

**PBT5I102 PLANT AND ANIMAL BIOTECHNOLOGY**

**Module-I: Plant Biotechnology**

Concept of totipotency and plasticity of plant cell, Tissue culture media- preparation, composition and plant growth regulators, Initiation and establishment of culture: Explant preparation, Callus culture, Single cell culture, Suspension culture, Microspore culture Micropropagation: Organogenesis, Somatic embryogenesis, Artificial seed; Protoplast technology: Isolation and culture of protoplast, Somatic hybridization, Screening and selection of somatic hybrid.

Secondary metabolites of plant origin and its type; Production of secondary metabolites through tissue culture, Factors affecting the production and its optimization, Bioreactor based production of secondary metabolites and its kinetic studies, isolation and purification of secondary metabolites, Biotransformation with case studies.

**Module-II: Animal Biotechnology**

Equipments and materials for animal cell, culture technology, Brief discussion on the chemical, physical and metabolic functions of different constituents of culture medium, Development of primary culture. Development of cell line by enzymatic disaggregation, Culture media and growth conditions. Cell growth characteristics and kinetics, Measurement of viability and cytotoxicity; Biology and characterization of the cultured cells, measuring parameters of growth

**Module-III: Techniques and applications**

Direct transformation (Gene gun, Electroporation, Microinjection, etc.) Concept of genetic transformation: Vector based (Agrobacterium, Virus) and

Application of genetic transformation: promoter tagging, activation tagging, herbicide resistance, insect resistance, disease resistance, molecular farming, terminator seed technology; Products of genetic transformation: Case studies for golden rice, Bt cotton and Flavr Savr tomato.

Cell transformation, Application of animal cell culture, stem cell cultures, embryonic stem cells and their applications. Hybridoma technology, Organ culture technology, Transfection of animal cells, Future tissue engineering, animal cloning

**Text Books:**

H S Chawla, Plant Biotechnology, Oxford University Press.

K G Ramawat, Plant Biotechnology, S. Chand & Co.

A Kumar and SK Sopory, Recent advances in Plant Biotechnology, I.K. International.

A Slater et al., Plant Biotechnology, Oxford Univ. Press

**Text Books:**

1. R. Ian Freshney, Culture of Animal Cells, 3<sup>rd</sup> Edition, Wiley-Liss publication
2. Martin Clynes, (Eds) Animal Cell culture Techniques Springer Publication
3. Balasubramanian, Bryce, Dharmalingam, Green and Jayaraman (Eds.), Concepts in Biotechnology, University Press, 1996.
4. Hood L.E., Weissman I., Wood W.B. & Wilson J.H. Immunology, Benjamin Cummings, 1989.
5. Biotol Series – Butterworth and Heineman, Oxford, 1992
6. A Text Book of Biotechnology R C Dubey, S Chand publication
7. Animal cell culture by R.I. Freshney
8. Animal Biotechnology by P.Ramadas
9. In vitro cultivation of Animal cells by Dr.C.K.Leach, Butterworth and Heinmamm Ltd.1994.
10. Hand book of Animal Husbandry by Gopalakrishnan .