MMB - E304
ELECTIVE - IV AGRICULTURAL MICROBIOLOGY

L T Credit
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Learning objectives:

- Student will learn about positive or negative interaction or association of microorganism with soil.
- To impart in-depth information on soil and agriculture.
- To know the importance of biofertilizers and biopesticides.
- To make the students to know about various techniques involved in biofertilizers and biopesticides production..

Learning outcomes:

At the end of course student will be able to

- Describe the positive and negative aspect of microbes in soil fertility.
- Explain or suggest different biocontrol methodto control pests.
- Develop biofertilizer or biopesticde in lab condition. .
- Isolate rhizobium from the root nodule of leguminous plants.

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UNIT – I

Soil- Physico-chemical properties, soil fertility, Soil genesis: formation of soil and soil factors: climate, bed rock, temperature, vegetation and precipitation; factors affecting soil properties., soil enzymatic activity, Distribution of soil microorganisms in soil., factors influencing the soil microflora., Interactions among microorganisms- antibiosis, mutualisms, commensalism, competition, amensalism, parasitism, predation.

(10 Lectures)

UNIT – II

Interactions between microbes and plants,microflora of rhizosphere and phyllosphere, microbes in composting; characteristics features of the following beneficial organisms in agriculture- Bacteria-*Azospirillum, Azotobacter, Bacillus, Pseudomonas, Rhizobium and Frankia, Cyanobacteria-Anabaena, Nostoc, Hapalosiphon*. Fungi: *Glomus*. **(13 Lectures)**

UNIT – III

Microbial biomass, Microbial transformations of carbon, nitrogen, phosphorus and sulphur. Biological nitrogen fixation, mechanism, ammonification, nitrification, denitrification and microorganisms involved in such processes. **(11 Lectures)**

UNIT – IV

Biofertilizer-bacterial ,cyanobacterial and mycorrhizal (Ecto and endomycorrhiza) , production methods of biofertilizers – significance, storage, shelf life, quality control of biofertilizers, Isolation and Purification of phosphate solubilizers. Mass multiplication and field applications of phosphate solubilizer. Algal and other biofertilizers, endophytic biofertilizers.

(13 Lectures)

UNIT – V

Biological control- microbial agents for control of plant disease, production of microbial insecticides, Pseudomonads and bacillus (*B. thuringiensis*, toxin production etc.), Entomopathogenic fungi, biological control of nematodes and fungal pathogens.

(13 lectures)

Suggested Reading

1. N.S. SubbhaRao, Soil Microbiology, Science Publishers.
2. M.K.Rai, Handbook of Microbial Fertilizers, Internation Book Distributing Co.
3. Dubey, R.C. *Advanced Biotechnology*. S. Chand & Co. P Ltd, New Delhi, p. 1161; ISBN: 81:219-4290-X.
4. Rangaswami,G. Agriculture Microbiolgy, Prentice Hall Indian Learning Ltd

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