

BIOCHEMICAL ENGINEERING LABORATORY (ChBC-83P)

B.Tech. 8th Semester

Course Objective

The purpose is to impart fundamental knowledge with respect to the equipments and techniques essential for carrying out fermentation for generation and analysis of the data and finally development of the bioprocess.

Course Outcomes (COs)

CO1	Acquire basic knowledge of various equipments used in biochemical engineering lab.
CO2	Fundamental understanding of techniques with respect to sterilization, preparation of solid and liquid media, culture growth and preservation.
CO3	Basic understanding of estimation techniques for biomass, substrate and product.
CO4	Generation and analysis of data for design and development of bioprocess.

Details of the Syllabus

Unit-I	Study of various equipments used in biochemical engineering lab.
Unit-II	Study of sterilization. Preparation of culture media, agar slants and agar plates, growth and preservation of microbial cultures.
Unit-III	Study of aeration and agitation, determination of volumetric mass transfer coefficient ($k_1 a$) of oxygen. Methods for estimation of biomass, substrate and product concentrations.
Unit-IV	Kinetic study of fermentation.

List of Experiments

S.No.	Experiments
1.	Study the bioreactor, shaking incubator, spectrophotometer, HPLC, laminar flow chamber, autoclave, centrifuge. w.r.t. their construction, application, operation and working principle.
2.	To prepare basic solid media as agar slants and agar plates.

3.	Study of sterilization by application of a steam autoclave.
4.	Quantitative estimation of glucose concentration by DNS colorimetric method or by phenol-sulfuric acid method.
5.	Estimation of cell concentration.
6.	Determination of volumetric mass-transfer co-efficient of O ₂ by static method.
7.	Determination of volumetric mass-transfer co-efficient of O ₂ by dynamic method.
8.	To study the kinetics of alcohol (ethyl alcohol) fermentation by using baker's yeast (<i>Saccharomyces cerevisiae</i>) in a batch bioreactor.

List of Equipments

1. Bioreactor
2. Shaking Incubator
3. Spectrophotometer
4. Laminar Flow Chamber (Bio-safety Cabinet)
5. Autoclave
6. Centrifuge
7. Electronic Balance
8. Oven