

FULL-YEAR REPORT ON THE ACTIVITIES OF THE AFRL FOR HEAVY METALS AND TRACE ELEMENTS
DEPARTMENT OF MEDICAL SCIENCES (DMSc)
THAILAND
(OCTOBER 2024 – OCTOBER 2025)

No.	Program	Activities		Period & location	Comments / Outcome
		ASEAN/ International level	National level		
1	Recommendation on new analytical methods	Ready to inform if requested	Ready to inform if requested	-	-
2	AFRL's organization / coordination of Proficiency Testing (PT) or Comparative Testing (CT) Programs	-	Organization of PT scheme (BQSF WA 01-68): 10 heavy metals and trace elements (total As, Cd, Cu, Fe, Mn, Pb, Ag, Cr, Ni and Zn) in water, 50 participants from private and public laboratories, 50 submitting laboratories (accredited in compliance with ISO/IEC 17043: 2023)	Feb – Apr 2025	PT results: The participants achieved acceptable z-scores: - 91.4% for total As, - 97.4% for Pb - 94.3% for Cd - 86.2% for Cr - 94.3% for Cu - 80.4% for Mn - 96.2% for Ni - 91.7% for Ag - 88.2% for Fe - 88.2% for Zn Follow-up actions: Suggested the participating labs to find out the corrective actions.

No.	Program	Activities		Period & location	Comments / Outcome
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		-	Organization of PT scheme (BQSF CB 02-68): 4 heavy metals and trace elements (Pb, Cd, total As, total Hg) in cannabis/hemp/products, 30 participants from private and public laboratories (accredited in compliance with ISO/IEC 17043: 2023)	Mar - Jun 2025	PT results: The participants achieved acceptable z-scores: - 83.3% for total As - 90.0% for Pb - 86.7% for Cd - 93.3% for total Hg

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		Organization of PT scheme (BQSF ME 01-68): heavy metals (8 metals: total As, Cd, Cu, Fe, Pb, total Hg, Zn and Sn) in Squid at both national and ASEAN levels - Applied to PT: 46 laboratories (28 labs from private and public laboratories in Thailand and 18 labs from 7 AMSs) - Submitting results: 44 laboratories; 26 labs from private and public laboratories in Thailand and 18 labs from 7 AMSs as follows: Indonesia = 7 laboratories Lao PDR = 2 laboratories Viet Nam = 2 laboratory Malaysia = 1 laboratory Myanmar = 3 laboratories Brunei = 2 laboratories Singapore = 1 laboratory Thailand = 18 laboratories (accredited in compliance with ISO/IEC 17043: 2023)		Feb - Jul 2025	The final PT report was sent in July 2025 The participants achieved acceptable z-scores as follows: - 77.8% for total As - 81.8% for Cd - 75.9% for Cu - 85.2% for Fe - 62.8% for Pb - 82.8% for Zn - 91.4% for total Hg - 66.7 for Sn Follow-up actions: Suggested that the participating labs find out the corrective actions.

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3	Provision of training at ASEAN or national level	Hands-on training of Technical Follow-up Training on Heavy Metals in Rice for IAI beneficiary countries in National Institute for Food Control, Hanoi, Viet Nam, as joint activity with Bureau of Quality and Safety of Food, Physikalisch-Technische Bundesanstalt (PTB) and NIFC - 9 participants from CLMV	-	18-20 Mar 2025	Under the PTB-ASEAN Phase IV initiative (2023–2026), ASEAN Member States have prioritized strengthening food testing capacity as part of a broader effort to enhance regional food safety, support trade, and reduce development gaps. In alignment with Technical Training Concept (TTC), the ASEAN Food Testing Laboratory Committee (AFTLC), PTB and ASEAN Food Reference Laboratory (AFRL) for Heavy Metals and Trace Elements, hosted by the Bureau of Quality and Safety of Food (BQSF), Department of Medical Sciences (DMSc), Thailand, heavy metals testing in rice with ICP-MS has been identified as a key technical priority, particularly concerning toxic metal contaminants such as arsenic (As), cadmium (Cd), lead (Pb), and mercury (Hg), for IAI beneficiary countries; Cambodia, Lao PDR, Myanmar and Viet Nam (CLMV).

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		Follow-up activity of hands-on training using the Proficiency Testing (PT) in Heavy Metals Analysis with 2 chosen laboratories 1. NCFDA, Lao PDR 2. NIFC, Viet Nam	-	Jul - Sep 2025	This activity serves as a follow-up to two completed training sessions in Heavy Metals Analysis and takes place within the framework of the ASEAN-PTB Project “Strengthening the Quality Infrastructure in ASEAN”, specifically under the Workplan for the ASEAN Food Testing Laboratory Committee (AFTLC). The chosen laboratory performed the tests of FAPAS PT No. 07586 – Heavy Metals in Powdered Brown Rice and discussed the results with Thai experts.
		Short-Term Secondment to Strengthen the Toxicology Laboratory of Timor-Leste.	-	20-31 Oct 2025	The secondment program aimed to strengthen the capacity building of the Toxicology Laboratory of Timor-Leste in food testing, in collaboration with The GLOBAL FUND, MEKONG INSTITUTE, Regional Public Health Laboratory Network, DMSc and BQSF, relating to the key contents as follows: - Quality Management System in Food Testing Laboratory based on ISO/IEC 17025 - Determination of Heavy Metals (Lead and Cadmium) in Drinking Water by Atomic

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					Absorption Spectrophotometry (AAS)
4	Information dissemination on Certified Reference Materials [CRM] and other areas	Ready to inform if requested (no request received)	Ready to inform if requested (no request received)	-	-
5	Participation in national and international forums to strengthen technical capabilities	Participation in the 25th AFTLC, Da Nang, Viet Nam (3 persons)	-	29 - 30 Oct 2024 (on-site)	- Update the agreement on activities
		Participation in the 18th Codex Committee on Contaminants in Foods (CCCF), held in Thailand (2 person)	-		- Update the process in the development of MLs related to heavy metals in foods
		Participation in the 26th AFTLC (3 persons)	-	10-11 Apr 2025 (on-line)	- Update the agreement on activities
		-	Participation in the 33rd Annual Medical Sciences Conference (2 persons)	11-13 Jun 2025 (on-site)	- 2 poster presentations
6	Collaborative programs with other agencies	The project of Strengthening Quality Infrastructure in ASEAN", Phase IV,	-	Project period: 2023 to 2026	AFTLC-PTB requested Technical Training in Heavy Metals Analysis to improve the CLMV based on the identified gap analysis. The

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		2023-2026 is implemented by the Physikalisch-Technische Bundesanstalt (PTB), Germany, and AFRL for Heavy Metals and Trace Elements, BQSF, DMSc under the ASEAN Consultative Committee on Standards and Quality (ACCSQ) to provide the technical support, regarding the Heavy metals analysis in food for CLMV, based on their needs and gap analysis.			AFTLC assigned AFRL for Heavy Metals and Trace Elements to provide the training in collaboration with PTB. There were 3 activities as follows: -Online technical training on technical instruments and heavy metals analysis in food, method validation/verification, and measurement uncertainty for 51 participants from 9 ASEAN member states (AMS), delivered by 2 experts from AFRL for HMTE. - On-site technical training on technical instruments and heavy metals analysis in rice, method validation/verification, and measurement uncertainty for 9 participants from Cambodia, Lao PDR, Myanmar and Viet Nam at NIFC, Viet Nam, delivered by 2 experts from AFRL for HMTE - Follow-up assessment by proficiency testing sample of heavy metals in rice for 2 laboratories; NCFDA, Lao PDR and NIFC, Viet Nam.
7	AFRL's participation in PT/CT programs.	PT FAPAS for Drinking Water (z-score)	-	Jan 2025	Chromium = -1.0 Nickel = -0.7 Manganese = -0.8 Aluminium = -0.9

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					Lead = -1.3 Cadmium = -1.5 Copper = -0.2 Zinc = -0.5
		PT FAPAS for Sunflower Seeds (z-score)	-	Feb 2025	Cadmium = -0.1 Lead = 0.3
		PT FAPAS for Infant Formula (z-score)	-	Mar 2025	Calcium = 0.7 Copper = 0.7 Iodine = -1.7 Iron = 0.1 Manganese = 0.2 Potassium = 0.6 Selenium = -0.4 Sodium = 0.4 Zinc = 0.3
		PT FAPAS for Drinking Water (z-score)	-	Mar 2025	Fluoride = 0.2 Chloride = -0.9 Calcium = -0.1 Sodium = 0.1 Potassium = 0.4 Silver = -0.2 Barium = -0.4 Arsenic = -0.4 Selenium = 0 Antimony = 1.4 Tin = -0.2 Mercury = -1.3
		PT FAPAS for Salt (z-score)	-	Mar 2025	Lead = -0.2 Arsenic (total) = -1.0

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					Iron = 1.1 Nickel = -0.1 Manganese = 0.1 Iodine = 0.5
		PT FAPAS for Fish (heat-treated can/pouch) (z-score)	-	Mar 2025	Arsenic (total) = 0.2 Cadmium = -0.4 Mercury (total) = -0.5 Methyl Mercury = -0.5
		PT FAPAS for Infant Formula (z-score)	-	Apr 2025	Aluminium = -0.5 Iodine = 0.1 Tin = -0.5 Arsenic (inorganic) = -0.2 Mercury = -0.1 Copper = 0.2 Zinc = 0.7
		PT FAPAS for Tea (Dried) (z-score)	-	May 2025	Aluminium = 0.1 Arsenic (total) = 0.2 Cadmium = -0.4 Lead = 1.9 Nickel = -0.5 Chromium = -0.4 Copper = -0.2 Iron = -1.8 Selenium = 0.3 Manganese = -0.9 Zinc = -0.7
		PT FAPAS for Powdered brown rice (z-score)	-	July 2025	Arsenic (total) = -0.1 Arsenic (inorganic) = 0.0 Cadmium = -0.2 Copper = 0.6 Iron = 0.9

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					Manganese = -0.5 Mercury (total) 0.5 Nickel = 0.4 Zinc = 0.3
		PT FAPAS for Baby Food (Vegetable-based) (z-score)	-	Aug 2025	Copper = 0.5 Iron = 1.0 Manganese = 0.1 Mercury (total) = 0.0 Nickel = 0.7 Zinc = 1.9
		PT FAPAS for Coconut Powder (z-score)	-	Sep 2025	Calcium = 0.0 Copper = 0.5 Iron = -0.1 Manganese = -0.2 Magnesium = -1.0 Phosphorus = 0.3 Potassium = -0.7 Sodium = 0.4 Zinc = -0.1
8	Status of accreditation by AFRL under ISO/IEC 17025	-	-	-	- ISO/IEC 17025: 2017 accredited since March 2020-Present - Heavy metals in food scope and cannabis/hemp/their products have been accredited ISO/IEC 17043: 2023 since Dec to
9	Other activities	Scientific panel of ASEAN Risk Assessment Centre for Food Safety (ARAC) for risk assessment of	-	Oct 2024 – Sep 2025	A qualified expert from BQSF, Thailand, collaborated with AMS for health risk assessments of cadmium and arsenic exposure in rice of ASEAN.

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		Cadmium and Arsenic in rice of ASEAN			
		-	Participated in the training of quantifying Uncertainty in Analytical Measurement	27 Jan 2025	- Enhance the capacity and skills of technical staff for international standards
			Participated in the training of quantifying Uncertainty in Analytical Measurement	27 Jan 2025	- Enhance the capacity and skills of technical staff for international standards
			Participated in the training of new assessors for ISO/IEC 17025	29 – 30 Apr and 1 – 2 May 2025	
			Participated in the training of ISO/IEC 17043: 2023	21-22 May 2025	
			Accreditation of lab safety under the Enhancement of Safety Practice of Research Laboratory (ESPreL) project, Thailand	28 Apr 2025	- Passed the evaluation of the lab safety according to the criteria of ESPReL project, Thailand
			As assessor for ISO/IEC 17025	16 – 17 Oct 2025	-
			External quality assessment of ISO/IEC 17025: 2017	7-8 Oct 2025	- Reassessment of heavy metal analysis - Extended scope of metals and trace elements analysis in water with ICP-MS

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					- New or Extended scope of Mercury analysis in water with DMA - New or Extended scope of Iodine in food with ICP-MS - New or Extended scope of Methyl mercury analysis in aquatic animals and its products with HPLC/ICP-MS

a. Major changes at the AFRL (in terms of technical staff, policy, location, instrumentation, scope of work etc.)
- Sarawut Boonsuk, M.D., Dr. P.H,Ph.D., New Director-General of the Department of Medical Sciences (DMSc), Ministry of Public Health, Thailand.

b. Recommendations
none

Information provided by: Mr. Sirichai Sunya and Mr. Kanphirom Lertbumroonchai

Representative of AFRL: Mr. Supat Sangsuay and Mr. Sirichai Sunya

Designation: AFRL for Heavy Metals and Trace Elements

Date: 11 October 2025