

PAPER – IX: BIOPROCESS TECHNOLOGY

UNIT I:

Isolation and screening of industrially important microbes. Improvement of the strains for increased yield and other desirable characteristics. Advantage of bioprocess over chemical process.

UNIT II:

Basic principles in bioprocess. Media formulation. Sterilization. Thermal death kinetics. Batch and continuous sterilization systems. Sterilization of air Fibrous filters.

UNIT III:

Bioreactor design, parts and their functions. Types of reactors Sub-merged reactors – CSTR, Tower, Jet loop, Airlift, Bubble column, packed bed. Aerators and Agitators Immobilized cells. Fluidized bed reactors packed bed reactors – Hallow fibre reactors – Enzyme coimmobilization. Some examples of bioprocess for the production of biomass. Primary and Secondary metabolites, extracellular enzymes, biotechnological important intracellular products, exopolymers.

UNIT IV:

Transport phenomena in bioprocess – Mass transfer. M. transfer coefficient for gases and liquids. Dimentic less groups. Mass transfer resistance. Rate of oxygen transfer. Determination of oxygen transfer coefficients. Rheological properties of intermedium. Biological heat transfer. Heat transfer coefficients.

UNIT V:

Bioprocess control and monitoring variables such as Temperature, agitation, pressure, pH. On line measurement. On/Off control PID control. Computers in bioprocess control systems. Downstream processing of biologicals.

REFERENCE BOOKS:

1. Comprehensive Biotechnology – Volume 2, 3 and 4 by M Mootyoung (Editor) (1985) Pergamon Press.
2. Fundamentals of Biotechnology by P.Prave, V.Faust W. Sitting and D.A. Sukatseh (Editors) (1987) WCH Weinhein.
3. Principles of Fermentation Technology by P.F. Stanbury and A. Whitaker (1984) Pergamon Press.
4. Chemical Engineering by J.M. Coulson and J.F. Richardson (1984) Pergamon Press.