

# **COURSE: BIO-FERTILIZERS**

## **Course Code: BOT(N)-121**

### **Syllabus**

- Bio-fertilizers: definition, different sources, importance and comparison with conventional fertilizers.
- Biological nitrogen fixation: symbiotic and asymbiotic.
- General account of the microbes commonly used as bio fertilizers.
- *Rhizobium*- isolation, identification, mass multiplication, and carrier based inoculants, Actinorrhizal symbiosis.
- *Azospirillum*: isolation, important characteristics and mass multiplication – carrier based inoculant, associative effect of different microorganisms.
- *Azotobacter*: classification, important characteristics – crop response to *Azotobacter* inoculum, maintenance and mass multiplication
- Cyanobacteria (BGA), cell structure, forms and characteristic features. *Azolla* and *Anabaena azollae* association, nitrogen fixation, factors affecting growth, blue green algae and *Azolla* in rice cultivation.
- Mycorrhizal association: types of mycorrhizal association, taxonomy, occurrence and distribution, phosphorus nutrition, growth and yield – colonization of VAM – isolation and inoculum production of VAM, and its influence on growth and yield of crop Plants

### **BLOCK-1: INTRODUCTION TO BIO FERTILIZERS**

- Unit-01 : Bio fertilizers: definition, different sources, importance.
- Unit-02 : Biological nitrogen fixation.
- Unit-03 : General account of the microbes commonly used as bio fertilizers.
- Unit-04 : *Rhizobium*- isolation, identification, mass multiplication etc.

### **BLOCK-2: COMMON BIO FERTILIZERS AND NITROGEN FIXERS**

- Unit-05 : *Azospirillum*: isolation, important characteristics and mass multiplication
- Unit-06 : *Azotobacter*: classification, important characteristics
- Unit-07 : Cyanobacteria (BGA), cell structure, forms and characteristic features.
- Unit-08 : Mycorrhizal association.

**COURSE: BIO-FERTILIZERS (LABORATORY)**  
**Course Code: BOT(N)-121L**

**Syllabus**

- **Bio-fertilizers:** Exercises on nitrogen fixing organisms in soil fertility and will be practically trained to make Bio fertilizers.

**Exercise Schedule:**

- Exercise -1 : Study the root system of leguminous plants.  
Exercise -2 : Isolation of *Rhizobium* from root nodules of legumes.  
Exercise -3 : Collection of Cyanobacteria and *Azolla* from rice fields.  
Exercise -4 : Study the morphology of *Azolla*.  
Exercise -5 : Demonstration of bio fertilizer preparation.  
Exercise -6 : Study of cell structure of Cyanobacteria.