B.Sc. II Year **Semester – IV**

BIM -S401
SEC-2 BIOFERTILIZERS

MM : 100
Time : 3 hrs
L Credit
4 4
Total Hours: 60

Sessional : 30
ESE : 70
Pass Marks : 40

Learning objectives:

- To understand the beneficial plant-microbes interaction and their role as biofertilizer.
- To understand Symbiotic and non-symbiotic nitrogen fixation.

Learning outcomes:

At the end of course students will be able to

- Explain the role of microorganism in nitrogen fixation, phosphate solubilisation and other beneficial roles.
- Cultivate cyanobacteria in laboratory by different methods

UNIT–I

Biofertilizers; General account of the microbes used as biofertilizers for various crop plants and their advantages over chemical fertilizers. Symbiotic Nitrogen fixers: *Rhizobium* - Isolation, characteristics, types, Inoculum production and Mass cultivation; Field applications; Carrier materials.

(16 Lectures)

UNIT-II

Non - symbiotic Nitrogen Fixers; Free living *Azospirillum*, *Azotobacter*- isolation, characteristics, mass inoculum, production and field application.

(08 Lectures)

UNIT–III

Phosphate Solubilizers; Phosphate solubilizing microbes - isolation, characterization, mass inoculum production, field applications.

(08 Lectures)

UNIT–IV

Mycorrhizal Biofertilizers: Importance of mycorrhizal inoculum, types of mycorrhizae and associated plants, Inoculum production and Mass production of VAM; field applications of Ectomycorrhizae and VAM.

(16 Lectures)

UNIT –V

Cyanobacteria: *Nostoc/ Anabena*; cultivation methods (tray and pit methods); applications in field. *Azolla*:isolation, characterization, mass multiplication, role in rice cultivation, crop response, field Application

(12 Lectures)

Suggested Reading

1. Dubey R.C. and Maheshwari, D.K. *A Textbook of Microbiology*. 3rd ed., S. Chand & Co, Ram Nagar, New Delhi, p. 1034. ISBN 81-219-2620-3
2. N.S. SubbhaRao, Soil Microbiology, Science Publishers.
3. M.K.Rai, Handbook of Microbial Fertilizers, Internation Book Distributing Co.
4. Dubey, R.C. *Advanced Biotechnology*. S. Chand & Co. P Ltd, New Delhi, p. 1161; ISBN: 81:219-4290-X.
5. Rangaswami,G. Agriculture Microbiolgy, Prentice Hall Indian Learning Ltd
6. Dubey, R.C. and Maheshwari, D.K. *Practical Microbiology*. 2nd ed., S. Chand & Co. P Ltd, New Delhi, p. 413. ISBN: 81:219-2559-2

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