

## Post Harvest Management Practices: Enhancing Quality and Shelf Life of Horticultural Produce

Rohit Kumar<sup>1</sup>, Sandeep Gautam<sup>2</sup>, Shubham Gangwar<sup>1</sup>, Shankar Rajpoot<sup>1</sup> and Amit Kumar<sup>3</sup>

### Introduction

The optimum postharvest management of horticultural products is not the same for all products. Growers, wholesalers, exporters and retailers must all be aware of the specific needs of a product if the postharvest shelf life and quality is to be maximized. Therefore, it is imperative to reduce post-harvest losses in order to feed the nation's expanding population. Food product processing, mostly as a cottage industry, has long been a custom that has been ingrained in the nation's diverse ethnicities. India is a wealthy horticulture nation that produces an enormous range of fruits, vegetables, spices, and decorative as well as therapeutic plants. India's food production has been rising significantly as a result of technological advancements in the industry, but large losses in agricultural products are caused by poor post-harvest handling, processing, value addition, and storage. However, the importance of the food processing industry has grown significantly

due to shifting dietary habits, rising incomes, and growing preferences for packaged and ready-to-eat meals.



### Post-harvest management practices:-

Reducing post-harvest losses can be achieved by the use of breeding technologies to increase shelf life, better harvesting practices, handling, marketing, packaging, shipping, and storage procedures, as well as the creation of suitable processing technologies.

### Harvesting:

Harvesting should occur as soon as possible, at the lowest possible cost, and at the right stage with the least amount of loss and

**Rohit Kumar<sup>1</sup>, Sandeep Gautam<sup>2</sup>, Shubham Gangwar<sup>1</sup>, Shankar Rajpoot<sup>1</sup> and Amit Kumar<sup>3</sup>**

<sup>1</sup>Ph.D. Scholar, Department of Post Harvest Technology, Banda University of Agriculture and Technology, Banda (U.P.)

<sup>2</sup>Ph.D. Scholar, Department of Agricultural Economics, Acharya Narendra Deva University of Agriculture and Technology, Kumarganj, Ayodhya (U.P.)

<sup>3</sup>P.G. Scholar, Department of Post Harvest Technology, Banda University of Agriculture and Technology, Banda (U.P.)

harm. It is best to harvest in the early morning or late evening. When harvesting, a temperature higher than 27 °C should be avoided. While goods for local markets are gathered early in the morning, those intended for export to far-off markets are harvested in the evening and carried throughout the cold night. It is not advisable to harvest right away after irrigation or rain. The best quality and production are guaranteed when harvesting at the ideal stage of maturity. To prevent mechanical damage to the product, caution must be exercised.

**Pre-cooling:**

The technique of pre-cooling, especially during harvesting during hot weather, is to remove field heat from the collected commodity. Pre-cooling lessens the strain on the transport or storage chambers' cooling system by reducing the rate of transpiration and respiration, which delays ripening. Pre-cooling can be done in a number of ways, including vacuum cooling, room cooling, hydro-cooling and contact icing etc.

**Sorting/Grading:**

Harvested horticulture product must be sorted to eliminate any damaged, diseased, malformed, overripe, or insect-attacked produce. To prevent any infection from spreading to regular, healthy vegetable or fruit produce, diseased or insect-attacked product should also be thrown out.

In addition to extending postharvest shelf life, wholesomeness, freshness, and quality, systematic grading when combined with suitable packing and storage would also significantly lower losses and marketing expenses. The factors of maturity, size, shape, color, weight, pest and insect-free status, ripeness, and pesticide residues must all be taken into consideration while sorting and grading horticultural produce.

**Washing:**

The produce is cleaned or washed to enhance appearance and get rid of any clinging dust, debris, insects, mold and spray residue.

After harvesting, onions, garlic, okra, and mushrooms are not washing. For surface disinfection, glacial acetic acid, sodium chloride (1%) or a light chemical detergent (soap solution) might be utilized. Surface disinfection can also be achieved with chlorinated water (100 parts per million). Before packing, fruits and vegetables should be thoroughly cleaned of any leftover water and allowed to dry.

**Trimming:**

Crops such as lettuce and cabbage, among others, require trimming. To take out undesirable, discoloured, decayed, and broken components. Trimming improves appearance, slows down produce deterioration, and makes handling, packaging, and transportation easier.

**Curing:**

Curing is the increases the shelf life of root and tuber crops by forming a corky layer that guard against water loss and infections from decaying organisms. Curing is the process of strengthening and wound periderm (skin) of these crops for a specified period of time under well-defined temperature and relative humidity conditions. Curing is a drying procedure used to tighten necks and toughen exterior skin. At roughly 20 (degrees celsius) and 80% relative humidity, potato curing works best. A few instances of bulb crops, such garlic and onions.

#### **Waxing:**

One of the main goals of waxing is to increase storage life by minimizing water loss and reducing shrivelling and wilting. As the most important pathways for transpiration, wax blocks the stem near the root and the fruit's surface pores. The primary pathway for transpiration is the wax on the outer layer of fruits and vegetables. Produce that has been waxed looks better too. Paraffin wax, Carnuba wax and various resins are common types of wax used for preparation of wax emulsion. Waxes are generally applied by foaming, spraying and brushing of which foaming is the best, since it leaves a very thin coating. Some of the common coating materials are semper fresh, prolong and waxol. To improve their luster and slow down moisture loss, vegetables including carrots, tomatoes, brinjal, sweet

peppers, cucumbers, muskmelon, and others are frequently sprayed or dipped in a water emulsion. In our nation, it is often not fashionable to maintain the product's sound and luster.

Shelf life of fruits and vegetables may be extended by utilizing different plant based coating materials viz., neem extract, tulsi extract, aloe vera extract etc. may be used locally which have anti-fungal properties at farmers level so that more return will be generated from their horticultural produces.

#### **Post- Harvest Disease Control:**

The growth of fungus and bacteria that cause disease and result in massive postharvest losses severely damages agricultural output. Vegetables are susceptible to microbial infection due to their succulence. Products are predisposed to diseases by heat, other environmental factors, vegetables contaminated by diseases, and mechanical accidents. Fungicides can be used as sprays, dips, additives to wax, or impregnated in packaging materials to prevent post-harvest illnesses.

#### **Sprout inhibition:**

When potatoes and onions reach maturity, they go into a latent state, and sprouting occurs when the inactive or rest period ends. Resuming growth is the process of sprouting. Due to the respiratory consumption of substrates during sprouting,

significant loss occurs. Maleic hydrazide (MH-40), 3-Chloroisopropyl-N-Phenyl Carbamate (CIPC), Methyl naphthalene acetic acid (MENA) and 2,3,4,6 tetra nitro benzene (TCNB) are commonly used as sprout inhibitors. Gamma irradiation at 0.02- 0.15 KGY is widely accepted by many countries for successful sprout inhibition of onion and potato without affecting other quality attributes.

### **Packaging:**

For the management of extremely perishable products, packaging is essential. Produce must be assembled into manageable portions for handling and protected during transportation, storage, and marketing. This is the primary function of packing. Plant properties are taken into account while choosing packaging materials. It increases the produce's shelf life and makes it more visually appealing. Packaging materials should protect fresh produce as various types such as bamboo baskets, sacks (made of plastic or jute), wooden crates, and corrugated fiber board boxes (CFB) cartons are used. An effective packaging practice protects product from any physical, physiological, and pathological deterioration throughout storage, transport, and marketing. The most effective way to save waste while packing vegetables is to utilize bamboo baskets, gunny bags, and plastic crates. Horticultural products such as

tomatoes, broccoli, capsicum, and assam lemons can be wrapped in polyethylene film bags for transportation.

### **Transport:**

In the handling, storing, and distribution of postharvest products, transportation is an essential aspect. Horticultural products are transported via train, truck, airplane, and ship from the fields to the distribution markets. Open trucks are used for the transportation of large amounts of horticulture crops. Produce quality is preserved when it is transported during the cold night time hours using refrigerated or ventilated vehicles. In many wealthy nations, horticultural produce is traded on pallets. The introduction of mechanical loading and unloading is also important, especially when fork lift trucks are involved. Reefer containers, which are refrigerated containers, are produced in developed nations. It is advisable to promote the usage of containers in India for evaporative cooling methods.

### **Marketing System:**

The market for vegetables frequently faces numerous obstacles because of its high perishability, seasonality, and bulkiness. The absence of adequate storage facilities and efficient transportation methods further impedes the assembly and subsequent selling of the produce. When these bottlenecks cause a seasonal excess of food, the goods are

frequently created to get rid of the produce at a very low price. The development of multiple middlemen who control the market and make huge earnings is another significant flaw in the marketing of vegetables. As a result, the producer's profit margin in the final price drops significantly. To manage intermediary activity and ensure a smooth and efficient vegetable marketing system, it is imperative that a concerted effort be made to build a cooperative system of marketing at the village and district levels. Moreover, close co-ordination among Agricultural Marketing Board, National Horticulture Board and state department of agriculture/Horticulture should be ensured to formulate an action plan for regulating marketing of vegetables in a smooth and streamlined way.

#### **Storage:**

Horticultural produce storage is essential for extending shelf life, preventing market oversupply, ensuring year-round supply, and boosting producer profits. Reducing and controlling transpiration, respiration, and disease infection while simultaneously preserving life processes at the necessary level is the major goal of storage.

#### **Conclusion:-**

In order to reduce waste and ensure greater returns to farmers, it is imperative that certain fundamental features of postharvest management of horticultural produce be

examined more thoroughly. The nation's postharvest management of horticultural produce are still in their infancy. This will assure a uniform distribution of agricultural goods across the nation, boost per capita availability, and enhance farmers' economic standing.

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