

ST.JOSEPH'S COLLEGE FOR WOMEN(A)
ZOOLOGY - PAPER - V
ANIMAL BIOTECHNOLOGY

OBJECTIVES:

1. To understand the importance of biotechnology in the utilization of microorganisms, cellular components and transgenic animals for beneficial use.
2. To study the techniques of recombinant DNA technology.
3. Application of biotechnology in industries, agriculture, & medicine.
4. To inculcate interest in research.

Max. Marks:100

COURSE

Unit 1: Tools of Recombinant DNA technology - Enzymes and Vectors

Restriction modification systems: Types I, II and III. Mode of action, nomenclature, applications of Type II restriction enzymes in genetic engineering.

DNA modifying enzymes and their applications: DNA polymerases. Terminal de - oxynucleotidyl transferase, kinases and phosphatases, and DNA ligases

Cloning Vectors: Plasmid vectors: pBR and pUC series, Bacteriophage lambda and M13 based vectors, Cosmids, BACs, YACs,

Unit 2: Techniques of Recombinant DNA technology

Cloning: Use of linkers and adaptors

Gene delivery: Microinjection, electroporation, biolistic method (gene gun), liposome and viral-mediated delivery

PCR: Basics of PCR.

DNA Sequencing: Sanger's method of DNA sequencing- traditional and automated sequencing

Hybridization techniques: Southern, Northern and Western blotting,

Genomic and cDNA libraries: Preparation and uses

UNIT 3 :Animal Cell Technology

Cell culture media: Natural and Synthetic

Cell cultures: primary culture, secondary culture, continuous cell lines; Protocols for Primary Cell Culture; Established Cell lines (common example HeLa); Organ culture; Cryopreservation of cultures.

Hybridoma Technology: Cell fusion, Production of Monoclonal antibodies (mAb), Applications of mAb

Stem cells: Types of stem cells, applications

Unit 4: Reproductive Technologies & Transgenic Animals

Manipulation of reproduction in animals: Artificial Insemination, *In vitro* fertilization, microfertilization, super ovulation, GIFT (gamete intrafallopian transfer), Embryo transfer, Embryo cloning

Transgenic Animals: Strategies of Gene transfer; Transgenic - sheep, - fish; applications.

Unit 5 :Applied Biotechnology

Industry: Fermentation: Different types of Fermentation: Short notes on - Submerged & Solid state; batch, Fed batch & Continuous; Stirred tank, Air Lift, Fixed Bed and Fluidized; Downstream processing - Filtration, centrifugation, extraction, chromatography, spray drying and lyophilization

Agriculture: fisheries – monoculture in fishes, polyploidy in fishes; DNA fingerprinting

TEXT BOOKS

1. Genetic Engineering by Mohan P.Arora. Himalaya Publishers.
2. Genetics by Sinott, Dunn, Dobzanhansky . T.M.H Edition
3. Genomics and Biotechnology by P.K.Gupta .
4. A Text book of Biotechnology by U.Satyanarayana.
5. Biotechnology by B.D.Singh.
6. Text book of Biotechnology by R.C.Dubey.
7. Genetics and Evolution by P.L.Kochhar.
8. CellBiology,Genetics&Molecular Biology by N.Arumugam.