

BIM -C401
DSC-4 INDUSTRIAL MICROBIOLOGY

MM : 100

Time : 3 hrs

L Credit

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Sessional : 30

ESE : 70

Pass Marks : 40

Total Hours: 60

Learning objectives:

- To understand the scope and applications of industrial microbiology.
- To understand fermentation technologies used for the production of industrially important products.
- To understand how different fermentation products are produced, purified and recovered.

Learning outcomes:

At the end of course student will be able to

- Screen and isolate industrially important microorganisms.
- Make use of fermenters to produce alcoholic beverages and other fermentation products.
- Explain the different methods of disinfection used in industry and also how to maintain quality of product.

UNIT - I

Metabolite: Primary and secondary, principal of exploitation of microorganisms and their products, screening of microorganisms, primary and secondary screening, strain development strategies, downstream processing: filtration, centrifugation, coagulation and flocculation

(14 Lectures)**UNIT – II**

Alcoholic products: production and recovery of industrial alcohol, beer, wine, whiskey, rum, and brandy; commercial production of vinegar; Yeast and Baker's yeast

(10 Lectures)**UNIT – III**

Antibiotics: Fermentation and recovery process of penicillin, streptomycin and tetracycline.

(10 Lectures)**UNIT - IV**

Enzymes and Amino acids: Microbial production and applications of amylases, lipase and protease; Amino acids: production of L-glutamic acid and L-lysine.

(14 Lectures)**UNIT - V**

Vitamin B-12; Vitamin B2 (riboflavin), Vitamin C; Organic acids: Lactic acid and citric acid (fermentation and recovery).

(08 Lectures)**Suggested Reading**

1. Dubey, R.C. *Advanced Biotechnology*. S. Chand & Co. P Ltd, New Delhi, p. 1161; ISBN: 81:219-4290-X.
2. Casida, L.E.J.R. *Industrial Microbiology*, New Age International Publisher,
3. A.H.Patel, *Industrial Microbiology*, Laxmi Publication, ISBN-10: 9385750267
4. Prescott and Dunns. *Industrial Microbiology*, CBS Publishers and Distributors, ISBN-10: 8123910010

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1. Isolation of antibiotic producing microorganisms from soil.
2. Laboratory production of alcohol from Grape Juice/Sugarcane Juice.
3. Demonstration of vinegar production in the laboratory.
4. Bioassay of vitamin B₁₂.
5. Fat hydrolysis (lipase activity) by a given bacterial culture.
6. Demonstration of fermentation by yeast.
7. Isolation of *Azotobacter* from garden soil.
8. Isolation of VAM (Vesicular Arbuscular Mycorrhiza) spores from soil.
9. Isolation of phosphate solubilising microorganisms from soil.
10. Antibiotic sensitivity of UTI causing bacteria.
11. Slide agglutination reaction of unknown bacterial culture.
12. Demonstration of antigen-antibody reaction.

Suggested Reading

1. Dubey, R.C. and Maheshwari, D.K. *Practical Microbiology*. 2nd ed., S. Chand & Co. P Ltd, New Delhi, p. 413. ISBN: 81:219-2559-2

Handwritten signatures and dates:

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