Provision of Proficiency Testing (PT) Scheme on Proximate and Mineral Analyses: The Philippine Experience

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Rationale

- Proficiency testing (PT) is an essential element of quality assurance in the conduct of food quality and safety analyses
- Participation in PT and the use of RMs are two of the QA procedures included in the ISO/IEC 17025 standard for lab accreditation
- No PT provider and RM developer in the country.
- PT project funded by the Philippine Department of Science and Technology (DOST)

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Project on "Provision of Food Reference Materials and Subsequent Conduct of Proficiency Test Program"

Funded by the Philippine Council for Industry and Energy Research and Development (PCIERD), DOST

OBJECTIVES

- To evaluate performance of participant laboratories in the analysis of moisture, fat, protein, ash, iron, calcium and sodium using different food matrices.
- To produce a batch of homogeneous material with assigned values for use as Quality Control Test Material by food testing/analytical service laboratories.

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Methodology

Preparation of PT Materials





Food Matrix

↓

Drying (@4% moisture

↓

Grinding

↓

Sieving (60-120 mesh, 120-200 mesh), mixing

↓

Packaging (50g –aluminum foil)

↓

Random sampling

↓

Homogeneity/Stability Testing PT material, Contingency samples

↓

Homogenous and Stable PT Test Material







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8th International Food Data Conference

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Methodology

Conduct of PT

Engagement of Consultants and Technical Working Group

Participants Meeting/SW

PT Material

Distribution of PT material

Analysis by participant/ (Reporting results with MU)

Collation/Plausibility check

Statistical evaluation/data analysis

Preparation/Distribution of PT Report

PT participants meeting

Laboratory Performance Assessment

TWG meetings

ILAC G13:2000 Guidelines for the Requirements of the Competence of Providers for Proficiency Testing

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Statistical Evaluation

z-score

$$z = \frac{\chi - X}{\sigma}$$

- Standard deviation for proficiency assessment (SD for PT) or target standard deviation **(σp)**
- Participants results χ
- Assigned Value (Consensus of participants results) X
  - Exclusion of invalid data or extremely low and high values
  - Derivation of robust mean, robust standard deviation (robust statistics)
  - "Bump hunting" using kernel density estimates to determine mode
  - Computation of uncertainty of the mode

ISO 13528: Statistical methods for use in proficiency testing by interlaboratory comparisons

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PT Rounds Organized

Particulars	Proficiency Test		
	Round 1	Round 2	Round 3
Sample Matrix	Wheat Flour Low conc level (plant-based food)	Powdered Tonic Food Drink Medium conc level (processed food)	Dried Shrimp High conc level (animal-based food)
No of participants	52 (local and foreign)	53(local and foreign)	49 (local and foreign)
Analyte	Proximate (Moisture, Fat, Protein, Ash), Minerals (Iron, Calcium, and Sodium)		
Methods	Laboratory's Own Routine Method		

Percentage "Satisfactory" Performance

Analyte	Percentage "Satisfactory" Performance					
	N	Round 1 (Wheat Flour)	N	Round 2 (Tonic Food Drink)	N	Round 3 (Dried Shrimp)
Moisture	52	75.0	52	84.6	46	87.0
Fat, w/ acid hydrolysis	18	67.0	29	85.7	25	72.0
Protein	45	71.0	45	68.9	39	76.9
Ash	50	88.0	49	85.7	45	80.0
Iron	32	53.0	33	69.7	31	64.5
Calcium	30	50.0	33	60.6	34	61.8
Sodium	24	-	31	-	30	63.3

Performance Assessment for Three (3) Rounds Participation

Summary of Performance of Laboratories Participated in PT Rounds 1, 2 and 3

	Laboratories (%)						Remarks
	Moisture	Ash	Fat	Protein	Calcium	Iron	
Maintain "S" Performance	62.5	66.7	50	52.4	28.6	33.3	good performance
Improved Performance "Q" or "U" to "S"	12.5	4.2	8.3	14.3	21.4	41.7	shows improvement in performance
Failed to Improve Performance "Q"/"U" to 'Q" or 'U"	0	0	8.3	4.8	7.1	8.3	poor performance; problems in methods and IQC; requires training of analysts
Failed to Maintain "S" Performance "S" to "Q" or "U"	25	29.2	33.3	28.6	42.9	16.7	problems in methods and IQC; requires training of analysts
No. of laboratories participated in 3 rounds	**24**	**24**	**12**	**21**	**14**	**12**	

No. of laboratories participated in the 3 PT Rounds- 25 (22 local and 3 foreign participants)

RMs Developed

- Developed three (3) RMs – surplus PT materials (with assigned values for moisture, fat, protein, ash, calcium, iron and sodium) – for method validation and IQC work
  - wheat flour
  - dried tonic food drink
  - dried shrimp
- Organized three PT participants meeting/Seminar-Workshop

Experiences/Problems

- PT test materials limited to dry samples. Problems are encountered in obtaining a fine and homogenous PT test materials
- Routine methods used by some laboratories were not standard method and not applicable to all food matrices
- Not all laboratories submitted measurement uncertainty (MU) estimates
- No traceable reference values for minerals (obtained by primary measurement method)

Experiences

- Statistical analysis and report interpretation is not simple and advice of statistician and technical working group is necessary
- PT results identified manpower training needs e.g. MU, IQC, method validation
- PT participants became more aware of data quality, IQC needed for tests and conduct of corrective action for “unsatisfactory” results
- The PT Program generated a demand for PT on other food analyte/different matrices to be organized by FNRI

Ongoing Activity/Future Plan

Ongoing Activity

- Organization of PT on total dietary fiber in wheat flour (2009-2010)
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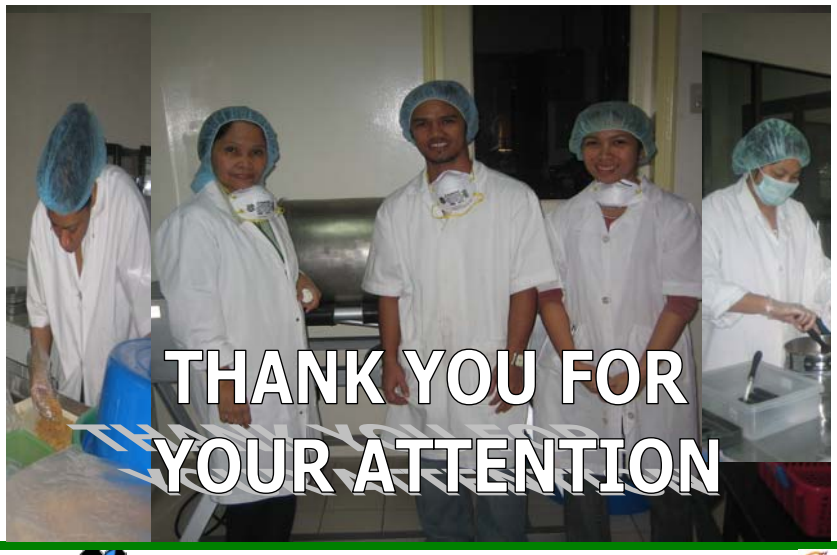
Future Plan

- Establishment of traceable assigned values/reference values/reference laboratories
- Accreditation of FNRI as PT provider

PT Team



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