

22PAFE303 POST-HARVEST ENGINEERING OF HORTICULTURAL CROPS

Hours Per Week :

L	T	P	C
0	0	4	2

PREREQUISITE KNOWLEDGE: Basics of post-harvest practices in food processing industry.

COURSE DESCRIPTION AND OBJECTIVES:

The goal of this course is to acquaint and specialize the students with processing and handling of fruits and vegetables to minimize the post-harvest losses and also to facilitate with design features of the equipments

MODULE-1

UNIT-1

4L+0T+8L=12 Hours

POST HARVEST PRACTICES: Importance of processing of fruits and vegetables, spices, condiments and flowers. Characteristics and properties of horticultural crops important for processing. Post-harvest management and equipment for spices and flowers, Quality control in fruit and vegetable processing industry. Food supply chain. Peeling; Slicing; Blanching; Drying - Importance and objectives.

UNIT-2

4L+0T+8L=12 Hours

PEELERS BLANCHERS DRYERS: Different peeling methods and devices (manual peeling, mechanical peeling, chemical peeling, and thermal peeling), equipment for slicing, shredding, crushing, chopping, juice extraction, etc., Blanching methods, effects on food (nutrition, colour, pigment, texture), Dryers for fruits and vegetables, Osmo-dehydration. Flowcharts for preparation of different finished products, Important parameters and equipment used for different unit operations.

MODULE-2

UNIT-1

4L+0T+8L=12 Hours

FREEZING PACKAGING: Chilling and freezing. Thermophilic, mesophilic & Psychrophilic microorganisms. Effect on food during chilling and freezing. Cold storage. Packaging of horticultural commodities. Packaging requirements (in terms of light transmittance, heat, moisture and gas proof, microorganisms, mechanical strength), Different types of packaging materials commonly used for raw and processed fruits and vegetables products, bulk and retail packages and packaging machines, handling and transportation of fruits and vegetables, Pack house technology.

UNIT-2

4L+0T+8L=12 Hours

PRESERVATION AND MINIMAL PROCESSING: Deterioration in food products and their controls, Preservation Technology, General methods of preservation of fruits and vegetables, Brief description and advantages and disadvantages of different physical/ chemical and other methods of preservation. Application of refrigeration in different perishable food products. Chilling requirements of different fruits and vegetables, freezing of food, freezing time calculations, slow and fast freezing, Equipment for chilling and freezing (mechanical & cryogenic). Common methods of storage, Low temperature storage, evaporative cooled storage, Cold storage heat load calculations and cold storage design, refrigerated vehicle and cold chain system. Minimal processing. Controlled atmospheric storage, Modified atmospheric packaging.



Source: <https://www.futura-technology.com/nuovo/wp-content/uploads/2016/11/sorting-grading-machine-1.jpg>

SKILLS:

- ✓ Compute quality control of fruits and vegetables.
- ✓ Develop value added products by the application of processing concept.
- ✓ Apply various processing concepts in post-harvest.
- ✓ Evaluate cooling load and freezing time required in cold storage plant of fruits and vegetables.

PRACTICES:

- Study of cold storage and its design,
- Study of CAP and MAP storage,
- Minimal processing of vegetables,
- Visit to fruit and vegetable processing industry,
- Visit to spice processing plant.

COURSE OUTCOMES:

Upon successful completion of this course, students will have the ability to:

CO No.	Course Outcomes	Blooms Level	Module No.	Mapping with POs
1	Illustrate effect of post-harvest losses of fruits and vegetables and minimize them by post-harvest practices.	Apply	1	1, 2, 7
2	Analyze composition of different value added products and develop suitable blanchers and dryers required.	Analyze	1	1, 2, 3, 4, 11
3	Examine factors affecting deterioration or spoilage of fruits and vegetables during distribution and storage at packaging.	Evaluate	2	1, 2, 4, 7
4	Propose and design cold storage plant required for small pilot plant.	Evaluate	2	1, 2, 3, 4, 9, 11
5	Design and develop small freezer or chiller.	Create	2	1, 2, 3, 4, 9, 11

TEXT BOOKS:

1. Pandey, R.H. "Postharvest Technology of fruits and vegetables" (Principles and practices). Saroj Prakashan, Allahabad, 1999.
2. Arthey, D. and Ashurst, P. R. "Fruit Processing. Chapman and Hall" New York, 1996.

REFERENCE BOOKS:

1. Pantastico, E.C.B. "Postharvest physiology, handling and utilization of tropical and subtropical fruits and vegetables" AVI Pub. Co., New Delhi, 1997.
2. Sudheer, K P. and Indira, V. Post Harvest Engineering of horticultural crops. New India Publishing House, 2007.