



# ICAR-NBAIM

Understanding and conserving our national heritage of agriculturally important microorganisms

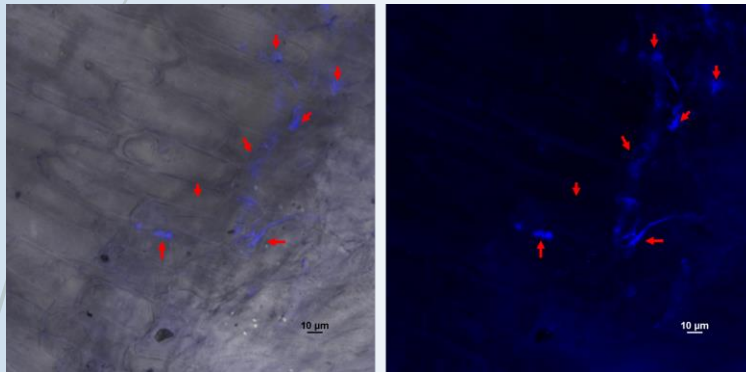


## National Training Program

on

## Techniques for isolation and characterization of bacterial endophytes and its application in agriculture

From December 15 to 22, 2023



### Course Director

Alok K. Srivastava, Director ICAR-NBAIM

### Course Coordinators

Pramod Kumar Sahu  
V. Mageshwaran  
Adarsh Kumar

ICAR National Bureau of Agriculturally Important Microorganisms

(ISO 9001:2008 Certified Institute)

Kushmaur, Maunath Bhanjan-275103

Uttar Pradesh, India

Email id: [director.nbaim@icar.gov.in](mailto:director.nbaim@icar.gov.in)  
Website: [www.nbaim.icar.gov.in](http://www.nbaim.icar.gov.in)

### About NBAIM

ICAR-National Bureau of Agriculturally Important Microorganisms (NBAIM) is one of the premier institutions of Indian Council of Agricultural Research (ICAR) leading research and development programs in the field of Agricultural Microbiology in India. The Bureau aims at collection, maintenance and conservation of agriculturally important microorganisms and their genomic resources for future needs. The Bureau is engaged in the cutting-edge research in Agricultural Microbiology, Microbial Biotechnology, Plant Pathology and Bioinformatics for the benefit of Indian agriculture and farmers. Human resource development is one of the important mandates of the bureau. The Bureau has organized several national training programs on molecular microbial identification and characterization, molecular taxonomy, microbial diversity, biocontrol, plant-microbe interactions and the applications of bioinformatics in gene mining for the benefit different stakeholders.

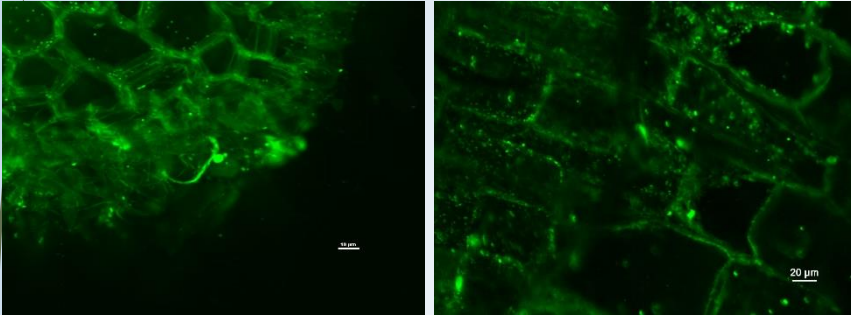


### Background

Endophytes are the group of microbes which reside inside the plants and does not cause any apparent disease symptoms. The research on endophytes has gained new dimensions due to its potential role in nutrient supplementation, plant growth promotion and alleviation of biotic and abiotic stresses in plants. Being closer to plant cells, endophytes have advantage of inducing plants' internal immunity. In recent days, the concept of holobiome is getting momentum which indicates that genome of endophytic microbes is also contributing significantly to the plant genome expression and its phenotype. This signify the potential of endophytes in agriculture to meet the growing demand of food, increasing population and climate change.

## Objectives :

1. To appraise students/researchers about advanced tools and techniques for characterization of bacterial endophytes.
2. To provide hands on research experience and training on application of bacterial endophytes for sustainable crop production.



## Thematic areas

- Surface sterilization and Isolation of endophytes
- Seed endophyte research
- Roles in plant growth promotion/ nutrient fortification /biotic &/ abiotic stress tolerance
- Endophyte ecology and microbial tracking
- Endophytes from medicinal plants
- OMICS approaches to decipher plant-endophyte interaction

The training programme will include both lectures and practical sessions on the above thematic areas. Resource experts from the Bureau and other reputed institutes will address the participants.

## Expected benefits to the participants

- The participants will get hands on experience in surface sterilization and isolation of bacterial endophytes, their molecular and biochemical characterization for plant growth promotion, nutrient fortification, biological control and abiotic stress alleviation. Participants will also get a detailed exposure of Confocal Scanning Laser Microscopic imaging and localization of endophytes in plants cells using live dead cell imaging system, cell trackers, fluorescent in-situ hybridization, and few other cell tracking methods
- The participants will get structured training on practical and applied aspects on endophytes along with newly arising concepts, which enable them to initiate independent research in this area.

## Eligible participants

- M.Sc./Ph.D. Students and Research Scholars, Post-Doctoral Students, Technical Officers, Scientists/Assistant Professors or above, from any university/institute/organization working in the area of biological sciences.

## Fees for the training

- Rs. 5000 per trainee for students/ research scholars and Rs. 8000/- for Technical officers, Scientists/Assistant Professors or above from Public/Private Universities or Govt. Institutions. Rs. 12000/- per trainee for researchers from private or Non-Government Organizations/ Companies/ Firms.

## How to apply?

- Eligible participants should send the dully filled application form forwarded by the HoD/Head of the institution to the Director, ICAR-NBAIM on/or before **20<sup>th</sup> November, 2023** to the email ids: [director.nbaim@icar.gov.in](mailto:director.nbaim@icar.gov.in) and [endophyte.training@gmail.com](mailto:endophyte.training@gmail.com)
- The number of seats are limited to 20 participants
- The selected candidates will be notified on **21<sup>th</sup> November, 2023** by email
- For any queries please contact: 7054707822 (Dr. Pramod), 9769941511 (Dr. Mageshwaran), 9452640028 (Dr. Adarsh)