

17FT008 FOOD PACKING TECHNOLOGY

Hours Per Week :

L	T	P	C
3	-	3	5

Total Hours :

L	T	P	WA/RA	SSH/HS	CS	SA	S	BS
45	-	45	15	30	-	5	5	-

Course Description and Objectives:

This course deals with types and functions of packaging material along with its various methods and equipment used for packaging. The objective of this course is to impart knowledge to students on applications of food packaging materials and methods effectively in accordance with relevant standard regulations, environment protection and ethical principles.

Course Outcomes:

Upon successful completion of this course student should be able to:

- understand various methods of packaging, factors affecting the shelf life of packaged foods
- know about hazards and toxicity associated with packaging materials
- understand various testing methods used for packaging materials
- Understand the design flow from simulation to synthesizable version
- develop knowledge on laws and regulations involved in safety and labeling of foods

SKILLS:

- ✓ Measure and evaluate properties of packaging materials
- ✓ Define the packaging requirements for a given food product
- ✓ Suggest suitable labeling requirements for a food package

ACTIVITIES:

- Prepare database for packaging materials with their functional properties
- Report on national and international packaging standards

UNIT-1

Introduction to principals of food packaging, Types of packaging. Functions of packaging; Type of packaging materials; Selection of packaging material for different foods. Selective properties of packaging film; Methods of packaging and packaging equipment. Mechanical strength of different packaging materials; Printing of packages. Barcodes & other marking; Interactions between packaging material and foods; Environmental and cost consideration in selecting packaging materials.

UNIT-2

Testing of packaging; Rigid and semi rigid containers; Flexible containers; Sealing equipment; Labelling; Aseptic and shrink packaging; Secondary and transport packaging. Food packaging and law, shelf life testing, modern and traditional packaging material, physical and chemical properties, production, storage and recycling of packaging materials, regulation and equipment analysis of various existing packaging system and standards. Active and intelligent packaging techniques: Active packaging techniques, intelligent packaging techniques, Current use of novel packaging techniques, Consumers and novel packaging. Oxygen, ethylene and other scavengers: Oxygen scavenging technology, Selecting the right type of oxygen scavenger, Ethylene scavenging technology, Carbon dioxide and other scavengers. Antimicrobial food packaging: Antimicrobial agents, Constructing an antimicrobial packaging system, Factors affecting the effectiveness of antimicrobial packaging

UNIT-3

Non-migrating bioactive polymers (NMBP) in Food Packaging: Advantages of NMBP, Inherently Bioactive synthetic polymers: types and application, Polymers with immobilized bioactive compounds, Applications of polymers with immobilized bioactive compounds. Time- temperature indicators (TTIs): Defining and classifying TTIs, Requirements for TTIs, The development of TTIs, Maximising the effectiveness of TTIs, Using TTIs to monitor shelf- life during distribution. The use of freshness indicator in packaging: Compounds indicating the quality of packaged food products, Freshness indicators, Pathogen indicators Other methods for spoilage detection. Packaging-flavour interactions: Factors affecting flavour absorption, The role of the food matrix, The role of differing packaging materials, Flavour modification and sensory quality. Moisture regulation: Silica gel, Clay, Molecular sieve, Humectant salts, Irreversible adsorption.

UNIT-4

Developments in modified atmosphere packaging (MAP): Novel MAP gases, Testing novel MAP applications, Applying high oxygen MAP. Recycling packaging materials: The recyclability of packaging plastics, Improving the recyclability of plastics packaging, Testing the safety and quality of recycled material, using recycled plastics in packaging. Green Plastics for food packaging: The problem of plastic packaging waste, The range of biopolymers, Developing novel biodegradable materials.

UNIT-5

Integrating intelligent packaging, storage and distribution: The supply chain for perishable foods, The role of packaging in the supply chain, Creating integrated packaging, storage and distribution: alarm systems and TTIs. Testing consumer responses to new packaging concepts: New packaging techniques and the consumer, Methods for testing consumer responses, Consumer attitudes towards active and intelligent packaging.

FOODQUALITY ASSURANCE LAB**List of Experiments:**

1. Application of GC for pesticide residue analysis.
2. Exercise for identifying CCP in bakery processing.
3. Exercise for identifying CCP in milk processing.
4. Establishment of CCP Decision tree.
5. Visit to HACCP UNIT.
6. Exploring BIS and FPO and study their importance.

7. Exploring Codex standards and specifications and study their importance.
8. Experiments on food quality analysis – physical parameters
9. Experiments on food quality analysis – biochemical parameters
10. Visit to food quality analysis laboratory / BIS / Spice Board / AGMARK.
11. Visit to quality control laboratory of a food processing industry.
12. Chemical analysis of raw water quality
13. Assay of lipid degradation and polymerization products in fried foods and fried oils
14. Analysis of phytosterols, trans-fatty acids and omega fatty acids
15. Estimation of Gluten
16. Determination of alcoholic acidity
17. Determination of falling number/amylase
18. Determination of Pelshenke value
19. Determination of sedimentation value
20. Evaluation of quality of products stored in packaging films and glass bottles.
21. Quality analysis of vacuum packaged products after storage.
22. Estimation of sugar-acid ratio of fruits

Note: Out of the above experiments, a minimum of 12 experiments will be conducted in a semester.

Pilot Plants:

1. Vegetable processing plant
2. Automatic mango processing plant
3. Combined rice mill / paddy processing plant
4. Automatic idli / dosa making plant
5. Fully Automatic Pet Bottle Filling, Capping and Labeling plant
6. Honey Processing Plant
7. Soymilk and tofu processing plant

TEXTBOOKS:

1. A handbook of Food Packaging, FAPaine and HY Paine, Blackie & Sons Ltd., Glasgow, UK.
2. Modern Food Packaging, Published by Indian Institute of Packaging, Mumbai (1998).
3. A Textbook of Food Science and Technology, ICAR, New Delhi (2001).

REFERENCEBOOKS:

1. Food Packaging and Preservation (theory & practice) by M.Mathlouthi Elsevier Applied science publisher, London and New York.
2. Plastics in packaging by forwarded by H.B Ajmera & M.R Subramaniam – Indian institute of packaging. Published by A.P.Vaidya, Secretary IIP, E2, MIDC, Industrial Area.
3. Food and Packaging Interactions by Joseph H. Hotchkiss, (ACS symposium series - 365, April 5-10, 1987, American chemical society, Washington DC, 1988.)
4. Packaging foods with plastics by winter A. Jenkins & James P Harrington – Technomic publishing co. Inc, Lancaster. Basel.
5. Flexible food packaging (Question &Answers) by Arthur Hirsch VNB – Van Nostrand Reinhold, New York (An AVI Book), ISBN 0-442-00609-8.