

FOOD MICROBIOLOGY

THEORY

Paper No.	:	5.3
Maximum Marks	:	100
Credits	:	4
Teaching Period	:	4 Theory + 1 Students' Presentation/ Week
Teaching Load	:	48 Theory Periods + 12 Presentation/ Semester

Objectives

- To know the important genera of microorganisms associated with food and their characteristics.
- To understand the role of microbes in fermentation, spoilage and food borne diseases.

CONTENTS

UNIT 1. INTRODUCTION TO FOOD MICROBIOLOGY (2 Lectures)

History and Development of Food Microbiology, Definition and Scope of food microbiology, Inter-relationship of microbiology with other sciences.

(Chapter 1, Garbutt)

UNIT 2. CHARACTERISTICS OF MICROORGANISMS IN FOOD (6 Lectures)

Types of microorganisms, Classification and Nomenclature, Morphology and Structure and their importance in food (bacteria, fungi, viruses and prions, protozoans and others), Significance of spores.

(Chapter 3,5,17,18,19,20, Pelczar et.al)

UNIT 3. MICROBIAL GROWTH IN FOOD (6 Lectures)

Microbial Growth Characteristics- Bacterial growth curve, microbial reproduction and microbial growth in food, Factors affecting the growth of microorganisms in food.

(Chapter 4, Banwart)

UNIT 4. MICROBIAL FOOD SPOILAGE (7 Lectures)

Sources of Microorganisms in foods, Some important food spoilage bacteria, Changes caused by micro-organisms during spoilage (breakdown of proteins, carbohydrates, fats and other constituents)

Spoilage of specific food groups- milk and dairy products, meat, poultry and seafoods, cereal and cereal products, fruits and vegetables and canned products.
(Chapter 4 to 9 Jay ; Chapter 12,13,14,17,18, Frazier and Westhoff)

UNIT 5 FOODBORNE DISEASES

(5 Lectures)

Types – food borne infections, food borne intoxications and toxin infections, Origin, symptoms and prevention of some commonly occurring food borne diseases, Emerging pathogens of concern
(Chapter 23,24,25 - Frazier and Westhoff)

UNIT 6. FOOD PRESERVATION

(7 Lectures)

Principles and methods of preservation, Physical Methods of Food Preservation- Dehydration, Freezing, Irradiation, Thermal Methods and Non Thermal methods, Thermobacteriology, Biopreservatives esp. Bacteriocins
(Chapter 10,11,12- Banwart; Chapter 4 Adams and Moss)

UNIT 7 CULTIVATION OF MICRO-ORGANISMS

(6 Lectures)

Pure culture technique, Methods of isolation and cultivation, Enumeration of Microorganisms- qualitative and quantitative methods
(Chapter 8 Pelczar et. al ; Chapter 2 Banwart)

UNIT 8 FOOD FERMENTATIONS

(4 Lectures)

Definition, Type of Starter microorganisms, Common Food Fermentations
(Chapter 9-Banwart ; Chapter 9-Adams and Moss)

UNIT 9. TRENDS IN FOOD MICROBIOLOGY

(5 Lectures)

Introduction to Hurdle concept and Predictive Microbiology, Minimal Processing, Genetically Modified Foods, Probiotics, Rapid Methods of Detection of food borne pathogens.
(Chapter 1 -Tortorello and Gendel)

Recommended Readings

1. Frazier William C and Westhoff, Dennis C.2004. Food Microbiology, TMH, New Delhi
2. Jay, James M.2000. Modern Food Microbiology, CBS Publication, New Delhi

3. Garbutt, John.1997. Essentials of Food Microbiology, Arnold, London
4. Pelczar MJ, Chan E.C.S and Krieg, Noel R.2007. Microbiology, 5th Ed., TMH, New Delhi.
5. Banwart G.J. 1979 . Basic Food Microbiology ,AVI Publishing.
6. Adams M.R. and Moss M.O. 2000. Food Microbiology IInd Edition ,The Royal Society.
7. Tortorello M.L. and Gendel S.M. 1999. Food Microbiology and Analytical Methods,CRC Press.

(DC I) PRACTICALS IN FOOD MICROBIOLOGY

Maximum Marks	:	50
Credits	:	4
Teaching Period	:	4 / Week
Teaching Load	:	48/Semester

CONTENTS

1. Introduction to the Basic Microbiology Laboratory Practices and Equipment
2. Components and use of a compound microscope
3. Cleaning and sterilization of glassware
4. Preparation and sterilization of nutrient broth
5. Cultivation and sub-culturing of microbes using slant, stab and agar plates
7. Morphological study of bacteria and fungi using permanent slides
8. Simple staining
9. Gram's staining
10. Negative staining
11. Endospore staining
12. Standard Plate Count Method

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- 1) Frazier William C and Westhoff, Dennis C.2004. Food Microbiology, TMH, New Delhi
- 2) Jay, James M.2000. Modern Food Microbiology, CBS Publication, New Delhi
- 3) Garbutt, John.1997. Essentials of Food Microbiology, Arnold, London
- 4) Pelczar MJ, Chan E.C.S and Krieg, Noel R.2007. Microbiology, 5th Ed., TMH, New Delhi.