



# POST HARVEST OPERATIONS AND PROCESSING OF FRUITS, VEGETABLES, SPICES AND PLANTATION CROP PRODUCTS

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**INTENDED AUDIENCE :** Food Processing and Engineering, Food Technology, Agricultural Engineering, Biochemical Engineering, Post Harvest Technology, Chemical Engineering, Horticulture and related disciplines.

**INDUSTRY SUPPORT :** Food industries such as Britannia Industries Ltd, Nestle, Hindustan Unilever Ltd, Patanjali, PepsiCo Frito Lay, General Mills, Glaxo, ITC, Parle, Coca Cola, Keventer Agro, Reliance Fresh, etc.

### COURSE OUTLINE :

According to the Food and Agriculture Organization (FAO), about 1.3 billion tons of food (30-50% of the total production) are globally wasted or lost per year. In India, post-harvest losses of fruits and vegetables are around 15% and the processing and value addition is less than 10% (CIPHET Annual Report 2018-19). The huge gap between production and utilization can be mitigated by post-harvest management and value addition which include the creation of innovative technologies for processing, preservation and storage practices. The byproducts and waste could also be converted into value-added novel/innovative products and ingredients which would be functionally more beneficial that can further enhance global food security and sustainability. An intense demand persists for food products that not only provide health & nutrition benefits and convenience to the consumers but also offer immense economic promise to the food processing industry and the farmers. This course "Post-Harvest Operations and Processing of Fruits, Vegetables, Spices and Plantation Crop Products" deals with the principles & practices and technological innovations in post-harvest handling, processing, packaging & storage of fruits, vegetables, spices, plantation crops, and utilization of these materials into the preparation of healthy & nutritious food products. This course will play a pivotal role in creating a human resource with an enhanced knowledge base for serving the food industry and academia including research & development. The course will provide ample materials for the preparation of competitive examinations like GATE / NET / ARS, etc. This will enable new idea generation & innovation for the commercial manufacture of products which ultimately lead our country to an international platform.

### ABOUT INSTRUCTOR :

Prof. Hari Niwas Mishra has over thirty years of experience in teaching, research and administration and has many laurels and awards to his credit. A professor of Food Technology in the Agricultural and Food Engineering Department and past President of the Association of Food Scientists & Technologists (India), Dr. Mishra is the former Chairman of the Post-Harvest Technology Centre, IIT Kharagpur. Prof. Mishra teaches Food Science & Technology, Food Product & Process Technology, Non-Thermal Processing of Food, Industrial Processing of Foods & Beverages, and Food Chemistry. His research interests include RTE Health foods & Nutraceuticals, Novel Food Products & Process Development and Extension of Shelf Life of Perishable Foods. Professor Mishra has published 581 research papers including 243 in peer-reviewed refereed journals, 338 in conference proceedings. He has written 4 books, 4 e-books, 7 edited volumes, 34 book chapters, 7 lecture compendium & laboratory manuals, 4 technology manuals, and has 14 Indian patents to his credit. Besides, he is on the editorial boards of several reputed journals. He has supervised more than 282 student research projects including 12 Post-Doctoral and 50 Ph D research scholars. Professional details of Prof H N Mishra can be seen at <http://iitkgp.ac.in/department/AG/faculty/ag-hnm> or [www.fctliitkgp.co.in](http://www.fctliitkgp.co.in)

### COURSE PLAN :

- Week 1:** Composition, Nutritional and Health Value
- Week 2:** Post Harvest Handling and Storage
- Week 3:** Processing and Preservation Principles
- Week 4:** Primary Process Operation (On-Farm & In-Plant)
- Week 5:** Minimal Processing Strategies and Hurdle Technology
- Week 6:** Juices and Concentrates
- Week 7:** Dehydrated and Snack Food Products
- Week 8:** Processing of Plantation Crop Products
- Week 9:** Spices and Condiments Technology
- Week 10:** Plant-Based Fermented Foods and Beverages
- Week 11:** Packaging and Storage
- Week 12:** Green Technologies, By-products & Waste Utilization (Waste to Wealth)