

BCO 107-P INDUSTRIAL BIOCHEMISTRY

Practical Course Credit: 1 [P]

Contact Hours: 30

1. Fermentor:

a. Designing of fermentor – stirred tank reactor

b. Aeration efficiency using dissolved oxygen analysis

2. Fermentation processes – production and estimation of ethanol

3. Production of biochemically important products

a. Casein from milk

b. Sugar from sugarcane

c. Lecithin from egg yolk

Reference Books (Composite list for theory and practicals)

1. Patel, A.H., Industrial Microbiology –McMillan India Ltd, 1st Edition
2. Frazier & Westhoff., Food Microbiology –Tata McGraw Hill Publishers, New Delhi
3. Jay, J. M., Food Microbiology
4. Apsinon, J., Total synthesis of natural products, Vol I
5. Hilditch, J.P. Industry chemistry of Fats and Waxes
6. Guenther, E., Essential Oils, Vol I
7. Furnas, C.C. (ed.) Roger's Industrial Chemistry Vol I & II
8. Agarwal & Sharma. Chemistry of Natural Products
9. Shreeve, N. & Brink, J. Chemical Process Industries

BCO 107-T INDUSTRIAL BIOCHEMISTRY

Theory Course Credit: 3 [T]

Contact Hours: 45

1. Industrial bioreactor designs (15)

1.1 Fermenters: design of fermenters, types of fermenters.

1.2 Fermentation process, maintenance of aseptic conditions, aeration and agitation

1.3 Fermentation: batch, fed-batch and continuous. Scale up and scale down. Solid state fermentation.

1.4 Control of various parameters – online and offline monitoring, rheological properties of fermenter, computerization of fermenter operation.

1.5 Downstream processing, recovery and purification of fermentation products.

1.6 Effluent treatment

2. Food technology (15)

2.1 Characteristics of industrial microorganisms; strain improvement; use of auxotrophic mutants; Cultivation of microorganisms.

2.2 Processed foods – cheese, cold meats

2.3 Fermentations – wine, beer, vinegar.

2.4 Oriental fermented foods: Soy sauce, tofu, tempeh

2.5 Indian fermented foods: Idli, dosa, dakhla.

2.6 Probiotics – yoghurt/ curd

3. Industrial production of biochemically important products (15)

3.1 Production of protein/ carbohydrate/ lipids

a. Proteins from milk and SCP; Industrially important enzymes

b. Production of dextrins, glucose.

c. Preparation of fatty acids, lecithins; Production of essential oils and their fractionation

3.2 Production of pharmaceuticals/neutraceuticals/ biochemicals

a. Antibiotics: penicillins

b. Vitamins: B1, B6, B12; A, D, E concentrates.

c. Amino acids: lysine.

d. Alcohol: ethanol

e. Organic acid: citric acid