FOOD BIOTECHNOLOGY

THEORY

Paper No. : 8.4
Maximum Marks : 100
Credits :
Teaching Period : 4 theory + 1 student's presentation

Objectives:

- **Introduction of basic concepts and principles of food biotechnology.**
- **Understanding applications of biotechnology in food production.**

UNIT I Introduction to Food Biotechnology

Historical development of biotechnology, Biotechnology application to food stuffs, food-omics

UNIT II Biotechnology in Food Fermentation

Basic principles of food fermentation technology, Types of fermentation: sub-merged/solid state, Batch /continuous fermentation, Fermenter design, operation, measurement and control in fermentation, Principles of down stream processing and Product recovery.

UNIT III Molecular methods and Production of new products

Basic principles of gene cloning, application of molecular cloning in foods with example of Golden Rice. Developmental technique for new plant varieties and animal species, Transgenic and GM foods. Immobilized enzymes. Production of bio-colours and bio-flavors

UNIT IV Application of Biotechnology to Food processing

Transducers and Biosensors in food- Principle, types and application in food processing

UNIT VI Modification and Bioconversion of food

Bioconversion of whey, molasses and starch and other food waste for value addition raw materials

UNIT VII Regulatory and Social aspects of Food Biotechnology

Modern Biotechnological regulatory aspects in food industries, biotechnology and ethics, IPR, Safety concerns

Practical in Food Biotechnology

Paper No.	**:**	
Maximum Marks	**:**	**50**
Credits	**:**	
Teaching Period	**:**	**4/week**

Contents

1. Biofermenter -Design and functioning
2. Isolation of DNA
3. Commercial Uses of Enzymes
4. Production of wine by yeast
5. Production of yoghurt: downstream process control and product optimization
6. Solid state fermentation: Sauerkraut/Tempeh/Kimchi
7. Development of a fermented food/drink utilizing plant /animal/byproduct as substrate.
8. Visit to a Lab to see a PCR machine.

Suggested Readings

1. Kalidas Shetty, Gopinadhan Paliyath, Anthony Pometto, Robert H. Levin. 2014. Food Biotechnology, 2nd Edition, CRC Press, Taylor and Francis Group.
2. Geoffrey Campbell-Platt 2011. Food Science and Technology. Blackwell Publishing
3. Joshi V.K. and Pandey A.(1999). Biotechnology- Food Fermentation, Vol 1 and 2, Educational publishers and distributors.
4. Garbutt J (1997), Essentials of Food Microbiology, second edition, Hodder Arnold Publication
5. Wood B.J. (1997), Microbiology of Fermented Foods. Volume I and II, Elsivier Applied
    a. Science Publication.
6. Stanbury, P.F., Whitekar A. and Hall. 1995., Principles of Fermentation Technology
    a. Butterworth- Heinenmann, Elsevier Science.
7. Lee B.H.(1996), Fundamentals of Food Biotechnology, VCH publishers.
8. Tombs M.P. (1991), Biotechnology in Food Industry, Open University Press,
9. Schwartzberg S and Rao M.A. (1990), Biotechnology and Food Process Engineering, Marcel Dekker, INC, New York