

# Introduction to ICP-OES and ICP-MS: Analysis of Toxic and Nutritional elements in Food



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training centre

The agricultural sector is a major contributor to the gross domestic product (GDP) of many African Countries. Major sectors include cocoa beans, fruit, fish and coffee; with cocoa beans and products constituting an approximate \$4.2 billion EU export market.

While the nutritional value of agricultural and food products is, in part, determined by the mineral content of the food, the presence of toxic elements adversely affects health. Local and international legislation aimed at monitoring nutritional and toxic content in food, therefore makes accurate quantification of elemental content not only crucial in safeguarding human and animal health, but also in securing exports. Here ICP-OES and ICP-MS techniques offer both the sensitivity and precision to achieve the required accuracy.

This workshop will provide an overview of the basic operating principles of both ICP-OES and ICP-MS, focusing on sample preparation, instrument set-up (impact of sample introduction systems), method development, validation as well as quality control aspects. Additionally, an overview will be provided on basic maintenance and trouble shooting.

Limited space available,  
maximum of ten  
participants - register now!

JOIN OUR ICP JOURNEY

How to ensure the quality of  
your analysis.

15 – 26 July 2024

An informative workshop  
aimed at ICP-OES and ICP-  
MS analysts from beginners to  
advanced users



An AFRIMETS initiative supported by

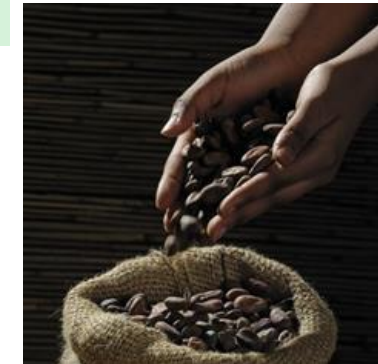


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Your measure of excellence

# WEEK 1

DAY 1	DAY 2	DAY 3	DAY 4	DAY 5
<ul style="list-style-type: none"> <li>• Registration and coffee</li> <li>• Welcome and logistics</li> <li>• Lab tour</li> <li>• Coffee</li> <li>• Safety</li> <li>• Basic laboratory skills</li> <li>• Operating a trace and ultra-trace analytical laboratory</li> <li>• Lunch</li> <li>• Sample digestion approaches</li> <li>• Laboratory practical: Pipetting &amp; weighing</li> </ul>	<ul style="list-style-type: none"> <li>• Morning Coffee</li> <li>• Basic ICP operating principles</li> <li>• Coffee</li> <li>• ICP-OES</li> <li>• ICP-MS</li> <li>• Lunch</li> <li>• ICP optimisation, maintenance and trouble shooting</li> <li>• Practical: Selection of appropriate digestion method</li> <li>• Questions and discussion</li> </ul>	<ul style="list-style-type: none"> <li>• Morning coffee</li> <li>• Calibration approaches</li> <li>• Coffee</li> <li>• Experimental planning</li> <li>• Lunch</li> <li>• Practical: Designing your own experimental plan</li> <li>• Questions and discussion</li> </ul>	<ul style="list-style-type: none"> <li>• Morning coffee</li> <li>• Metrological traceability and the correct use of certified reference materials (CRMs) – Part 1</li> <li>• Coffee</li> <li>• Metrological traceability (continues)</li> <li>• Lunch</li> <li>• Laboratory practical: Sample preparation</li> <li>• Questions and discussions</li> </ul>	<ul style="list-style-type: none"> <li>• Morning coffee</li> <li>• Metrological traceability and the correct use of CRMs – Part 2</li> <li>• Coffee</li> <li>• Metrological traceability (continues)</li> <li>• Lunch</li> <li>• Laboratory practical: Microwave digestion of samples</li> <li>• Questions and discussions</li> </ul>



## Finding a course that is right for you

The NMISA Training Centre is committed to building measurement capacity in Africa. The centre has a number of courses that may meet your training needs, from personnel at the beginning of their careers to those wanting to develop advanced skills. Please visit our website [www.nmisa.org](http://www.nmisa.org) for more information or contact us at [training@nmisa.org](mailto:training@nmisa.org) or call +27 12 947 2461.

## We are with you every step of the way

- The NMISA provides an extensive suite of products and services to meet your laboratory's needs. This includes but is not limited to consultation services that spans the entire lifetime of your laboratory from design to implementation.
- Training in method development; validation and uncertainty.
- Providing calibration, proficiency testing and reference materials to assist your laboratory in meeting quality control and assurance objectives.



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# WEEK 2



## DAY 1

- Morning Coffee
- Method validation
- Coffee
- Quality control
- Lunch
- Laboratory practical: Finalise sample digestion, dilution and preparation of calibration standards
- Questions and discussion

## DAY 2

- Morning Coffee
- Uncertainty of Measurement – Part 1
- Coffee
- Uncertainty continues
- Lunch
- Laboratory practical: Setting up an ICP-OES method, optimise instrument and analyse samples
- Questions and discussion

## DAY 3

- Morning coffee
- Uncertainty of Measurement – Part 2
- Coffee
- Uncertainty continues
- Lunch
- Laboratory practical: Setting up an ICP-MS method, optimise instrument and analyse samples
- Questions and discussion

## DAY 4

- Morning coffee
- Practical: Evaluation of ICP-OES and ICP-MS instrument results
- Coffee
- Calculation of results
- Lunch
- Prepare method validation report and calculate uncertainty of measurement
- Questions and discussions

## DAY 5

- Morning coffee
- Participant feedback on results, method validation and uncertainty of measurement data
- Lunch
- Questions and discussions



### Finding Proficiency Tests that suit your needs

The NMISA is an ISO/IEC 17043 accredited proficiency testing service provider with accreditation in the following fields: Food Testing (chemical additives, residues, and nutritional content); Water Testing (Chemical contaminants and residues) and Forensic Testing (forensic level alcohol, forensic preservatives and breath alcohol).

### We are with you every step of the way

To support your measurement quality control and quality assurance objectives, the NMISA has released several reference materials (RMs) and certified reference materials (CRMs). These materials (where possible) originate from within the African Continent, to ensure compatibility with the samples routinely measured in your laboratory. RMs currently available include mycotoxins (analytical standards as well as naturally incurred materials such as maize flour and peanut slurry), forensic blood alcohol analysis analytical standards, matrix materials for nutritional content, nutritional and toxic elements as well as pesticides. Please visit our on-line store for available products and pricing [www.store.nmisa.org](http://www.store.nmisa.org).

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