

Post Harvest Loss Minimization In Fruits And Vegetables

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Introduction

The presence of wide range of agro climatic conditions in India favours the production of various fruits and vegetables. Globally India ranks second in fruit and vegetable production after China. Although the production is high but it fails to meet the consumption of the country. Generally 30 to 40 percentage loss occurs in post harvest stages. Sometimes the loss is as high as 50%. Post harvest loss refers to deterioration in quality and quantity of commodities during harvesting, post harvest handling, and storage till it reaches to the consumer. Fruits and vegetables are more diverse in their morphology and physiology. High water content makes them more perishable and prone to damage. So strategic steps should be taken at several stages to minimize the loss for feeding the population.

Causes of post-harvest loss

- **Harvest**

Fruit and vegetables should be harvested at proper edible maturity stage. Sometimes due to early or late maturity the quality of the produce is affected. Mechanical injury, scars on fruit during harvesting creates losses. Over ripe fruits and vegetables are more prone to disease and pest attack, which spreads to other later on. Adverse climatic conditions like drought, hail storm and rain damage the fruits. Faulty methods of harvesting of the produce cause damage.

- **Packaging**

Improper packaging of the produce affects the losses. Bruising of fruits and vegetable at the time of storage and transportation increases the chances of infection and ultimately the loss of the product. Use of poor quality materials do not protect the produce properly

sometimes favors spoilage. Rough and harsh packaging of the delicate produce like leafy vegetables causes severe damage and loss. Produce directly placed in crates or wooden boxes without packaging increases the amount of loss.

- **Storage**

The rate of transpiration and respiration increases with increase in temperature. High temperature during the storage leads to more ethylene production which affects the quality. High moisture and relative humidity in storage atmosphere favours the microbial growth leads to bacterial rot of fruits and vegetables.

- **Transportation**

Transportation connects the chain between production and consumption. Faulty transportation is one of the main causes of losses, especially for fresh products. Many fruits and vegetables require optimum temperature maintenance during the transportation beyond which the damage occurs. Broken cold chain management causes losses. The way of transport like poor roads facility favors the damage. In rainy season severe rain create barriers in open transportation facility or in truck. Improper loading and unloading of the material by unskilled and uneducated laborers causes mechanical damage of the produce.

- **Consumer Waste**

Consumption is the final stage of any produce. Considerable losses for fruit and vegetable occur at consumption stage in the food supply chain. Fresh fruit and vegetables contribute to almost 50% of food wasted by households. The main causes of the consumers' waste are due to over-purchasing, improper planning, poor home-storage facility, etc. The consumer waste is highly affected by factors such as gender, lifestyle, income and home storage facilities. Sometimes rodent infestation in houses causes severe loss of fruits and vegetables.

- **Cultural practices and variety**

Appropriate and feasible agricultural practices should be adopted for extending shelf-life of perishable fruits and vegetables to minimize the losses. Variety with good shelf-life and adapted to long distance transportation should be grown where the market facility is far. Cultural operations such as proper spacing, weeding, fertilizing and pesticide application could be conducted with great care. Optimum harvesting age and harvesting time has to be

knowledge for each crop as in fruits and vegetable the edible maturity differs from the physiological maturity. This can be done by using a maturity index standard and pre-sorting loss greatly reduced. So all these factors are very much important for reducing the post-harvest losses.

- **Harvesting method**

Proper harvesting should be carried out to reduce the losses. Techniques of harvesting such as physical, mechanical, manual should be chosen wisely to minimize injury such as scratches, cuts, punctures and bruises to the crop. Harvesting should be carried out during the cool part of the day, which is early morning and late evening harvest crop at turgid stage. Immediately after harvesting, damaged produce should be removed from the bulk.

- **Storage and transportation facility**

The transportation of perishable commodities like fruits and vegetables require multiple stages from farm to plate of the consumer. Produce should be kept at optimum conditions during the transport. Adequate temperature control systems and air circulation systems are the most important means to ensure quality preservation of the produce. Cold chain is the logistics system provides ideal condition to the perishable goods from the point of source to the point of consumption. Provision for proper loading and unloading, maintenance of moisture and humidity should be taken care of during transportation. Storage is an important operation during post harvest stages. Adoption storage technique like Controlled Atmosphere Storage (CAS), Modified Atmosphere Storage (MAS) and Zero Energy Cool Chambers (ZECC) should be used to maintain the temperature and relative humidity of fruits and vegetables is necessary. This will increase the shelf-life and maintain the quality during storage.

- **Packaging**

Physiological and biochemical activities of fruits and vegetables continue even after harvest. Packaging restricts the rate of transpiration and respiration, protects against the microbial contamination and physical injury so minimizes the water and quality loss. It also controls the ethylene concentration. Therefore, appropriate packaging systems should be

designed to reduce food losses. The packaging solutions for minimizing food waste during post-harvest vary from crop to crop and that should be taken care while going for packaging.

- **Sanitation**

From the harvesting till the produce reach in the hand of consumer sanitation is an important measure during all pre and post-harvest operations in fruit and vegetable crops to eliminate sources of infection and reduce level of crops contamination. Good hygiene practices are throughout the produce handling practices. Producers, wholesalers, retailers and consumers should aware of the impact of sanitation. All the equipments used in the post harvest practices at each stage should be sanitized at regular interval to avoid contamination by pathogen.

Conclusion

In developing country like India minimization of post harvest loss is beneficial to combat the growing hungry population in coming days. Proper storage infrastructure, transport facility, involvement of educated and skilled labor is mandatory in loss reduction. Market strategy and consumer awareness regarding the loss should be acknowledged. All together the loss reduction in perishable commodities like fruits and vegetables will boost the economy in sustainable way.

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