



MCC, Department of Botany

Paper 8a Combined Practical

**BIOLOGY AND BIOTECHNOLOGY OF ALGAE, MOLECULAR
BIOLOGY, GENETICS, BIOTECHNOLOGY, PLANT TISSUE
CULTURE AND CROP IMPROVEMENT**

M.Sc. va (Candidates admitted from the academic year 2008-2009)

Core Practical

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Biology and Biotechnology of Algae

1. Identification of micro and macro algae collected from natural habitats.
2. Examination of selected algae belonging to the Cyanophyceae, Chlorophyceae
Phaeophyceae and Rhodophyceae for studying their morphology and reproductive structures.
3. Identification of selected freshwater and marine diatoms.
4. Preparation of algal culture medium (Bold's basal medium).
5. Isolation and culturing of any freshwater alga under laboratory conditions.
6. Preparation of alginate beads of immobilized algae.
7. Preparation of blue green algal biofertilizer.
8. Preparation of liquid seaweed fertilizer.
9. Phycoremediation of sewage using algae.
10. Screening marine algae for their antimicrobial activity.
11. Extraction of agar-agar.
12. Extraction of carrageenan.
13. Extraction of alginic acid/sodium alginate.

Molecular Biology and Genetics

1. Isolation of plant genomic DNA
2. Quantification of DNA
3. Electrophoresis of DNA
4. Determination of mitotic indices in control and in treated root meristems.
5. Study of chromosomes in colchicine-treated materials.
6. Study of polytene chromosome in *Drosophila* larva and *Chironomous* larva.
7. Calculation of mitotic indices and anomalous mitosis in tissues treated with chemicals.
8. Solving problems in genetic engineering and gene regulation.

Biotechnology, Tissue Culture and Crop Improvement

1. Laboratory procedures: Inoculation chamber, autoclave, sterilization, handling of glassware.
2. Preparation of solid, semi-solid and liquid media (Murashige-Skoog, Whites and Nitsch and Nitsch).
3. Culture of excised leaves, roots, shoot tips, axillary buds, flower buds, anthers, seeds, young embryos and cotyledons.
4. Establishment and maintenance of callus and subculture of callus from tissue explants of carrot and coleus.
5. Regeneration of plantlets from explants and callus tissue.
6. Isolation of protoplast from mesophyll cells, determination of cell number and observation of cell wall formation.
7. Culture of Cyanobacteria and single cells of algae and higher plants in batch culture.
8. Demonstration of cell immobilisation techniques.
9. Visit to a Biotechnology lab, breweries.
10. Isolation of plant DNA.
11. Separation of DNA by electrophoresis.