

MOHANLAL SUKHADIA UNIVERSITY, UDAIPUR

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

Paper I : *Principles of Plant Tissue Culture*

Unit-I

History, scope and applications of plant tissue culture – contribution of Indian Scientists. Concept of asepsis and methods of sterilization (physical and chemical methods). Nutrient media, their composition and methods of preparation. Role of plant growth regulators, vitamins and other adjuvants in tissue culture.

15 Credit hours

Unit-II

Concept of cell totipotency, polarity and *in vitro* differentiation. Callus and cell suspension culture, growth curve and methods of growth measurement. Callus organogenesis – dedifferentiation and redifferentiation. Somatic embryogenesis – induction of embryogeny *in vitro*, indirect and direct somatic embryogenesis, stages of embryogenesis, factors influencing embryogenesis.

15 Credit hours

Unit-III

Selection and preparation of explants for adventitious shoot bud induction and axillary bud proliferation. Steps of micropropagation-management of donor plants, culture establishment, shoot multiplication, rooting and hardening and acclimatization. Protoplast isolation, culture and differentiation. Somatic hybridization.

15 Credit hours

Unit-IV

Anther and pollen culture – production of haploids. *In vitro* fertilization, embryo, endosperm, ovary and ovule culture. Embryo rescue. Methods of cryopreservation for germplasm conservation. Somaclonal and gametoclonal variation. Meristem tip culture for elimination of viruses in plants.

15 Credit hours

Unit-V

Cell culture and *in vitro* production of secondary metabolites. Important alkaloids and factors affecting their production. Hairy root culture, elicitation and biotransformation, Bioreactors – their types, construction and use in secondary metabolite production.

15 Credit hours

Suggested Readings

1. Robert Smith. Plant tissue culture : Techniques and Experiments. South Asia Edition.
2. Gamborg and Phillip. Plant Cell, Tissue and Organ Culture. Narosa.
3. Dixon and Gonzales. Plant Cell Culture. Panima.
4. Narayanswamy. Plant Cell and Tissue Culture. McGraw Hill.
5. Bhojwani, S.S. and Rajdan, M.K. Plant Tissue Culture : Theory and Practices a revised Edition. Elsevier.
6. Razdan, M.K. Introduction to plant tissue culture. Oxford & IBH Publishers.
7. Chawla, H.S. Introduction to Plant Biotechnology. Oxford & IBH Publishers.
8. Dey, K.K. Plant Tissue Culture.