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The Role of Proficiency Testing in Laboratory Capacity Building in Chile

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Facultad de Ciencias Veterinarias y Pecuarias

The Role of Proficiency Testing on Laboratory Capacity Building

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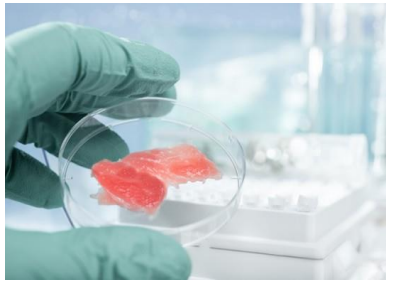


Food Safety Laboratories

Critical Role in National Food Safety Progress

Importance of Laboratory Capacity Building

Capacity Building in Food Safety Laboratories

2010 APEC/PTIN Expert Working Group defines gaps in knowledge across the APEC economies and prioritized areas for possible collaboration, emphasizing the need to focus on laboratory capacity building efforts.

Eleven priority areas were identified as critical laboratory capacity:

- Critical Role of Laboratories in National Food Safety Progress
- Assessing needs of laboratories
- Safety (personnel and laboratory)
- Quality Assurance/Validation
- Metrology
- Sampling
- Laboratory Management
- Lab Accreditation
- Analytical Methods
- Data Analysis and Interpretation
- Maintenance and Troubleshooting

Dubois, J., 2014. APEC FSCF PTIN Laboratory Capacity Building ,Pilot projects and Regional Workshop 2013 Interim report. JIFSAN

After the priority areas where determined, a laboratory collaboration program has been set, these consists of **five critical components**:

1. Establishing existing Lab Accreditation/QA measures.	Laboratories can range from no QA system to highly rigorous systems (ISO 10725 accredited).
	Current laboratory status will dictate needs assessment. Important to identifying scope of accreditation and recommending sources for gap analysis.
2. Proficiency Testing (PT).	identification of programs and available resources and reference materials.
	Usually included under laboratory QA, it is separated to emphasize the importance of participation in a PT program.
3. Training.	Utilizing current programs, including government sponsored training courses, and international training laboratories, among others.
	Screening and confirmatory testing.
4. Laboratory Infrastructure.	Recommendations for current and new technologies and equipment utilized by regulatory laboratories.
	what equipment, standards and reagents are most suitable for test methods.
	Harmonize platforms for testing will.
5. Methods.	sharing current food testing methods (microbiological and chemical)
	method validation protocols,
	participation in collaborative studies.

Dubois, J. 2014. APEC FSCF PTIN Laboratory Capacity Building ,Pilot projects and Regional Workshop 2013 Interim report. JIFSAN

Quality assurance of analytical measurements in laboratories

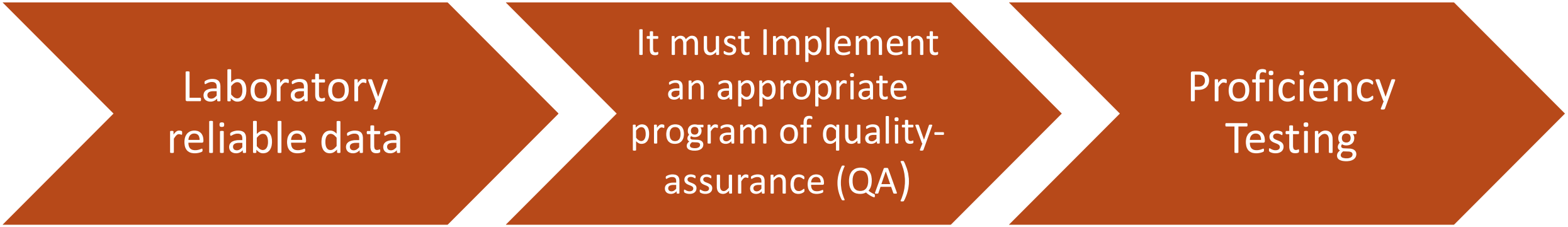
Analysis → critical importance wide range of areas → food, agriculture and environment.

Food testing labs play an important role in ensuring food safety

Proper care during the entire analytical process → from the collection of samples to the analysis in the laboratory → consequences.

Ensuring the deliver of reliable results of our analytical methodologies → priority at all levels in the field of food safety

Quality Assurance of analytical measurements in laboratories



Proficiency Testing

Inter-laboratory comparison to determine the performance of individual laboratories for measuring an specific analite in a specific matrix

Comparison of laboratories on the same sample

Results are delivered as z Scores or Deviation from the Mean

Proficiency testing in relation to other quality-assurance methods

A comprehensive scheme of quality assurance (QA) in analytical chemistry laboratories:

- **Proficiency Testing (PT)**
- **Validation of analytical methods**
- **Use of certified reference materials (CRMs), where available.**
- **Routine internal quality control (IQC).**

IUPAC, Pure and Applied Chemistry 78, 145–196

Proficiency testing in relation to other quality-assurance methods

Within-laboratory procedures: Method validation and IQC

- In theory , sufficient to ensure accuracy.
- In practice, they are often less than perfect

Proficiency testing in relation to other quality-assurance methods

PT → ensure that these procedures are working satisfactorily.

No external references - Biases

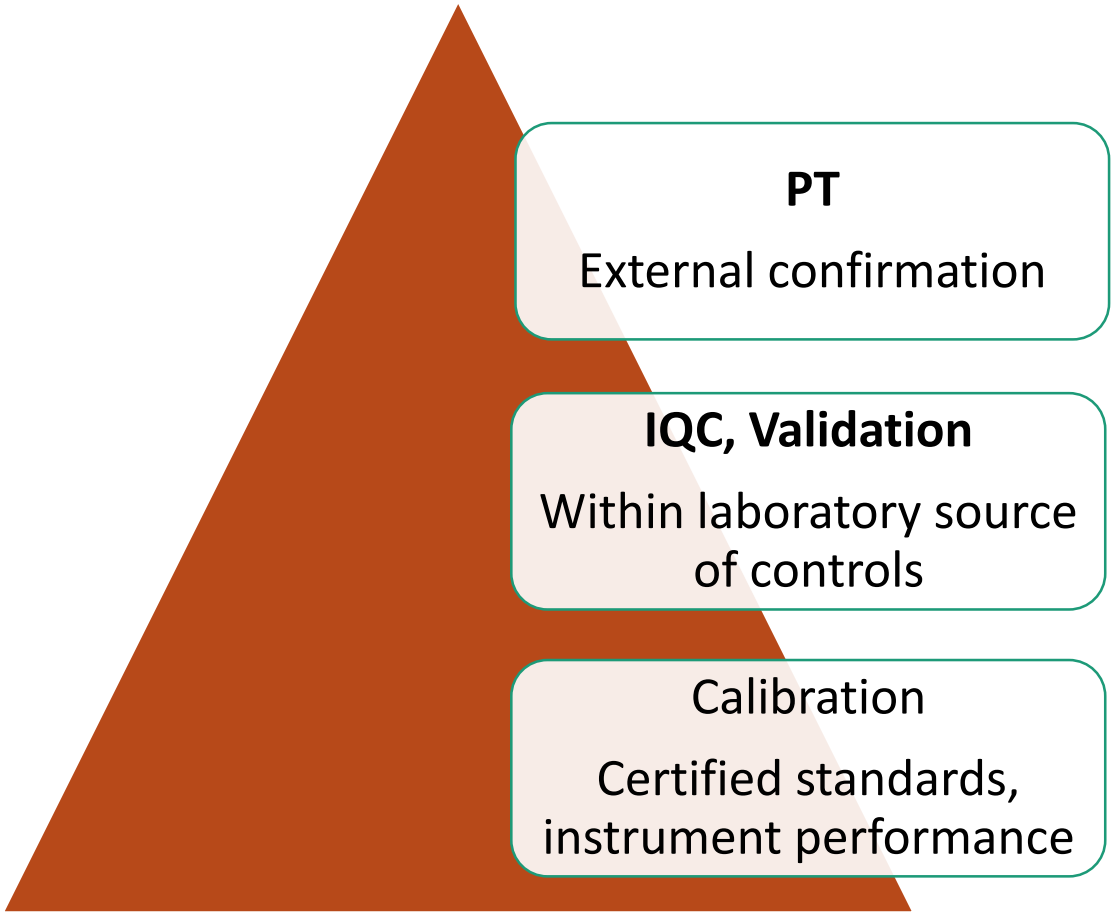
- Random variations of serious magnitude.

Mean of detecting and initiating the remediation of such problems

Provides a means by which participants can obtain an external and independent assessment of the accuracy of their results.

Proficiency testing in relation to other quality assurance methods

Laboratory Quality Pyramid



Participation in proficiency testing schemes provides laboratories with an objective means of assessing and demonstrating the reliability of the data they are producing.

Proficiency Testing – the best way for a laboratory to prove its performance

Essential to enforce the capacity building and training in PT Key point to ensure reliability of laboratory result

Proficiency Testing on Laboratory Capacity Building

Monitor a laboratory's performance

Valuable tool in the quality improvement process for the analysis of veterinary drugs

Verify whether the results delivered by a laboratory conform to expectations and quality requirements

Proficiency Testing on Laboratory Capacity Building

ISO IEC 17025 Standard, include it as a requirement.

Test competence over time

Identify problems and initiate actions to improve them.

Management of preventive actions or corrective measures in case of non-compliant result

Proficiency Testing on Laboratory Capacity Building

In-House Industry Laboratory

Government Laboratory

Private/Contract Testing Laboratory

University Laboratory

Competent authorities

Capacity building on PT should be done at different levels of laboratories that are involved in food safety

Proficiency Testing on Laboratory Capacity Building

The Effect of Proficiency Testing Participation on Laboratory Performance

PT performance scores of the laboratories increase over the first few PT rounds

Laboratory accreditation and proficiency testing are a powerful combination, providing the tools necessary to effectively manage a laboratory

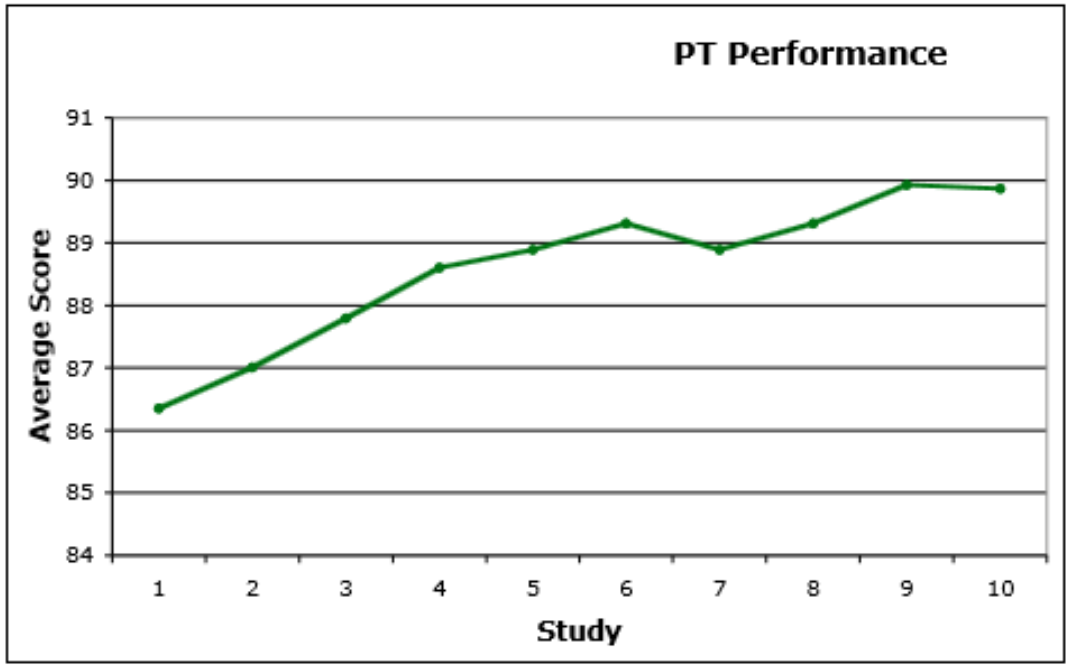
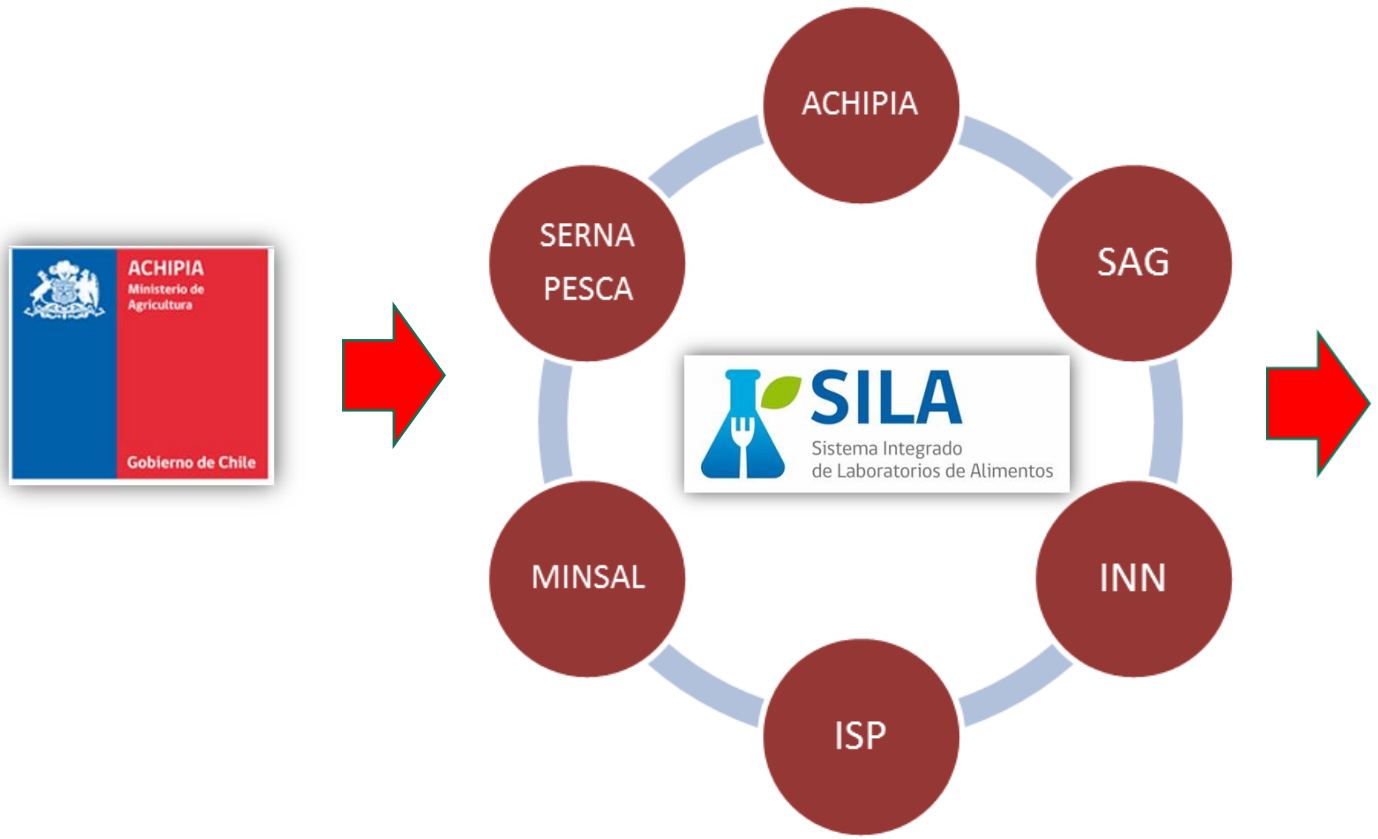


Figure 3. Comparison of average PT score for all parameters combined.

Middlebrook and Morris. 2004. CAEL.

Proficiency Testing on Laboratory Capacity Building

- "APEC FSCF PTIN Laboratory Competency Strengthening Initiative: Building Comprehensive Laboratory Capacity" : Chile selected to execute one of two pilot projects



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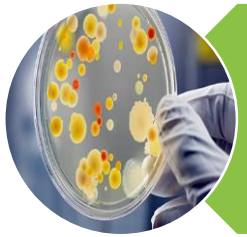
Gras, N. 2013. Pilot projects and Regional Workshop, University of Maryland.

Proficiency Testing on Laboratory Capacity Building

The 3 priority areas identified by the travel team and Chilean team :



Coordinate the interpretation of the requirements to select and use validated methods in microbiology official labs and authorized control labs.

Hands on Lab Training includes the topics of: campylobacter and salmonella detection, multi-residue methods for veterinary drugs, and viruses and bacteria in shellfish

Proficiency Testing Requirements

Proficiency Testing on Laboratory Capacity Building

PTIN Regional Workshop on Strengthening Laboratory Capacity in Food Safety, December 2013 University of Maryland:

- Governments, academia, industry
- Pilot Projects outcomes where presented
- The needs in capacity building and how to prioritize these needs.
- Food safety challenge identified

Unavailability of reference/standard materials, reference methods, and **Proficiency Testing**

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Proficiency Testing on Laboratory Capacity Building

Detected problem	Possible solution
Number of PT, not al the laboratories have the same amount of participation in these rounds	Standardize the level of participation among network laboratories
Limited variety in terms of analytes, usually not all the molecules and matrixes included in the residues control plans are available for PT.	Increase the number of providers, create regional partnerships or networks (like the APMP)
The level of the analyte in the proficiency test materials usually are according the MRLs stablished in the country of the provider sometimes there may be difference in the levels stablished in the different countries for different matrices.	Tailored PT for country or regional needs

PT Capacity Building needed !!

Proficiency Testing on Laboratory Capacity Building

Veterinary Drug Multi-residues in Chicken Proficiency Testing Program (April 2013)

Laboratory capacity building program under the MYP Building Convergence in Food Safety Standards and Regulatory Systems hosted by FSCF and led by China.

Objective → evaluate the competence of laboratories for quantitative testing of veterinary drug multi-residues including diferent antibiotics and metabolites (3-amino-2-oxazolidone (AOZ), 5-morpholinomethyl-3-amino-2-oxazolidone (AMOZ), sulfamethoxazole, sulfadimidine, sulfaquinoxaline, ciprofloxacin) in chicken samples.

Food testing laboratories of APEC economies are encouraged to participate in the PT program.

For testing each item, routine methods should be used, preferably LC/MS or LC/MS^n method

Proficiency Testing on Laboratory Capacity Building

Each economy is suggested to nominate not more than 2 participants.

Chile → FARMAVET (National Fisheries Service Official lab for residues and Contaminants) and ISP (Public Heath Institute).

70 Official Labs

39 Labs → Chemical contaminants and Veterinary drugs residues

Need to increase the availability of PT,

Greater number of laboratories can get involved and participate in experiences like this proficiency testing program.

Excellent results and benefits

- Proficiency Testing plays and important role of on Laboratory Capacity Building
- PT, as an external reference is a key point to ensure reliability of laboratory result
- PT the best way for a laboratory to prove its performance over time, correcting possible repetitive errors and biases in measurements.
- Capacity building efforts in the APEC region have been prove to be successful allowing a better understanding of technical issues
- PT has been pointed out as a priority area and needs for food safety laboratories
- **Essential to enforce international cooperation, availability and training in PT**

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