

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA
Syllabi for Ph.D Credit Courses
Bio-Technology

Subject Code: 1462 PLANT AND ANIMAL BIOTECHNOLOGY

UNIT - I

INTRODUCTION

Introduction of plant tissue culture and cell suspension culture, physico-chemical conditions for propagation of plant cells and tissues, composition of media, nutrient and hormone requirement, continuous culture, techniques for immobilization of plant cells, continuous product recovery system using immobilized plant cell system.

UNIT - II

DEVELOPMENT OF TRANSGENIC PLANTS

Transfer of nucleic acid to plant cells Direct transformation by electroporation and particle gun bombardment. Agrobacterium, Ti plasmid vector conferring resistance to herbicide, pesticide, plant pathogens Theory and techniques for the development of new genetic traits,. Plant engineering towards development of enriched food products, plant growth regulators, Molecular pharming. biosynthesis of secondary metabolites (e.g. serpentine, shinkonin,) in plants.

UNIT -III

APPLICATION OF TRANSGENIC PLANTS

Metabolic products produced by in vitro culturing of plant cells, selection of plant cells/tissues for the production of a specific product, Culture system in secondary plant product biosynthesis-batch continuous cultures and immobilized plant cells, iotransformation of precursors by cell culturing.

UNIT- IV

ANIMAL BIOTECHNOLOGY

Scope of Animal Biotechnology, Transgenic animals, Vectors used in development of transgenic animals, transfection mechanisms, Expression of heterologous genes, Gene therapy-prospects and problems; Knockout mice and mice model for human genetic disorder, Baculo virus in biocontrol, Somatic manipulation of DNA, Animal Biotechnology for production of regulatory proteins, blood products, vaccines, hormones and other therapeutic proteins.

UNIT-V

ANIMAL CELL CULTURE TECHNOLOGY

Culturing of cells, primary and secondary cell lines, Cell culture-Scaling up of animal cell culture-monolayer culture, suspension culture, Various bio-reactors used for animal cell culture-Roller bottle culture; Bioreactor process control, stirred animal cell culture, Air-lift fermentor, Chemostat/ Turbidostat, High technology vaccines, Hybridoma technology, Cell lines and their applications.

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TEXTBOOKS:

1. C. Chawla, Plant Biotechnology, 1st edition, Oxford and IBH, 2004.
2. Glick, B.R. and Pasternack, J.J. Molecular Biotechnology, 3rd ed., ASM Press, 2003.
3. Sandy B. Primrose , Richard M. Twyman , Robert W. Old, Principles of Gene Manipulation, 6th edition, Wiley-Blackwell, 2002.
4. Freshney R.I. Animal Cell Culture- a practical approach, 6th edition, Wiley-Blackwell 1987.
5. Watson, J.D., Gilman, M, Witowski J. and Zoller, M, Recombinant DNA, 2nd ed, Scientific American Books, 1983.
6. Ed. John R.W Masters, Animal Cell Culture - Practical Approach, 3rd Edition, Oxford University Press, 2000.
7. Ed. Martin, Clynes Animal Cell Culture Techniques, 1st edition, Springer, 1998.
8. Thorpe, T.A, Plant Tissue Culture methods and application in agriculture, 1st edition, Academic Press, 1981.

REFERENCES:

1. Lewin, B. Genes VIII ,1st edition, Pearson Prentice Hall, 2004.
Davis J.M. Basic Cell Culture: A Practical Approach, 2nd edition, IRL Press, 1998.