Hands-on training program on
Mass Spectrometry-based Proteomics and Metabolomics

BioNcube, a BIRAC-Bio incubator of International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) calls for applications for a hands-on training program on “Mass Spectrometry Based Proteomics and Metabolomics”. ICRISAT is an International non-profit agricultural research institute with state-of-the-art facilities for Agri-biotechnology research and product translation. The training course is being organized from April 17th - 21st at ICRISAT, Patancheru, Hyderabad, India-502 324

Course description

LC-MS-based approaches are the most utilized techniques due to their high sensitivity, selectivity, robustness, and reproducibility. The selective nature and high resolution provided by ultra-high-performance liquid chromatography (UHPLC), combined with proficient mass spectrometry, have made it the gold standard for metabolomics profiling and proteomics studies, and for metabolite, and protein profiling analysis. With the aid of these technologies, we can gain a deeper understanding of plant biochemistry, which leads to important advances. This includes identifying phytochemicals with nutritional properties, detecting biomarkers for genetic variation identification, and understanding plant defense mechanisms.

Mass spectrometry (MS) selectively acquires the data needed to identify and quantify individual peptides and metabolites and bioinformatic analysis to correlate the empirical mass data with protein or metabolite databases. These technological advances have led to significant improvements in in-depth proteomics and metabolomics analyses and have enabled the development of true single-cell proteomics and metabolomics. The purpose of this training program is to introduce proteomics and metabolomics principles, both theoretically and practically, to assist participants in better understanding these two techniques. In recent years, mass spectrometry-based proteomics and metabolomics have emerged as powerful tools for identifying, characterizing, and quantifying proteins and metabolites important for cellular function.
This course will provide you with a basic understanding of mass spectrometry, sample preparation, and data analysis. It is a good opportunity to gain a better understanding of proteomics and metabolomics studies in cells. During the program, you will have the opportunity to interact with our scientists and experts. We hope that all the participants will be able to apply this knowledge to the research areas they are interested in and develop their workflow.

Objective

- Introduction to basic chromatography and mass spectrometry
- The overview of proteomics and metabolomics
- Experimental procedural 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 supporting Ag-biotech innovation, development, and applications of broad range of biotechnological solutions spreading across various domains from basic research to product translation. Agribiotech start-ups incubated in BioNcube, have access to the scientific knowledge of ICRISAT, biotechnology laboratories with state-of-the-art equipment including LC-MS, HPLC, 2-D apparatus and SDS-PAGE, and infrastructure such as plant genotyping, phenotyping, and transgenic facilities, greenhouses, molecular biology lab, transformation facility, contained fields, etc. The value proposition of the BIRAC- Bio incubator is to link business incubation to translation and support ag-biotech start-ups from the proof-of-concept stage through to technology translation and commercialization, to further benefit farming communities.
### Lectures

- Basic principles of mass spectrometry as well as liquid chromatography
- Introduction to Metabolomics workflow specifically non-targeted metabolomics
- Introduction to basic proteomics
- Quantitative proteomics strategies such as label-free quantification
- Integration of metabolomics and proteomics approaches to identify candidate genes responsible for biotic stresses.
- Bioinformatics tools for omics data analysis.

### Practical sessions

- Extraction of proteins and quantification
- SDS-PAGE and gel staining
- 2D-Gel electrophoresis
- Digestion of protein samples by in-gel and in-solution digestion
- Demonstration HPLC
- Extraction of metabolites
- Sample preparation for LCMS
- Data analysis and interpretation.
Resource persons/trainers
Resource persons for this course would be from National and International Research organizations.

Course fees
- **Students/Postdoc**
  - INR 20,000 (without accommodation)
  - INR 35,000 (with accommodation)
- **Scientist/Faculty**
  - INR 25,000 (without accommodation)
  - INR 40,000 (with accommodation)
- **Industry**
  - INR 50,000 (with accommodation).

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

Venue
The venue for the training program is 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. Information on 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/k67GbryAhF

The completed application should be submitted through the link or sent to bioncube@icrisat.org with copy to wricha.tyagi@icrisat.org; yogendra.kalenaahalli@icrisat.org, and Sudhakarreddy.Palakolanu@icrisat.org.

The final date for application is 05 April 2023
# Hands-on training program on Mass Spectrometry Based Proteomics and Metabolomics

**17-21st April 2023**

## Application Form

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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)

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

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