied, limited data exist on its sugar composition, which may influence its taste, processing, and potential nutritional value. This study aimed to analyze the sugar composition in 13 cultivars of kava plant collected from various regions in Fiji. High-Performance Liquid Chromatography with Refractive Index Detection (HPLC-RID) and Evaporative Light Scattering Detection (HPLC-ELSD) were employed to identify and quantify major sugars present in the samples. The analysis revealed distinct sugar profiles among the cultivars, with variations in fructose and glucose. These findings contribute to a better understanding of kava's biochemical diversity and may inform future research on its processing, quality control, and potential health implications. The study also demonstrates the applicability of HPLC-RID and HPLC-ELSD in profiling sugars in complex plant matrices.

Keywords: Kava (*Piper methysticum*); Sugar composition; HPLC-RID; HPLC-ELSD; Fructose; Glucose; Cultivar variation.

Titrimetric Determination of Iodine in Edible Salt and Salt Content (as NaCl) in Processed Foods in Fiji

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Monitoring iodine in edible salt and salt content in processed foods is essential for ensuring food quality, regulatory compliance and protecting public health. Adequate iodine intake prevents iodine deficiency disorders (IDD), while reducing excessive dietary salt intake is a key strategy for lowering the risk of hypertension and other non-communicable diseases (NCDs). Reliable analytical methods are therefore fundamental to national food monitoring programmes.

This study presents the routine analytical procedures used at the IAS Section of the Centre of Sustainable Futures Analytical Laboratory at the University of the South Pacific (USP), for the determination of iodine in edible salt and salt content in locally processed Fiji foods using validated titrimetric methods operating under an ISO/IEC 17025 quality management system. Iodine concentration in salt was determined using the iodometric titration method, while salt content in processed foods was determined using a validated chloride titration method following sample preparation. The concentration of iodine in salt is generally found in a range of (xx $\pm$ yy %). While the salt content in processed foods tested range from (xx $\pm$ yy %). Quality assurance measures included standardized reagents, method blanks, duplicate analyses, routine calibration of laboratory equipment, internal quality control procedures and participation in proficiency testing programmes where applicable.

The application of validated titrimetric methods provides reliable analytical data for assessing compliance with food standards, supporting nutrition labelling and strengthening food safety surveillance. These analytical approaches contribute to national initiatives aimed at ensuring adequate iodine fortification of edible salt while monitoring salt levels in locally processed foods. The study demonstrates the importance of accredited laboratory testing in generating accurate data to support evidence-based public health and regulatory decision-making in Fiji.

Keywords: Iodometric titration, iodine, salt, processed foods, ISO/IEC 17025

Sustaining Analytical Excellence: Long-Term Experience in Serum Vitamin A Proficiency Testing

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Reliable measurement of serum vitamin A is essential for assessing vitamin A deficiency, monitoring nutrition programs, and supporting clinical decision-making. Participation in proficiency testing (PT) programs is a key component of laboratory quality assurance, providing an external assessment of analytical performance and promoting continuous quality improvement. This study assessed the performance of Biochemical Laboratory of DOST-FNRI in an external quality assessment scheme for the last 6 years. PT performance data were retrospectively reviewed to evaluate laboratory precision, and consistency across PT rounds. Performance indicators, including assigned allowable imprecision (within-lab imprecision, %) and allowable difference (deviation from the target, %), were analyzed to identify trends and recurring analytical challenges. The impact of methodological changes, equipment operations and staff competency on PT performance was also assessed. Overall, sustained participation in the PT program demonstrated consistent satisfactory performance: Allowable Imprecision: Optimum Performance (<2.6%) for Levels 1 – 3; Allowable Difference: Desirable Performance (<±8.2) for Levels 1 and 3 and Optimum Performance (<±4.1%) for Level 2. Periodic deviations were associated with identifiable factors such as staff competency, equipment operations and methodological changes underscoring the importance of systematic root-cause investigation and timely corrective actions. Continuous monitoring of PT results strengthened confidence in the laboratory's analytical capability and supported compliance with international quality standards. The laboratory's long-term PT experience highlights the value of external quality assessment as a tool in monitoring reliable serum vitamin A measurements and fostering a culture of continuous quality improvement.

Evaluating Lab Proficiency in Food Moisture and Ash Analysis in Fiji

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Gravimetric determination of moisture and ash content forms the core foundation of proximate analysis. Accurate moisture and ash values are not only vital parameters on their own, but they also serve as essential baseline inputs required to calculate available carbohydrates (by difference) and total energy for Nutritional Information Panels (NIP) in local and regional food trade. For analytical testing laboratories operating under tropical, high humidity conditions, maintaining strict analytical rigor for these gravimetric measurements presents ongoing quality assurance challenges. This study evaluates the analytical performance of the IAS-CSF-USP Fiji laboratory using proficiency testing (PT) samples from the international recognized Food Analysis Performance Assessment Scheme (FAPAS). Moisture determinations were performed via air-oven drying at 105°C, and ash content was quantified using muffle furnace incineration at 550°C, adhering to standardised validated AOAC protocols.

Laboratory competence was benchmarked against global participant data using FAPAS z-score criteria ($|z| \leq 2.0$). IAS-CSF-USP laboratory achieved satisfactory z-scores across a range of FAPAS food matrices, demonstrating that potential environment bias from high ambient humidity was successfully controlled. Crucially, this high level of precision prevented compounding errors in subsequent carbohydrate and calorie calculations. These results confirm that the lab gravimetric testing capabilities operate in full compliance with ISO/IEC 17025 standards, providing high confidence in the nutritional composition data generated for local and exported Fijian food products.

Keywords: FAPAS, Gravimetric Analysis, Moisture, Ash, Nutritional Information Panel, ISO/IEC 17025, Proximate Analysis, Fiji

Demonstrating Analytical Competence in Food Proximate Analysis Through A Decade of Proficiency Testing Participation

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Proximate analysis provides the analytical data used for nutrition labeling, making the accuracy and reliability of laboratory results essential for regulatory compliance and consumer information. As part of its quality assurance program, the Department of Science and Technology – Food and Nutrition Research Institute - Service Laboratory (DOST-FNRI-SL) has participated in international proficiency testing (PT) programs offered by BIPEA, FAPAS, APFAN, APLAC, and MyKIMIA PTP. Over the past decade, the accumulated PT results have provided an opportunity to assess long-term laboratory performance and evaluate how PT participation has supported the laboratory's continuous improvement.

This study retrospectively reviewed 10 years of PT participation in proximate analysis across a variety of food matrices. Laboratory performance was evaluated using the reported z-scores to identify recurring analytical challenges, assess the effectiveness of corrective actions, and demonstrate consistent satisfactory performance.

Approximately 60 PT rounds comprising over 300 evaluated PT determinations for proximate analyses were reviewed. Overall, the laboratory consistently achieved satisfactory performance across the evaluated analytes throughout the ten-year study period. Occasional questionable and unsatisfactory results were mainly associated with sample preparation, analytical procedure execution, data transcription, matrix homogenization, and calculation or reporting errors. Investigation of these results led to corrective actions such as method improvement, revision of analytical procedures, analyst retraining, strengthened quality control practices, improved documentation, and verification through repeat analyses and subsequent PT participation, demonstrating the effectiveness of the laboratory's continual improvement process.

The results demonstrate that long-term participation in PT provides evidence for sustained analytical competence in routine proximate analysis. Beyond meeting ISO/IEC 17025:2017 accreditation requirements, regular review of PT performance supports continual improvement and increases confidence in the reliability of laboratory results.

From Verification to Surveillance: Rapid PCR Detection of *Listeria monocytogenes* in RTE Foods

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Listeria monocytogenes remains one of the most significant foodborne pathogens associated with ready-to-eat (RTE) foods because of its ability to survive and proliferate under refrigerated conditions and the absence of a final listericidal treatment before consumption. The pathogen poses a serious public health risk to pregnant women, newborns, older adults, and immunocompromised individuals. Despite its public health significance, validated rapid molecular methods and surveillance data for *L. monocytogenes* in Philippine ready-to-eat foods remain limited. To address this gap, this study verified a validated real-time PCR workflow integrated with chromogenic culture confirmation for the rapid detection and enumeration of *Listeria* spp. and *L. monocytogenes* and applied the verified method to surveillance of retail RTE foods.

Method verification was performed following ISO 16140-3 procedure, where challenging RTE food matrices were used at different contamination levels. Following primary enrichment, DNA was extracted and analyzed using the QuantStudio™ 5 Food Safety Real-Time PCR System, and presumptive positive samples were confirmed on Brilliance™ *Listeria* Agar. The workflow demonstrated complete concordance between molecular and culture-based methods at medium and high inoculation levels, with only minor variability near the analytical detection limit. The estimated limits of detection satisfied the acceptance criteria of ISO 16140-3:2021, confirming the method's suitability for routine laboratory implementation.

The verified workflow was subsequently applied to 69 retail RTE food samples intended for direct consumption without further cooking, collected from supermarkets, convenience stores, and wet markets in Metro Manila, Philippines. *Listeria monocytogenes* was detected in one cooked deli meat sample (1/69; 1.45%; Ct = 30.66) with an enumerated concentration of 10 CFU/g, whereas *Listeria* spp. were recovered from 29 samples (42.0%), with the highest contamination observed in fresh-cut fruits and vegetables (8.3×10^5 CFU/g).

This study demonstrates the successful verification and application of a validated real-time PCR workflow for *L. monocytogenes* surveillance in Philippine RTE foods, providing baseline surveillance data to support evidence-based risk assessment, routine food safety monitoring, and regulatory decision-making nationwide.

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Method Validation and Determination of Major Cations and Trace Heavy Metals in Agricultural Soils Using Atomic Absorption Spectrophotometry (AAS)

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Monitoring agricultural soil health and baseline elemental composition is essential for supporting sustainable land management, food safety, and trade compliance across Pacific Island countries. Aligning with Asia-Pacific Food Analysis Network (APFAN) objectives to enhance laboratory capabilities and data comparability, this study describes the method validation for quantifying major cations (K, CA, Mg, Na) and trace metals (Zn, Fe, Cu, Pb, Cd) in agricultural soils using Flame and Graphite Furnace, Atomic Absorption Spectrophotometry (AAS).

Soil samples were air-dried, sieved (<2mm), and digested using an optimized acid digestion protocol with trace metal grade nitric acid (HNO_3) and 30% hydrogen peroxide solution to extract total and bioavailable elemental fractions. Analytical conditions for Flame AAS (FAAS) were optimised for major cations and micro nutrients, while Graphite Furnace AAS (GFAAS) conditions were set for ultra trace detection of heavy metals. The effectiveness and accuracy of the analytical procedure were assessed using proficiency soil samples from the Australian Soil and Plant Analysis Council (ASPAC) proficiency program.

Using ISO/IEC 17025 criteria, the method was validated in terms of linearity, limit of detection (LOD), limit of quantification (LOQ), accuracy and precision. Linearity was satisfactory across all target elements with correlation coefficients (R^2) exceeding 0.995. Intra-day and inter-day precision yielded relative standard deviation (%RSD) well within acceptable regulatory thresholds (<10%). Accuracy evaluated through recovery fell within the target of 80% to 110%. The validated methodology demonstrates the operational testing capability at the USP-CSF-IAS laboratory to deliver reliable, traceable soil data supporting food safety and regional environmental monitoring in Fiji and the South Pacific.

Keywords: Atomic Absorption Spectrophotometry, Method Validation, Soil testing, Heavy metals, Quality Assurance, ISO/IEC 17025

Characterization of fatty acid composition in five Pacific Breadfruit varieties using Gas Chromatography Flame Ionisation

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Abstract

This study evaluated fatty acid profiles (FAPs) of five Pacific breadfruit varieties (PVBs) from the CePaCT Gene Bank in Fiji. Fat was extracted from lyophilised breadfruit, derivatised to methyl esters, and analysed by gas chromatography (n = 3 each). Results showed comparable differences in FAPs among the tested PVBs. Total fatty acids, saturated fatty acids (SFA), monounsaturated fatty acids (MUFA), polyunsaturated fatty acids (PUFA), and total unsaturated fatty acids of selected PVBs varied from 1.1 g/100 g to 1.3 g/100 g. The major fatty acids, methyl palmitate and methyl linoleate, together contributed over 70% of the total fatty acids present in breadfruit. Interestingly, differences among PVBs in terms of FAPs were due to differences in individual fatty acids in PVBs, irrespective of raw or boiled samples. Initial findings show that saturated fats exceed 50% in all breadfruit varieties studied. In conclusion, nutritionally sound, healthy PVBs can be selected by studying their total FAP. This is the first study to report total FAP in these five varieties and to report differences among FAPs of raw and boiled breadfruit.

Dietary Exposure to Heavy Metals: Findings from the Philippine Total Diet Study

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Heavy metals, including arsenic (As), cadmium (Cd), and lead (Pb), are priority food contaminants due to their persistence in the environment, bioaccumulation potential, and adverse health effects associated with long-term dietary exposure. This study determined the occurrence of these heavy metals in commonly consumed foods in the Philippines to generate occurrence data for dietary exposure assessment under the Philippine Total Diet Study (TDS). Representative food samples were collected from Metro Manila, Cebu City, Davao City, and selected municipalities in Benguet during the dry and wet seasons and analyzed using AOAC Official Method 2013.06. Arsenic was predominantly detected in rice across all study sites (0.010–0.028 mg/kg), with all concentrations well below the Codex maximum level (ML) of 0.20 mg/kg. Cadmium showed the highest frequency of occurrence, being detected in cereals (0.010–0.014 mg/kg), Brassica vegetables (0.015–0.065 mg/kg), Benguet crops (0.010–0.022 mg/kg), and cacao (0.059 mg/kg). Cadmium concentrations were generally comparable across regions and seasons, except for one Brassica vegetable sample collected in Cebu during the wet season (0.065 mg/kg), which exceeded the Codex ML of 0.05 mg/kg. Lead was infrequently detected and occurred only at trace levels (<0.01–0.020 mg/kg) in selected vegetables and Benguet crops, with no consistent regional or seasonal trends. Overall, heavy metal contamination in commonly consumed foods was low, indicating limited potential for elevated dietary exposure among the general population. These occurrence data provide a robust foundation for quantitative dietary exposure assessment under the Philippine TDS and will support evidence-based food safety risk assessment, risk management, and regulatory decision-making to protect public health in the Philippines.

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Prevalence and Antibiotic Resistance of *Salmonella* in Eggs from Retail Outlets in Suva, Fiji

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Abstract
Salmonellosis has been recognized as a critical global foodborne disease, primarily transmitted via raw or undercooked shell eggs and poultry products. In Suva, Fiji, escalating egg consumption combined with volatile supermarket storage temperatures highlights an urgent public health data gap due to the absence of systematic tracking mechanisms While a preliminary pilot study in Suva detected Salmonella in 2% of pooled egg samples, extensive baseline data remains completely absent for Fiji. Furthermore, notable storage temperature fluctuations across retail spaces elevate public health contamination risks.

This study aims to determine the prevalence of Salmonella contamination in retail shell eggs and liquid whole eggs (LWE) within the Suva region. Additionally, it screens for antimicrobial resistance (AMR) profiles and specific resistance genes across conventional, cage-free, and organic egg production systems. Over a 5-month period, 200 fresh retail eggs will be collected systematically from three major supermarkets in Suva. In accordance with the ISO protocols, eggshells will be swabbed, and surface-sterilized and internal contents will be homogenized. Samples undergo pre-enrichment in buffered peptone water, selective enrichment via tetrathionate broth, and isolation on selective BGA/XLD media. Suspected isolates will be verified using biochemical indexing and polyvalent O serological agglutination. Finally, antimicrobial resistance (AMR) profiling against seven widely used clinical antibiotics will be executed using the Kirby-Bauer disk diffusion method. This systematic investigation establishes crucial baseline data regarding *Salmonella* contamination pathways and resistant strains in Fiji. These baseline metrics will empower local regulatory bodies to forge data-driven antibiotic stewardship policies and design targeted consumer food safety education programs.

Keywords: Prevalence, Salmonella spp., Eggs, Antibiotic Resistance
Acronyms: LWE - Liquid Whole Eggs; AMR - Antimicrobial Resistance; XLD - Xylose Lysine Deoxycholate
Reference: World Veterinary Association (2025). Global prevalence and antibiotic resistance profiles of bacterial pathogens in table eggs: A systematic review and meta-analysis. Poultry Science / BMC Veterinary Research

Epidemiological Study of Antimicrobial Resistance Dissemination in Aquatic Sources in Fiji

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Antimicrobial resistance (AMR) is a major global public health challenge that threatens the effectiveness of antimicrobial therapy and increases the burden of infectious diseases. Aquatic environments, including surface waters and wastewater systems, are increasingly recognized as important reservoirs and transmission pathways for antimicrobial-resistant bacteria (ARB) and antimicrobial resistance genes (ARGs). However, limited information is available on the occurrence and environmental dissemination of AMR in Fiji and the wider Pacific region.

This study aims to investigate the occurrence and distribution of antibiotic-resistant bacteria in aquatic environments across Fiji. Specifically, it will: (i) develop and validate polymerase chain reaction (PCR)-based methods for detecting key AMR determinants; (ii) characterize antimicrobial-resistant bacterial populations in surface waters and wastewater; (iii) identify clinically significant resistant bacteria from wastewater sources; and (iv) establish a wastewater surveillance framework for monitoring population-level AMR trends.

Water samples will be collected from representative rivers, streams, municipal wastewater systems, and other surface water sources throughout Fiji. Conventional microbiological techniques will be combined with PCR-based molecular assays to identify bacterial isolates and detect selected AMR genes. Epidemiological analyses will be used to determine resistance profiles, assess spatial distribution patterns, and evaluate the role of aquatic environments in the persistence and dissemination of AMR.

This research will provide the first comprehensive baseline assessment of environmental AMR in Fiji and generate evidence to strengthen national AMR surveillance and environmental monitoring. The findings will support the implementation of a One Health approach by integrating environmental surveillance with human and animal health initiatives, informing public health policy, wastewater management, and antimicrobial stewardship. Ultimately, the study will contribute to regional efforts to mitigate AMR and strengthen health security across Fiji and the Pacific.

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