

MANGALORE UNIVERSITY
DEPARTMENT OF MICROBIOLOGY
MSc Microbiology

MBS- 554: Fermentation Technology

40h

OBJECTIVES:

1. Basics of fermentation process and their applications.
2. Optimization of Microbial fermentation process.
3. Understanding of production process.
4. Fermentation Media formulations.
5. Different types of Fermentation techniques.

COURSE OUTCOME

- CO1: To make students understand the fermentation process and its importance.
- CO2: Students are trained to establish own production units.
- CO3: To understand techniques of production process and purification of compounds.
- CO4: Students are trained to understand the strain improvement methods.
- CO5: Isolation and preservation of Industrial important microbes.

UNIT-I

10h

Fermentation: Batch and Continuous process, Design of a basic fermenter: body construction, aerators, agitators, baffles, foam separators, valves & steam traps. Types of Reactors: Tower fermenter, CSTR, Photobioreactor, airlift fermenter. Control: Online and Offline control. pH probe, temperature probe, DO probe, Tacchometer, Load cells.

UNIT- II

10h

Rheological Properties of Feed Stock, Intermediate, Biological, Newtonian and Non-newtonian fluids, Plastic fluids, Thixotropic and Rheoplexic nature of fluids, Characteristics of Foam and Antifoam, Heat transfer co-efficient, Mass transfer co-efficient, oxygen transfer co-efficient, determination of KLa, factors affecting KLa,

UNIT-III

10h

Fermentation Process: Kinetics of growth in batch culture, continuous culture with respect to substrate utilization, Monod kinetics, Specific growth rate, steady state condition, fed-batch fermentation, Yield of biomass & productivity, media formulation for industrial process. Response Surface Methodology in feed stock design and optimization of fermentation parameter, Scale- up of fermentation.

UNIT- IV

10h

Fermentation economics: Expenses for industrial organisms, strain improvement, media sterilization, heating, cooling, aeration, agitation. Cost of plant and equipments, batch process cyclic time, continuous culture. Control of Bioreactor, Types of control- Feed forward control, Cascade control, Adaptive control, Complex control systems, PID control systems. Computer applications on the control of Bioreactor, Recovery and effluent treatments, Cost recovery due to waste usages and recycling.

Note: Each unit is for 10h

