

ADVANCED FOOD CHEMISTRY

THEORY

Paper No.	:	5.2
Maximum Marks	:	100
Credits	:	4
Teaching Period	:	4 Theory + 1 Students Presentation/ Week
Teaching Load	:	48 Theory Periods + 12 Students Presentation/ Semester

Objectives

- To understand the chemistry of food components and their interactions.
- To know about the role of enzymes and various processing treatments in food industry.

CONTENTS

UNIT 1 WATER ACTIVITY IN FOOD (4 Lectures) **(Chapter 2, Fennema)**

Sorption phenomenon, Water activity and packaging, Water activity and spoilage.

UNIT 2 CHANGES IN FATS DURING PROCESSING AND SPOILAGE (8 Lectures) **(Chapter 2, DeMan and Chapter 4 Fennema)**

Effect of frying on fats, Changes in fats and oils- rancidity, lipolysis, flavor reversion, Auto-oxidation and its prevention, Technology of edible fats and oils- Refining, Hydrogenation and Interesterification.

UNIT 3 FUNCTIONAL PROPERTIES OF PROTEINS (8 Lectures) **(Chapter 5, Fennema)**

Functional properties of proteins eg. organoleptic, solubility, viscosity, binding, gelation / texturization, emulsification, foaming.

UNIT 4 BROWNING REACTIONS IN FOOD (8 Lectures) **(Chapter 3, Fennema)**

Enzymatic browning
Non – Enzymatic browning
1. Maillard reaction
2. Caramelization reaction
3. Ascorbic acid oxidation

UNIT 5 ENZYMES (10 Lectures)
(Chapter 6, Fennema, Chapter 10 DeMan, Chapter 1 Whitehurst and Law)

Introduction, classification, General characteristics, Enzymes in food processing, Industrial Uses of Enzyme, Immobilized enzymes

UNIT 6 PHYSICO-CHEMICAL AND NUTRITIONAL CHANGES OCCURRING DURING FOOD PROCESSING TREATMENTS
(Chap. 1 Desrosier and Desrosier)

(10 Lectures)

Drying and dehydration, Irradiation, Freezing, Canning

Recommended Readings:

1. DeMan, John M., Principles of Food Chemistry, 3rd Ed., Springer 1999
2. Desrosier, Norman W. and Desrosier, James N., The technology of food preservation, 4th Ed., Westport, Conn. : AVI Pub. Co., 1977.
3. Fennema, Owen R, Food Chemistry, 3rd Ed., Marcell Dekker, New York, 1996

PRACTICALS IN ADVANCED FOOD CHEMISTRY

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

CONTENTS

1. Determination of water activity in foods
2. Determination of thermal inactivation time of enzymes in fruits and vegetables
3. Estimation of iodine value
4. Estimation of peroxide value
5. Determination of percent free fatty acids and acid value
6. Determination of Nitrogen solubility index
7. Determination of smoke point and percent fat absorption for different fat and oils
8. Extend of non-enzymatic browning by extraction method

Recommended Readings:

1. DeMan, John M., Principles of Food Chemistry, 3rd Ed., Springer 1999
2. Desrosier, Norman W. and Desrosier, James N., The technology of food preservation, 4th Ed., Westport, Conn. : AVI Pub. Co., 1977.
3. Fennema, Owen R, Food Chemistry, 3rd Ed., Marcell Dekker, New York, 1996
4. Whitehurst and Law, Enzymes in Food Technology, CRC Press, Canada, 2002