



Post-Harvest Management of Vegetable Crops

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India is a horticulturally wealthy nation that produces an extensive range of fruits, vegetables, spices, and decorative and therapeutic plants. India is second globally in terms of vegetable production. "Losses that occur after harvest till the produce reaches the consumers" is the definition of postharvest losses. It may result in both quantitative and qualitative losses. In terms of money and effort, post-harvest losses are more excruciating and expensive than pre-harvest losses. Vegetables have about 80–90% moisture content, making them highly perishable. Since they are living commodities, they will continue to breathe and transpire even after harvest.

Name of vegetable	Post-harvest losses as percentage of production
Beans & peas	7-12
Brinjal	10-13
Cabbage	7-15
Cauliflower	10-15
Garlic	1-3
Onion	15-30
Potato	15-20
Tomato	10-20

Post-harvest management practices

By using breeding technologies for longer shelf lives, enhancing pre-harvest factors and harvesting techniques, developing suitable processing technology, and using appropriate handling, marketing, packaging, transportation, and storage techniques, post-harvest losses can be reduced. The post-harvest management procedures are as follows:

- Selection of varieties:** For various vegetables, cultivators should select and breed varieties with improved storage and processing qualities as well as lower susceptibility to handling. The tomato cultivars Pusa Gaurav, Arka Vishal, Arka Nidhi, and Arka Neelakandh (Brinjal) are a few examples of long-lasting varieties.
- Harvesting:** Harvesting must be carried out as quickly and inexpensively as feasible, at the right time, when there is the least amount of loss and damage. It is best to harvest in the early morning or late evening. When harvesting, a temperature higher than 27 °C should be avoided. Harvesting at the ideal maturity stage guarantees the highest possible yield and quality. To prevent the product from being mechanically damaged, care must be exercised.
- Sorting/Grading:** Vegetables are gathered and sorted to remove any damaged, infected, rotted, overripe, insect-attacked, or malformed product.

4. **Washing:** Dirt, stains, insects, molds, and occasionally spray residues are all removed from fruits and vegetables by washing them. Washing helps to prolong the shelf life of the food in addition to cleaning and preserving the freshness of the fruits and vegetables. Water that has been chlorinated (100 parts per million) works well for cleaning surfaces as well. Before packing, fruits and vegetables should be thoroughly rinsed with clean water and any surplus water left to dry.
5. **Trimming:** To get rid of undesirable, discolored, rotting, and damaged areas, crops like lettuce and cabbage, among others, must be trimmed.
6. **Curing:**
 - **Heal wound:** Decrease the entry points for bacteria that cause decay by allowing cuts and wounds on produce to heal.
 - **Remove excess moisture:** Lowering the produce's moisture level can prevent it from rotting.
 - **Improve skin texture:** Enhance the produce's look and texture.
 - **Reduce stress:** Produce that is under less stress is less likely to deteriorate.

Curing is commonly used for:

- **Tubers:** potatoes, sweet potatoes, and yams.
- **Roots:** carrots, beets, and parsnips.
- **Bulbs:** onions and garlic.

Curing conditions vary depending on the produce, but generally involve:

- ✓ Temperature: 15-25°C (59-77°F).
- ✓ Humidity: 80-90%.
- ✓ Ventilation: Adequate airflow to prevent moisture buildup.
- ✓ Duration: Several days to several weeks.

Produce with a proper curing process has a longer shelf life, which lowers food loss and improves quality.

7. **Waxing:** Waxing is done mainly to minimize water loss and reduce shriveling and wilting to enhance the storage life. Paraffin wax, carnauba wax, and various resins are common types of wax used for the preparation of wax emulsion.

8. **Precooling:** When harvesting during hot weather, precooling is the act of eliminating field heat from the harvested commodity. Pre-cooling aids in reducing respiration-delayed ripening and transpiration rate. There are several methods of the pre-cooling process as

- Room cooling
- Hydro-cooling
- Contact icing
- Vacuum cooling

9. **Packaging:** Plant features are taken into consideration when choosing packaging materials. Additionally, it increases the produce's appeal and extends its shelf life. When a product is packaged well, it is shielded from pathological, physiological, and physical deterioration during marketing, transportation, and storage. As various varieties such as bamboo baskets, corrugated fiberboard (CFB) cartons, hardwood crates, and sacks made of plastic or jute are utilized, packaging materials should cushion fresh produce. Packaging materials for vegetables are mostly bamboo baskets, gunny sacks, and plastic crates.

10. **Storage:** Fruit and vegetable storage extends their shelf life, reduces excess supply on the market, offers a variety of fruits and vegetables all year round, aids in organized marketing, boosts producer profitability, and maintains the quality of the living goods. The main goals of storage are to maintain the product in the most useable state for consumers and to regulate the rate of transpiration, respiration, and disease infection. If a commodity is not stored properly, the following bad outcomes may occur.

- ✓ Sprouting: e.g. onion, ginger, garlic, potatoes, etc.

- ✓ Rooting: e.g. sweet potato, onion, etc.
- ✓ Seed germination: e.g. pod-bearing vegetables, tomato, papaya, etc.
- ✓ Degreening: e.g. potatoes of exposed to light, and the green portion contains toxic solanine.
- ✓ Toughening: e.g. green beans, bhindi, etc.

Conclusion

Production loss is not as significant as postharvest loss. Vegetable availability can be considerably increased by reducing postharvest losses without requiring the use of more land or inputs. While there will always be some loss, it can be decreased by implementing contemporary cultural practices including harvesting, processing, marketing, and processing methods.

References

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