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MICROB-121 Agricultural Microbiology 2(1+1)

Theory

Introduction to microbial world: Prokaryotic and eukaryotic microbes. Sterilization, disinfection, pasteurization and Koch's postulates. Bacteria: cell structure, growth, Gram positive and Gram negative bacteria, chemoautotrophy and photoautotrophy. Bacterial genetics: Genetic recombination: transformation, conjugation and transduction, plasmids, transposon. Role of microbes in soil fertility and crop production: Carbon, Nitrogen, Phosphorus and Sulphur cycles. Biological nitrogen fixation: symbiotic, associative and asymbiotic. Azolla, blue green algae and mycorrhiza. Rhizosphere and phyllosphere. Microbes in human welfare: biofertilizers, bio-pesticides, bio-fuel production and biodegradation of agro-wastes.

Practical

Introduction to microbiology laboratory and its equipments. Microscope: parts, principles of microscopy, resolving power and numerical aperture. Methods of sterilization. Nutritional media and their preparations. Methods of isolation and purification of microbial cultures. Isolation of *Rhizobium*, *Azotobacter* and BGA. Staining and microscopic examination of microbes. Enumeration of microbial population in soil-bacteria, fungi and actinomycetes. **Lecture Schedule: Theory**

S.N.	Topic	No. of lectures
1.	Introduction to microbial world: Prokaryotic and eukaryotic microbes.	1
2.	Sterilization, disinfection, pasteurization and Koch's postulates.	1
3.	Bacteria: cell structure, growth	2
4.	Gram positive and Gram negative bacteria, chemoautotrophy and photoautotrophy.	2
5.	Bacterial genetics: Genetic recombination: transformation, conjugation and transduction, plasmids, transposon.	2
6.	Role of microbes in soil fertility and crop production: Carbon, Nitrogen, Phosphorus and Sulphur cycles	2
7.	Biological nitrogen fixation: symbiotic, associative and asymbiotic.	2
8.	Azolla, blue green algae and mycorrhiza	1

9.	Rhizosphere and phyllosphere	1
10.	Microbes in human welfare: bio-fertilizers, bio-pesticides	1
11.	bio-fuel production and biodegradation of agro-wastes.	1

Lecture Schedule: Practical

S.No.	Topic	No. of lectures
1.	Introduction to microbiology laboratory and its equipments.	2
2.	Microscope: parts, principles of microscopy, resolving power and numerical aperture.	2
3.	Methods of sterilization.	2
4.	Nutritional media and their preparations.	2
5.	Methods of isolation and purification of microbial cultures.	2
6.	Isolation of <i>Rhizobium</i> , <i>Azotobacter</i> and BGA.	2
7.	Staining and microscopic examination of microbes.	2
8.	Enumeration of microbial population in soil- bacteria, fungi and actinomycetes	2

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