MOHANLAL SUKHADIA UNIVERSITY, UDAIPUR

B. Sc. BIOTECHNOLOGY I YEAR TDC (2016-17)

B. Sc. Ist Year Practicals

Practical- II

(A) Microbial Biology and Diversity

1. General instructions for microbiology laboratory.
2. Study of construction, care and use of a compound microscope.
3. To study the principle and working of following microbilogical instruments:

   Hot air oven, Incubator, Spectrophotometer, Laminar Flow Clean Air Bench, Centrifuge, Autoclave, pH meter.
4. To demonstrate the importance of concept of asepsis and methods of sterilization. Isolation of bacteria from the soil sample in Nutrient broth medium under aseptic and non-aseptic conditions.
5. To study the following methods of sterilization-

   UV sterilization, Flame sterilization, Sterilization by dry and moist heat, Chemical methods of sterilization.
6. To become familiar with preparation of bacterial smears for the microscopic visualization of bacteria.
7. To perform the monochrome staining for the given bacterial samples (*E. coli, Bacillus cereus, Staphylococcus aureus*) to compare morphological shapes and arrangement of bacterial cells using crystal violet stain.
8. To perform the Gram staining procedure for the given bacterial samples (*E. coli, Lactobacillus* spp. *Rhizobium*) to differentiate two groups of bacteria gram-positive and gram-negative.
9. To perform the spore staining procedure for the given bacterial sample (*Bacillus cereus*) to differentiate between bacterial spore and vegetative cells.
10. Preparation of general purpose media (Nutrient agar and Nutrient broth) for cultivation of bacteria.
11. Isolation of bacteria from the given sample (soil, water or milk) by streak plate method.
12. To determine the cultural characteristics of bacteria as an aid for their identification.
13. To study the ubiquitous nature of bacteria.
14. To determine quantitatively the number of cells in a microbial culture (yeast cells) by direct microscopic count using Neubauer chamber.
15. To determine quantitatively the number of cells in a bacterial culture by pour plate technique.
16. To determine quantitatively the number of cells in a bacterial culture by spread plate technique.
17. To perform techniques for cultivating and enumerating bacteriophages.

18. Study of following plant diseases cause by bacteria:
    (a) Citrus canker (b) Crown gall (c) Blight of rice
19. Study of diseases caused by phytoplasma
    (a) Sesame phyllody (b) Little leaf of Brinjal (c) Grassy shoot of sugarcane.
20. Study of plant diseases caused by virus
    (a) Yellow vein mosaic of bhindi
    (b) Leaf curl of tomato
    (c) Bean mosaic
21. Microscopic measurement using stage and ocular micrometers.
22. Study of different types of Lichens

(B) Cell Biology, Genetics and Evolution

1. To study cell structure from onion leaf peels; demonstration of staining and mounting methods.
2. Examination of electron micrographs of eukaryotic cells with special reference to organelles.
3. Study of electron micrographs of viruses, bacteria, cyanobacteria and eukaryotic cells for comparative cellular organization.
4. Examination of various stages of mitosis and meiosis using appropriate material (*e.g*. onion roots tips, flower buds of onion, *Phlox* and *Tradescantia,* testis of grasshopper).
5. Preparation of metaphase chromosomes and karyotype from dividing cells in root tips of onion and pollen grains.
6. To draw idiogram from the prepared karyotype.
7. Isolation of chloroplasts from the plant cells.
8. Staining of mitochondria.
9. Demonstration of barr body in buccal smear.
10. Demonstration of salivary gland chromosomes from *Chironopous* larvae.
11. Separation of different organelles by sucrose density gradient.
12. Detection of enzyme activity(*e.g.* phosphatase and ADH) in cells/ tissue by cytochemical staining.
13. Demonstration of emasculation technique.
14. To perform the viability test and germination test for pollen grains.
15. Exercises based on genetics:
    (a) Working out the laws of inheritance using seed mixtures
    (b) Working out the mode of inheritance of linked genes from F2 data.
16. Permanent slides of cell organelles, stages of mitosis and meiosis.