

Strengthening Food Safety Measures through Participation in Proficiency Testing Schemes



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Key messages

- Ensuring food safety is paramount, as contaminated food poses serious health risks, potentially causing a range of diseases and illnesses.
- Proficiency testing schemes act as vital external benchmarks, enhancing the reliability and accuracy of testing methods employed in food safety assessments.
- Local chemical testing laboratories' engagement in proficiency testing schemes is instrumental in achieving correct measurements and bolstering confidence in food safety protocols.
- Adherence to proficiency testing schemes offers assurance to consumers, regulators, and stakeholders regarding the credibility and dependability of test outcomes.
- Promoting awareness, providing incentives, and offering financial support are essential strategies to encourage the participation of local laboratories in proficiency testing schemes.

What's the issue?

According to the World Health Organization, approximately 600 million people become ill each year due to consuming contaminated food, resulting in 420,000 annual fatalities and causing a loss of 33 million healthy life years ¹. Contaminants such as pesticides, veterinary drug residues, toxins, heavy metals, pathogens, and additives can pose significant health hazards when present in food at unsafe levels.

In 2022, the European Food Safety Authority released data on veterinary drug residues and other substances found in animals and animal-derived food across Europe. Specific violations included non-compliant samples in bovines, pigs, poultry, sheep, goats, and horses, with substances like beta-agonists and prohibited drugs like clenbuterol and ractopamine being detected ².

In September 2023, botulism cases were detected in France, associated with the consumption of homemade canned fish. A total of 15 cases were reported, resulting in one fatality and hospitalization for the others. The affected individuals had all consumed homemade sardines from jars served at a restaurant. Following this incident, local health authorities inspected the restaurant and confiscated all related products ³.

And in 2024, an Illinois-based company recalled its 3.5-ounce packages of cinnamon powder, after routine FDA sampling discovered elevated levels of lead in the product. The affected product was distributed across various U.S. regions. Lead poisoning can cause significant short-term and long-term health issues, particularly in children. ⁴

Inaccurate measurement of these contaminants poses a significant concern for public health and food safety, potentially prompting product recalls and threatening consumer safety. To ensure the competence and reliability of testing results, it is necessary to evaluate testing laboratories. Proficiency testing (PT) schemes are a method used to demonstrate competency and validate a laboratory's measurement processes, by comparing results to those from a reference laboratory and other participant laboratories.

Despite the well-established benefits of proficiency testing, some local laboratories have yet to adopt or actively participate in such programs. This raises concerns about the overall quality and reliability of analytical results produced by these laboratories, potentially hindering their ability to perform at the required level, meet industry standards and regulatory requirements.

Why is this important?

Proficiency testing schemes are integral to promoting food safety measures and to advancing Sustainable Development Goal 3, "Good Health and Well-being."⁵ These schemes provide a systematic means of evaluating the accuracy and reliability of food testing laboratories, ensuring that they adhere to stringent quality standards and regulatory requirements.

Through participation in proficiency testing, laboratories gain valuable insights into areas where enhancements to their testing methodologies and procedures are needed, thus strengthening their capacity to identify and mitigate risks associated with food contamination.

By upholding the highest standards of proficiency through these schemes, laboratories contribute significantly to preventing foodborne illnesses and promoting public health and well-being.

Additionally, participation in PT schemes is a requirement for accreditation under standards like ISO/IEC 17025:2017, demonstrating a laboratory's commitment to quality and regulatory compliance. Strengthening the participation of testing laboratories is essential for creating a sustainable and resilient food safety framework that will benefit consumers, producers, and regulatory bodies.

The role of metrology

Metrology, the science of measurement, serves as the cornerstone of quality assurance in the food industry. By meticulously calibrating instruments and validating methodologies, metrology ensures that every step of food production, from the initial harvest to the consumer's plate, adheres to rigorous standards.

Metrology plays a critical role in verifying the accuracy of food labels. It provides consumers with confidence that each product label in their local supermarket displays not just enticing descriptions, but also accurate nutritional information, and expiry dates.

Metrology is also instrumental in safeguarding food products from contaminants and ensuring compliance with regulatory standards. Through a proficiency testing scheme, the capability of testing laboratories to conduct specific tests on food can be assessed, accurately and reliably. As laboratories engage in proficiency testing and receive feedback on their performance, metrological principles guide them in identifying areas for improvement, fostering a culture of continuous enhancement.

Establishing measurement traceability for testing laboratories enables regulatory bodies, food manufacturers and consumers to have confidence in measurement results, thereby supporting decision-making and risk management practices. Many countries have regulations mandating that food testing laboratories participate in proficiency testing programs to demonstrate their competence and compliance with regulatory standards.

Overall, integrating metrology and proficiency testing schemes in food safety ensures that laboratories maintain high standards of accuracy, reliability, and traceability in their testing practices. This, in turn, contributes to safeguarding public health by minimizing the risk of foodborne illnesses and ensuring the safety and quality of food products consumed by the public.

What should policy makers do?

Engaging in proficiency testing is often not mandated by governments, and testing laboratories face hindrances such as insufficient resources, limited capabilities, and inadequate equipment. Such impediments undermine the accuracy and reliability of measurements crucial for ensuring food safety. Considering these challenges, it becomes imperative for governments to recognize their pivotal role in shaping policies and establishing robust regulatory frameworks that prioritize food safety as a paramount public health concern.

To address these challenges comprehensively, several measures are proposed. Firstly, the development of policies mandating the active participation of local laboratories in proficiency testing schemes should be established, making it a prerequisite for accreditation. Simultaneously, capacity-building initiatives should provide training and allocate resources to equip local laboratories with the necessary capabilities.

Incentives such as accreditation benefits or financial support are essential to motivate local laboratories to proactively engage in proficiency testing schemes. Concurrently, awareness campaigns should be conducted to highlight the benefits of proficiency testing and the potential consequences of non-participation within the laboratory community.

Through the implementation of these measures, the goal is to elevate the overall quality, reliability, and credibility of local laboratories, contributing to a culture of excellence in analytical testing practices and ensuring enhanced food safety measures aligning with global standards.

Keeping your food safe

Every year **Foodborne Diseases** cause approximately:



1 IN 10
People To Fall Ill

Worldwide¹



Million healthy life years (DALYs) lost



Children under 5 carry



of the global foodborne disease burden



125k

under 5's die each year due to foodborne illness

420k
Deaths



US\$95.2 billion

Total productivity loss associated with foodborne disease in low- and middle-income countries

How does foodborne illness spread?

Pathogenic organisms present in food (bacteria or viruses), contaminate production or the supply chain.

Local example: Philippines

The accurate assessment of histamine levels in canned tuna is critical for ensuring consumer safety and maintaining quality standards in the food industry. In response to the need for enhanced analytical capabilities, the Department of Science and Technology - Industrial Technology Development Institute (DOST-ITDI) introduced reference value-based proficiency testing (PT) schemes for histamine analysis in canned tuna. This initiative aimed to evaluate the proficiency of local testing laboratories while promoting accuracy, traceability, and credibility in chemical measurements.⁶

DOST-ITDI facilitated the deployment of PT schemes utilizing two homogeneous and stable reference materials as test items in 2014 and 2015. These reference materials were meticulously characterized, and reference values were assigned using established reference methods.

The introduction of reference value-based PT schemes led to a notable enhancement in the performance of local testing laboratories. This improvement is particularly encouraging as it signifies progress in developing the competence of laboratories involved in histamine analysis.

However, it was observed that certain local laboratories conduct histamine analysis without undertaking method validation or verification. Additionally, some laboratories neglect essential quality control measures such as utilizing reference materials and participating in PT schemes.

Despite the advancements achieved through the implementation of PT schemes, further support from the government is imperative to sustain and expand these efforts. Government intervention can play a crucial role in promoting compliance with quality standards, facilitating access to reference materials, and encouraging participation in PT schemes among local testing laboratories. By providing adequate resources and incentives, the government can foster a culture of excellence and accountability in food safety testing practices.⁷

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