



MANGALORE UNIVERSITY
DEPARTMENT OF MICROBIOLOGY
MSc Microbiology

MBS- 506: Microbial Biotechnology

56h

OBJECTIVES

1. To train towards practical approaches of recombinant DNA principles.
2. To isolate novel microorganisms with biotechnological potential
3. To control various microbial infections and other diseases by tapping biotechnological potentials of beneficial microbes
4. Novel research into Biofertilizers and Bio-pesticides production

COURSE OUTCOME

- CO1: Understanding of DNA recombinant tools and principles
CO2: Role of Microbial restriction enzymes, antibiotic resistance genes in recombinant DNA Technology
CO3: Promoter selection for useful product productions
CO4: Biotechnological screening of microorganisms for useful products for industrial, Agricultural and pharmaceutical applications
CO5: Regulations of biotechnological innovations, environmental concerns and patentability

Unit I

Recombinant DNA Technology, Prokaryotic Gene Expression, Promoter Selection, Construction of Vectors, Fusion Protein, Over Expression of Recombinant Proteins in *E.coli* driven by lac, T7 and Tet regulatable Promoters, Expression in *B. subtilis*, Gene Expression in other Microorganisms, cDNA, *Saccharomyces cerevisiae* expression systems, Secretion of Heterologous Proteins, Baculovirus over expression system.

Unit II

Screening of Microorganisms for Novel Products – protein pharmaceuticals, human interferons, optimizing gene expression, Vaccines, small biological molecules. Synthesis of L- Ascorbic acid, Amino Acids, Secondary Metabolites– Antibiotics Penicillin, Bacteriocins, Chloramphenicols, Streptomycin. Biopolymers – Polyhydroxy alkanates, Polyhydroxy butyrates. Monoclonal Antibodies, Aromatic compounds, Single Cell Proteins, Functional Foods, Probiotics.

Unit III

Principles of Bioprocessing, Optimization of Fermentation Process, Microorganisms in Production of Biofuels / Biogas from Solid and Liquid Wastes. Patenting of Biotechnological Inventions, Copy rights, IPR, National and International Patent Laws, Patentability Requirements, Rights, Infringement, applying, obtaining, patentprotection.

Unit IV

Regulations in Biotechnological Research, NIH-RAC. Genetically Engineered food. Food ingredients, Deliberate release of GEOs, EPA, Public concerns, Good Manufacturing Practices(GMP) and Good Laboratory Practices (GLP). Quality control, quality assurance, ISO, WHO Certifications.

Note: Each unit is for 14h

