

X. Suggested Reading

- Asiedu JJ. 1990. *Processing Tropical Crops*. ELBS/MacMillan.
- Chakraverty A. 1995. *Post-Harvest Technology of Cereals, Pulses and Oilseeds*. Oxford and IBH.
- Golob 2002. *Crop Post-Harvest: Science and Technology* Vol. 1, Wiley-Blackwell.
- Hodges 2004. *Crop post-harvest: science and technology* Vol. 2, Wiley-Blackwell.
- Morris Lieberman. 1983. *Post-Harvest Physiology and Crop Preservation*. Plenum Press.
- Pandey PH. 1994. *Principles of Agricultural Processing*. Kalyani.
- Pillaiyar P. 1988. *Rice - Post Production Manual*. Wiley Eastern.
- Sahay KM and Singh KK. 1994. *Unit Operations in Agricultural Processing*. Vikas Publ. House.

I. Course Title : Horticultural Crops Process Engineering

II. Course Code : PFE 504

III. Credit Hours : 2+1

IV. Aim of the course

To acquaint and equip the students with processing of fruits and vegetables and the design features of the equipment used for their processing.

V. Theory

Unit I

Importance of postharvest technology of fruits and vegetables, structure, cellular components, composition and nutritive value of fruits and vegetables, fruit ripening, spoilage of fruits and vegetables.

Unit II

Harvesting and washing, pre-cooling, blanching, preservation of fruits and vegetables, commercial canning of fruits and vegetables, minimal processing of fruits and vegetables.

Unit III

Cold storage of fruits and vegetables, controlled atmosphere and modified atmosphere packaging of fruits and vegetables, quality deterioration and storage.

Unit IV

Dehydration of fruits and vegetables, methods, osmotic dehydration, foam mat drying, freeze drying, microwave heating, applications, radiation preservation of fruits and vegetables, irradiation sources.

Unit V

Intermediate moisture foods, ohmic heating principle, high pressure processing of fruits and vegetables, applications, sensory evaluation of fruit and vegetable products, packaging technology for fruits and vegetables, general principles of quality standards and control, FPO, quality attributes.

VI. Practical

Determination of size, shape, density, area-volume-mass relationship of fruits and vegetables, sugar-acid ratio of fruits, evaluation of washer, grader and packaging methods, experiments on drying of fruits and vegetables, controlled atmosphere storage and quality evaluation.

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S.No.	Topic	No. of Practicals
12.	Determination of solid gain and moisture loss during osmotic dehydration in fruits	1
13.	Study of components and design of controlled atmosphere storage	1
14.	Study of quality evaluation of fruits and vegetables	2
	Total	15

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- Bhatti S and Varma U. 1995. *Fruit and Vegetable Processing*. CBS.
- Cruess WV. 2000. *Commercial Fruit and Vegetable Products*. Agrobios Publisher.
- Danthy ME. 1997. *Fruit and Vegetable Processing*. International Book Publisher.
- Simson. 2016. *Post-Harvest Technology of Horticultural crops*. AAP.
- Singh. 2018. *Advances in Post-Harvest Technologies of Vegetable Crops*. AAP.
- Srivastava RP and Kumar S. 1994. *Fruit and Vegetable Preservation*. Principles and Practices. International Book Distr.
- Thompson AK. 1996. *Post Harvest Technology of Fruits and Vegetables*. Blackwell.
- Verma LR and Joshi VK. 2000. *Post Harvest Technology of Fruits and Vegetables*. Vols. I-II. Indus Publisher.

I. Course Title : Storage Engineering and Handling of Agricultural Produce

II. Course Code : PFE 505

III. Credit Hours : 2+1

IV. Aim of the course

To acquaint and equip the students with the safe storage of food materials, design of storage structures and the design of different material handling equipment used in the industries.

V. Theory

Unit I

Storage of grains, biochemical changes during storage, production, distribution and storage capacity estimate models, storage capacity models, ecology, storage factors affecting losses, storage requirements.

Unit II

Bag and bulk storage, godowns, bins and silos, rat proof godowns and rodent control, method of stacking, preventive method, bio-engineering properties of stored products, function, structural and thermal design of structures, aeration system.

Unit III

Grain markets, cold storage, controlled and modified atmosphere storage, effects of nitrogen, oxygen, and carbon dioxide on storage of durable and perishable commodities, irradiation, storage of dehydrated products, food spoilage and preservation, BIS standards.

Unit IV

Physical factors influencing flow characteristics, mechanics of bulk solids, flow through hoppers, openings and ducts; design of belt, chain, screw, roller, pneumatic conveyors and bucket elevators, principles of fluidization, recent advances in handling of food materials.