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Nutritional and Toxic elements in Maize flour

Proficiency testing scheme

NMISA-PT-55

Protocol

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1 FOREWORD

The National Metrology Institute of South Africa (NMISA) was established under the Measurement Units and Measurement Standards Act No 18 of 2006. The NMISA is committed to supporting laboratories through the provision of proficiency testing schemes (PTs) that afford participating laboratories the opportunity to regularly demonstrate their continued analytical measurement competence. NMISA is an accredited proficiency testing scheme provider and the food testing PTS is included in our accreditation scope.

Please see the PTS registration form for the proficiency testing schemes on offer in the following year including PTSs for mycotoxin, heavy metal, food labelling and forensic blood alcohol testing.

NMISA provides a confidential service to participants that allows a laboratory to assess the accuracy of their test results using their routine laboratory methodologies, thereby testing the effectiveness of their methods and quality assurance programs. The provided PT report is generated to assist laboratories in identifying areas of improvement within their current quality system.

The current study protocol is the official call for participation in the NMISA proficiency testing (PT) scheme for the determination of selected nutritional and toxic elements (sodium, potassium, calcium, magnesium, phosphorus, iron, manganese, copper, cobalt, zinc, lead and cadmium) in a maize flour. Participants will also be required to report the moisture content of the sample. A confidential report will be issued to all participants after completion of the PT scheme. Dates for the registration, distribution and reporting of the maize flour PT scheme are listed in Table 1.

2 SCHEME AIMS

This scheme will assist laboratories that routinely analyse nutritious and toxic elements in food (e.g. food with high carbohydrate levels, grains, etc.) to monitor their laboratory performance. This covers aspects such as the accuracy and comparability of measurement results produced; the continued competency of analytical staff and the maintenance and effectiveness of the current quality assurance systems within the laboratory. In addition, this information may also be used to provide accreditation bodies or clients with objective evidence of laboratory performance.

3 PARTICIPATION FEES AND ADDITIONAL CHARGES

The cost of PT scheme participation is R 3 000.00 (0% VAT, NMISA is not a VAT registered company). This fee includes materials as listed in Table 1, together with a confidential report upon completion. Please note, this cost excludes delivery fees. Since many of the South African participants are located within proximity to NMISA, the option of collecting the PT scheme samples from NMISA premises is permitted. Upon registration for participation an official quotation will be provided. Participation is confirmed by receipt of a purchase order or proof of payment.

International laboratories will have test samples sent by courier and appropriately packaged to maintain sample integrity. International participants must provide NMISA with any import or quarantine permits that might be required to complete sample delivery well in advance of the shipment date. Please note, international participants are liable for any customs or import duties charged.

4 DISTRIBUTION DATE

The timeline for this PT scheme is presented in Table 1. Laboratories are requested to report results for as many of the parameters specified as possible, to allow for maximum benefit to be obtained from the participation.

Table 1 NMISA-PT-55 Nutritional and toxic elements in Maize flour PT scheme sample format and distribution dates.

Foodstuff category	Parameters	Concentration range (based on dried sample)	Sample format	Registration deadline	Dispatch date	Result submission deadline
Maize flour	Phosphorus	10-1500 mg/kg	1 finely milled, homogenised sample 40-50g	16 October 2020	30 October 2020	27 November 2020
	Potassium	100-5000 mg/kg				
	Calcium	10-500 mg/kg				
	Magnesium	10-500 mg/kg				
	Sodium	0.1-100 mg/kg				
	Iron	0.1-100 mg/kg				
	Manganese	0.1-100 mg/kg				
	Copper	0.1-100 mg/kg				
	Zinc	0.1-100 mg/kg				
	Cobalt	1-100 µg/kg				
	Lead	1-100 µg/kg				
	Cadmium	1-100 µg/kg				
	% Moisture	1-10 %				

5 TEST SAMPLE

The PT scheme consists of *ca.* 40-50 g of a homogenised, finely milled maize flour sample.

This study is designed to support laboratories routinely performing elemental analysis in food samples, specifically in the field of grains or high carbohydrate foods. The levels of the nutritional elements should be easily achievable using analytical methods typically applied. The levels of the toxic elements can be expected to represent a measurement challenge.

Instructions for proper handling and storage of the sample prior to sample preparation will accompany the PT scheme samples. Participants should adhere to these instructions to ensure sample integrity.

6 PROFICIENCY TESTING SCHEME ASSIGNED VALUE

Participants performance will be evaluated against assigned values for the sodium, potassium, calcium, magnesium, phosphorus, iron, manganese, copper, cobalt, zinc, lead and cadmium content in the PTS sample. Reference values will be obtained through ICP analysis at the NMISA Inorganic Analysis Laboratory.

7 ANALYSIS

Participants are encouraged to perform the analysis using their normal laboratory procedures.

An electronic result submission form will be sent to participants when samples are delivered/ collected.

Participants are expected to submit **two results on a dry mass basis for all selected parameters measured** and are encouraged to include an uncertainty estimate for each result obtained. Reporting of the **moisture content** (used to correct to a dry mass basis concentration) **is compulsory**.

Where applicable, participants must report whether a recovery correction was applied.

8 REPORTING

The data will be processed according to ISO 13528:2017 (Statistical methods for use in proficiency testing by interlaboratory comparisons). A report will be issued to each participating laboratory within 1 week following the submission deadline.

Laboratory performance will be reported using z-scores, calculated using the assigned value (reference values provided by NMISA) along with the Horwitz predicted standard deviation for proficiency assessment (based on the concentration level of the corresponding element).

Reports will be provided in electronic format only (Adobe Acrobat- pdf) files.

The scheme is fully confidential. Each participant will be issued with a unique identification number. For multiple participants within the same laboratory the participating laboratory is required to identify its analysts by a code known only to the laboratory.