

BIM -S401
SEC-2 BIOFERTILIZERS

MM : 100
Time : 3 hrs
L Credit
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Sessional : 30
ESE : 70
Pass Marks : 40

Total Hours: 60

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 microorganisms 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. SubbaRao, *Soil Microbiology*, Science Publishers.
3. M.K.Rai, *Handbook of Microbial Fertilizers*, International 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 Microbiology*, Prentice Hall India Learning Ltd

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