

PRACTICALS

IBT: 705

Cell Culture Technology & Bioinformatics

1. Animal Cell Culture :

- 1.1 Tissue culture : Media preparation, sterilization methods
- 1.2 Primary Culture :
 - 1.2.1 Pancreatic epithelium
 - 1.2.2 Bone Marrow
- 1.3 Culture of Cell Lines :
 - 1.3.1 Maintenance of cell Lines
 - 1.3.2 Phases of cell cycle
 - 1.3.3 Growth curve of cell
 - 1.3.4 Monolayer and Suspension culture
 - 1.3.5 Cytogenetic analysis of cultured cells

2. Plant Tissue Culture :

- 2.1 Callus Induction
- 2.2 Shoot and root regeneration form callus
- 2.3 Direct multiple shoot formation
- 2.4 Protoplast isolation
- 2.5 Establishment of suspension culture
- 2.6 Isolation of secondary metabolites from suspension culture
- 2.7 Isolation of chloroplast DNA
- 2.8 Isolation of Mitochondrial DNA
- 2.9 Isolation of RNA from plant tissue

3. Bioinformatics :

- 3.1 Introduction to sequencing databases
 - 3.1.1 Protein sequence databases
 - 3.1.2 Nucleic acid databases
 - 3.1.3 Genomic databases
 - 3.1.4 Metabolic databases
- 3.2 Comparison of sequences using BLAST
- 3.3 Construction of dendrograms using software
- 3.4 Methods of prediction of 3D structure of proteins

References:

1. Plant Tissue culture, Basic and Applied,
Timir Baran Jha & Bishwajit Ghosh, University Press - 2006.
2. Basic cell culture Protocols, Third Edition. Edited by : Cheryl D. Helga son, Cheryl L.
Miller.
3. A Laboratory Manual of plant Biotechnology, S. S. Purohit, Agrobios (India) - 2006.
4. Principles and Practice of Animal Tissue culture, Sudha Ganguly, University Press -
2007.
5. Practical Biotechnology (Methods & Protocols), S. Janarthanan, S. Vincent, University
Press - 2007

PRACTICALS

IBT: 706

Enzyme and Bioprocess Technology

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1. To investigate some of the kinetic properties of invertase
2. To study time course of the reaction catalysed by alkaline phosphatase (E.C. 3.1.3.1).
3. To determine Temperature optima for alkaline phosphatase
4. To investigate the thermal stability of horseradish peroxidase
5. To study yeast isocitrate dehydrogenase: an allosteric enzyme.
6. Enzymatic determination of 3-phosphoglyceric acid in sample.
7. Determination of thermal death point (TDP) and thermal death time (TDT) of microorganism for design of a sterilizer.
8. Estimation of oxygen transfer coefficient (KLa) by sulphite oxidation method.
9. Immobilization of bacteria and enzyme by calcium alginate method
10. Production and estimation of alkaline Protease.
11. Production and estimation of lipases
12. Batch cultivation of bacteria in fermentor; Different phases of bacterial growth.
(Estimation of μ_M , K_s and $Y_{X/S}$)

References:

1. Biochemical Engineering Aiba, S., Humphrey, A. E. and Millis, N.F. Univ. of Tokyo Press, Tokyo.
2. Biochemical Reactors, Atkinson, B., Pion Ltd. London.
3. Biochemical Engineering fundamentals, Baily, J.E. and Oils, D.F., McGraw Hill Book Co., New York.
4. Bioprocess Technology: Fundamentals and Applications, KTH, Stockholm.
5. Process Engineering in Biotechnology, Jackson, A. T., Prentice Hall, Engelwood cliffs.
6. Bioprocess Engineering: Basic Concepts, Shuler, M.L. and Kargi, F., Prentice Hall, Engelwood Cliffs.

7. Principles of Fermentation Technology, Stanbury, P.F. and Whitaker, A., Pergamon Press, Oxford.
8. Bioreaction Engineering Principles, Nielson, J. and Vissadsen, J., Plenum Press.
9. Chemical Engineering Problems in Biotechnology, Shuler, M.L. (Ed.), AICHE.
10. Biochemical Engineering, Lee, J. M. Prentice Hall Inc.
11. Bioprocess Engineering-Kinetics, mass Transport, Reactors and Gene Expression, Vieth, W.F., John V.& sons, Inc

