ICP-OES and ICP-MS: Method development, Instrument operation, Maintenance, and Troubleshooting

AFRIMETS
Intra-Africa Metrology System
Système Intra-Africain de Métrologie

Supporting sustainable agricultural practices, ecosystem health and exports through accurate measurement.

Since the introduction of Inductively Coupled Plasma – Optical Emission Spectroscopy (ICP-OES) in 1974, and Inductively Coupled Plasma Mass Spectrometry (ICP-MS) in 1980, these techniques have revolutionised the simultaneous analysis of major, trace and ultra-trace elements in a wide range of sample matrices.

Currently, these instruments are used extensively in diverse areas such as mining, manufacturing, food, and environmental testing. Through a combination of various digestion techniques, samples ranging from high fat foods (such as processed meat, butter) to refractory materials (such as automotive catalysts, ores, soils), can be dissolved, and their elemental content reliably determined. These measurements can be performed with very high accuracy and precision.

This workshop will provide an overview of the basic operating principles of both ICP-OES and ICP-MS, focussing 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. Participants will be introduced to recent developments, such as elemental speciation.

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

JOIN OUR ICP ANALYSIS JOURNEY

How to ensure your analysis suppors industry.

16 - 27 October 2023
12 - 23 February 2024

An informative workshop aimed at anyone interested in the analysis of elemental content in a variety of sample matrices.

The AFRIMETS initiative is supported by

german cooperation
DEUTSCHE ZUSAMMENARBEIT

PTB
Physikalisch-Technische Bundesanstalt
Braunschweig und Berlin

Visit **www.nmisa.org** or contact us on **+27 12 947 2780** for more information.

Excellence through measurement
Opening the doors to Africa and beyond

Friendly, Knowledgeable Facilitators

- The course will be presented by facilitators that strongly encourage interactive training, with a willingness to share.
- The last day of the course will be combined with a virtual workshop to encourage the sharing of information from suppliers to users throughout the continent.
- Facilitators will include:
  - Maré Linsky (NMISA)
  - Dr Angelique Botha (NMISA)
- Technical applications featuring several regional instrument manufactures/ suppliers.

WEEK 1 - A BASIC INTRODUCTION TO ICP-OES AND ICPMS TECHNIQUES

DAY 1: Sample Preparation for ICP-OES and ICP-MS	**DAY 2:** Fundamentals of ICP-OES and ICP-MS	**DAY 3:** Instrument set up and optimisation	**DAY 4:** Quality assurance and Elemental Speciation	**DAY 5:** ICP Supplier workshop & NMISA Tour
• Welcome • Sample Digestion Systems • Coffee break • Environmental contamination considerations • Lunch • Selection of suitable Chemical reagents • Coffee break • Selection of a suitable digestion method	• Morning Coffee • Operating principles • Coffee break • Sample introduction systems • Lunch • ICP-OES: Method development • Coffee break • ICP-MS: Method development	• Morning Coffee • Instrument optimisation • Coffee break Instrument calibration approaches • Lunch • Instrument calibration approaches (cont.) • Coffee break • Maintenance and trouble shooting	• Morning Coffee • Method validation & Quality control • Coffee break • Uncertainty of measurement • Lunch • Introduction to elemental speciation • Coffee break • Elemental speciation (cont.)	• Morning Coffee • Presentations from regional suppliers of ICP and Sample preparation equipment • Lunch • Tour of NMISA laboratories

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** for more information or contact us at **training@nmisa.org** or call **+27 12 947 2461.**

We are with you every step of the way

- The NMISA provides an extensive suit of products and services to meet your laboratories 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.

nmisa training centre

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Measurement and calibration expertise

The NMISA offers calibration and measurements in a wide field of scientific disciplines including, but not limited to:

- Acoustics, Ultrasound and Vibration
- DC Low Frequency and Radio Frequency
- Fibre Optics
- Gas Analysis
- Mass Calibration Services
- Temperature and Humidity Calibration Services
- Photometry and Radiometry
- Essential oils
- Environmental contaminants
- Toxic and nutritional content
- Food contaminants and nutritional content

WEEK 2 - LET'S GET PRACTICAL SAMPLING TO REPORTING

DAY 1: Experimental design and sample preparation	DAY 2: Sample digestion and standard preparation	DAY 3: Sample preparation and instrument set-up	DAY 4: ICP-OES and ICP-MS analyses	DAY 5: Data processing and reporting
• Laboratory safety and orientation • Coffee break • Experimental design • Weighing samples • Lunch • Digestion reagents • Coffee break • Laboratory preparations	• Morning Coffee • Microwave digestion • Coffee break • Microwave digestion (cont.) • Lunch • Preparing analytical standards • Coffee break • Introduction to ICP-OES, ICP-SFMS and ICP-QQQ instruments	• Morning Coffee • Sample transfer • Coffee break • Sample dilutions • Lunch • Sample dilutions (cont.) • Coffee break • Setting up ICP sequences	• Morning Coffee • ICP start up, optimisation • Coffee break • ICP sample analyses • Lunch • Evaluation of instrument calibration • Coffee break • Quality control	• Morning Coffee • Data analysis • Coffee break • Data analysis (cont.) • Lunch • Presentation of participants' results

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 and certified reference materials. These materials, where possible, originate from within the African Continent, to ensure compatibility with the samples routinely measured in your laboratory. Reference materials 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**

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