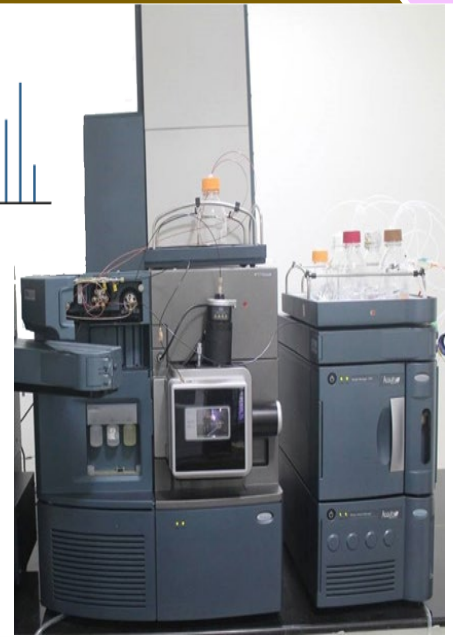
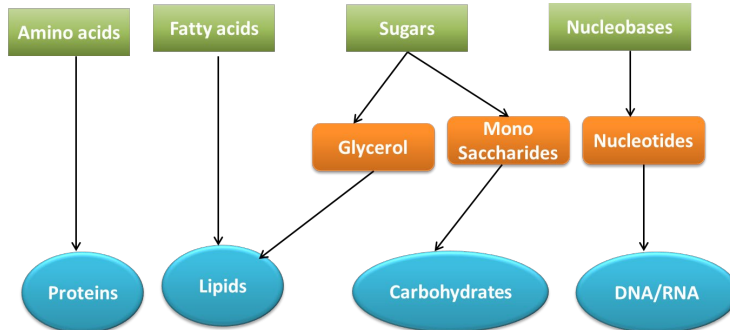
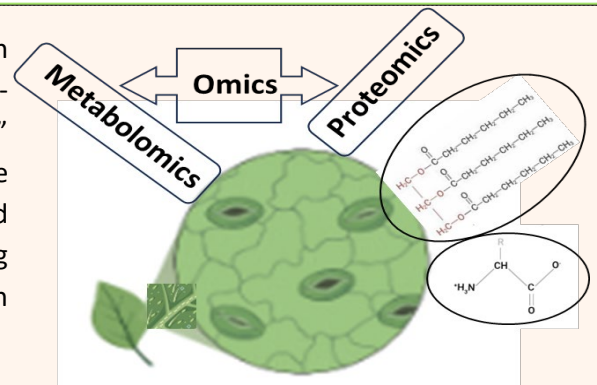


Small Molecules/ Compounds/Metabolites



Hands on training on Proteomics and Metabolomics using Mass Spectrometry

BioNcube, a BIRAC-Bio incubator of the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), invites applications for “Hands-on training on Proteomics and metabolomics using Mass Spectrometry.” ICRISAT is a globally recognized non-profit agricultural research institute renowned for its cutting-edge facilities in Agri-biotechnology research and for translating scientific innovations into practical applications. This training course will take place from December 04 - 06, 2024 at ICRISAT, located in Patancheru, Hyderabad, India (502 324).



Course Synopsis

LC-MS-based approaches are among the most widely used techniques due to their high sensitivity, selectivity, robustness, and reproducibility. The combination of ultra-high-performance liquid chromatography (UHPLC) with mass spectrometry provides high resolution and selectivity, making it the gold standard for metabolomics profiling, proteomics studies, and the analysis of metabolites and proteins. By utilizing these advanced technologies, we can gain a deeper understanding of plant biochemistry. This leads to important breakthroughs, such as identifying phytochemicals with nutritional properties, detecting biomarkers for genetic variation, and understanding plant defense mechanisms. These insights pave the way for significant advances in fields like agriculture, nutrition, and biotechnology.

Mass spectrometry (MS) is essential for selectively acquiring data to identify and quantify individual peptides and metabolites. It works in conjunction with bioinformatics tools that correlate empirical mass data with established protein and metabolite databases. These technological advances have greatly improved the depth and accuracy of proteomic and metabolomic analyses, facilitating the emergence of true single-cell proteomics and metabolomics. The primary objective of this training program is to equip participants with both theoretical and practical insights into the principles of proteomics and metabolomics. This knowledge will enhance their understanding and application of these techniques in their research. In recent years, mass spectrometry-based proteomics and metabolomics have become powerful methodologies for the identification, characterization, and quantification of proteins and metabolites, which are vital for comprehending cellular functions.

This course will provide a comprehensive introduction to mass spectrometry, covering essential topics such as sample preparation and data analysis techniques. It serves as an excellent opportunity to expand your knowledge of proteomics and metabolomics within the context of cellular studies. Participants will have the opportunity to interact with our team of scientists and experts throughout the program. Our goal is for all attendees to effectively apply this knowledge to their research interests and improve their workflows.

Purpose

- Introduction to basic chromatography and mass spectrometry
- The overview of proteomics and metabolomics
- Experimental procedure steps for the extraction of proteins and metabolites
- Preparation and processing of samples for Liquid chromatography-mass spectroscopy
- Data analysis and interpretation

BioNcube is a BIRAC-Bio incubator dedicated to promoting innovation in agricultural biotechnology by facilitating the development and implementation of a diverse array of biotechnological solutions, from basic research to product translation. Start-ups within **BioNcube** gain access to the scientific expertise of ICRISAT and advanced biotechnology laboratories equipped with state-of-the-art instruments, including LC-MS, HPLC, 2-D gel apparatus, and SDS-PAGE. Moreover, they benefit from a comprehensive infrastructure that includes plant genotyping, phenotyping, transgenic facilities, greenhouses, molecular biology labs, transformation facilities, and contained fields. The value proposition of the **BIRAC-Bio incubator** is its ability to integrate business incubation with technology translation. It offers extensive support to ag-biotech start-ups, guiding them from the proof-of-concept phase through to technology commercialization. This initiative ultimately aims to benefit farming communities and improve agricultural practices.

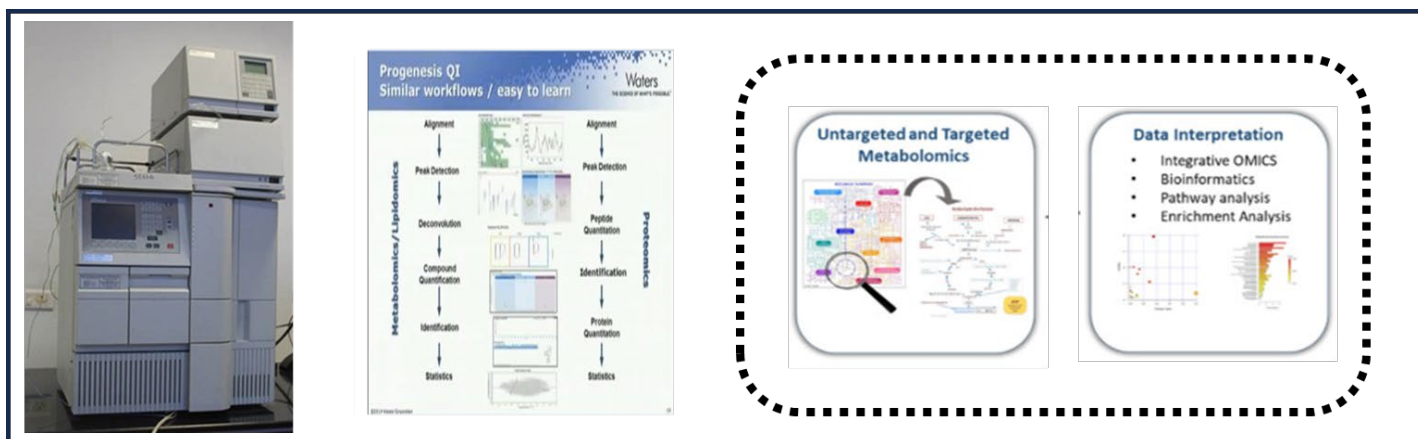


Instructional section

- ❖ Core Concepts of Mass Spectrometry and Liquid Chromatography
- ❖ Overview of Non-Targeted Metabolomics Workflows
- ❖ Fundamentals of Proteomics
- ❖ Quantitative Proteomics Techniques, Including Label-Free Approaches
- ❖ Integration of Metabolomics and Proteomics for Identifying Genes Linked to Biotic Stress
- ❖ Bioinformatics Resources for Analyzing Omics Data

Practical Exercises

- ❖ Extraction and Quantification of Proteins
- ❖ SDS-PAGE and Gel Staining Procedures
- ❖ Two-Dimensional Gel Electrophoresis
- ❖ In-Gel and In-Solution Protein Digestion Methods
- ❖ Demonstration of High-Performance Liquid Chromatography (HPLC)
- ❖ Procedures for Metabolite Extraction
- ❖ Preparation of Samples for LC-MS Analysis
- ❖ Analysis and Interpretation of Data



The composite image contains three main parts:

- Left:** A photograph of a Waters Progenesis Q1 mass spectrometer system, including the main unit and a detector.
- Middle:** A flowchart titled "Progenesis Q1 Similar workflows / easy to learn" comparing "Metabolomics / Lipidomics" and "Proteomics". Both workflows follow a similar sequence: Alignment, Peak Detection, Deconvolution (for metabolomics) or Peptide Quantification (for proteomics), Compound/Peptide Identification, and Statistics.
- Right:** Two slides within a dashed border. The first slide, "Untargeted and Targeted Metabolomics", shows a network diagram with a magnifying glass. The second slide, "Data Interpretation", lists: Integrative OMICS, Bioinformatics, Pathway analysis, and Enrichment Analysis, accompanied by a heatmap.



Resource people/trainers

Resource people for this course will be from National and International Research Organizations.

Course fees

- **Students/Postdoc**
INR 12,000 (without accommodation)
INR 22,000 (with accommodation)
- **Scientist/Faculty**
INR 15,000 (without accommodation)
INR 25,000 (with accommodation)
- **Industry**
INR 35,000 (with accommodation)

Course language

All course notes and lectures will be in English. Therefore, participants should have a good knowledge of English and be aware of the appropriate technical terms of metabolomics and proteomics technology.

Venue

The training program will be held at the Platform for Translational Research on Transgenic Crops (PTTC) building, ICRISAT Campus, Patancheru, Hyderabad.

Accommodation

The participants will be accommodated in the Guest House/Hotel during the training. The cost of any additional stay (beyond the dates of training) would be at the trainee's own expense. Plans for an extended stay needs to be given in advance.

More information

Additional information on the course will be provided to all the participants who are selected for admission to the course.



Application

Applications are invited from researchers who are familiar with basic molecular and cell biology techniques and want to learn proteomics and metabolomics applications in agriculture using the most recent and advanced Mass spectrometry systems. While previous experience in this technology is not required, it is expected that the participants have fundamental knowledge and working experience on chromatography. The application can be accessed from the following link provided in the brochure.

<https://forms.office.com/r/BGPSdyxclp>

The completed application should be submitted through the link or sent to bioncube@icrisat.org with copy to yogendra.kalenahalli@icrisat.org and wricha.tyagi@icrisat.org.

The final date for application is 27 November 2024





Comprehensive training on Proteomics and Metabolomics using Mass Spectrometry

Affix Recent
Passport size
Photograph

..... 04 to 06 December 2024

Application Form

Title (Dr/Mr/Ms/Mrs)	Gender (M/F)
First Name	
Middle Name	
Family Name	
Designation/Job title	
Organization (with address) State/Province; City; Postal/Zip Code; Country	
Date of Birth (age in years)	
Email (give primary and alternate email, if available)	
Mobile No.	
Phone No.	

Educational Qualifications (Ph.D./Postdoc/Young Scientist/any other)			
Degree	Year	Subject(s)	University/Institute

How did you find about the training (Restrict to 100 words)
Describe your responsibilities and job description: (Restrict to 300 words)
How will this training help you? (Restrict to 300 words)

Full Name of Applicant..... Date..... Signature.....

Remarks and Recommendations of the Host Organization (Please state clearly the strong and weak points about the applicant and how this training will be useful for your organization/country)

.....

Date..... Signature..... Place.....

Name of Forwarding Authority..... Seal.....