

Post Harvest Technology of Fruits and Vegetables

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The handling technologies involved in a harvested commodity until it reaches the consumers hand is termed as post harvest handling. When a harvested produce reach the consumer a certain portion of it is lost due to weight lost, losses due to mechanical damage, post harvest diseases, senescence etc. The quantity lost is referred to as post harvest loss. Post harvest losses in developing countries are reported to be excessively high ranging from 20 – 40%, while the value for developed countries remain around 10% or less.

Why is post harvest loss so important?

In marketing of fruits and vegetables, the increase in price of goods produced by the farmer is mainly due to profits made by the intermediaries and the cost of transport. In addition the price gap between farm-gate price and consumer price widens further due to post harvest loss. Hence reduction of post harvest losses can lead to the offer of a more reasonable price to the farmer as well as for the consumer.

Post harvest losses include both quality and quantity loss. The poor quality of fruits and vegetables available in the market is a serious problem for consumers. In addition, often the nutritive value of fruits and vegetables is badly affected when they reach the consumers.



Post harvest loss of a commodity cannot be reduced by adopting improved post harvest technologies alone, because the effect of the pre harvest factors such as crop management, field sanitation etc. also contribute to crop losses. Well managed orchards or vegetable fields produce high quality fruits and vegetables which have a potential for longer post harvest life.

Proper timing of harvests

Fruits must be harvested at correct maturity stages in order to get a higher quality ripe fruit. Fruits can be divided into two major groups based on their post harvest behavior, as shown in the following table.

Banana, mango, papaya, avocado, jak fruit, and anoda belong to climacteric group, while citrus, rambutan, mangosteen, pineapple, and grapes belong to non-climacteric group. Of the two groups harvesting non-climacteric fruits at ripe stage is very important because these fruits do not proceed towards ripening changes after harvest. However, climacteric fruits can be harvested at the unripe stage, but they must be properly matured to ensure a higher quality ripe fruit.

Climacteric	Non-climacteric
Increased respiration during ripening	Continuous decline in respiration
Peak ethylene production during ripening	Very low ethylene production
Ethylene production can be triggered	Ethylene production cannot be triggered
After harvest ripening changes takes place	No ripening changes after harvest

Fruits can be harvested using maturity indices developed for each fruit in order to get the maximum quality. Early harvesting lead to poor quality ripe fruits and their post harvest losses are also higher than fruits harvested at the correct stage of maturity. Fruits must be harvested in the morning of a sunny day when dew disappears.

In harvesting the use of improved picking poles prevent damage to the fruit. Fruits must be harvested into a rigid container, and fruits must never be allowed to touch the soil. Contact with the soil can cause minor injuries, and these injures serve as entry points for microorganisms.

Vegetables such as okra, ma, beans, and luffa should be harvested at the tender stage. If these vegetables are harvested at the mature stage, rapid toughening take place due to formation of fiber. Vegetables such as carrot, radish, knolkol, beet, cabbage should be harvested at their specific maturity stages. Early harvesting of



such crops results in poor yield while delayed harvesting cause very high loss due to cracking of root or stem.

Proper packaging and storage of crop produce

All fruits and vegetables should be sorted and graded before marketing. Grading can be done based on size.



Insect damaged and disfigured produce must be discarded.

Fresh produce should be packed in rigid, ventilated, shallow containers. For this purpose plastic crates can be used. These crates protect the produce from mechanical damage and temperature build up. Produce

transported in plastic crates have a reasonable post harvest life than those transported in polysack bags. Almost all vegetables in our country are transported in polysack bags, which is the major reason for excessive post harvest losses.

Commodities packed in plastic crates must be carefully handled without dropping them, and such packages must also be protected from direct sunlight and rain.

Mature fruits ripe naturally at ambient temperature within a few days time. However, the time taken for ripening can be shortened by artificial ripening methods. For this purpose fruits are sprayed with Ethrel solution (1ml per liter of water) and kept covered for 24 hours. Ethrel

treated fruits ripen giving very good quality while resembling naturally ripen fruit. There are no toxic effects with this method of ripening.

Occurrence of post harvest diseases is also a common problem in ripe fruits. Most of these diseases originate in the field before harvesting time. Field sanitation, pruning, and spraying of fungicide can be recommended to control such diseases in the field. If harvested fruits are carefully transported without damage the occurrence of diseases is negligible. Fungicides should never be applied to harvested fruit to control post harvest diseases.

Quality of fresh produce can be maintained longer if they are stored at refrigerated temperatures. Banana can be stored at 14°C, and rest of the produce can be stored

between 10 – 12°C. If fresh produce are to retain quality in refrigerated storage, they must be harvested at the correct maturity stage and be free from mechanical damage.

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Relative humidity of the storage facility must be maintained at 80% or above to prevent desiccation.

If fresh produce are handled using improved post harvest handling procedures post harvest losses can be reduced considerably enabling the supply of high quality produce for consumption. In addition adoption of proper post harvest technology reduces the

price gap between farm gate-price and the consumer price.

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Nutrients and energy claim of foods we eat

Component	Claim	Conditions not more than
Energy	Low	40 kcal (170 kJ) per 100 g (solids) or 20 kcal (85 kJ) per 100 ml (liquids)
	Free	4 kcal per 100 ml (liquids)
Fat	Low	3 g per 100 g (solids) 1.5 g per 100 ml (liquids)
	Free	0.5 g per 100 g (solids) or 100 ml (liquids)
Saturated fat	Low	1.5 g per 100 g (solids) 0.75 g per 100 ml (liquids) and 10% of energy
	Free	0.1 g per 100 g (solids) 0.1 g per 100 ml (liquids)
Cholesterol	Low	0.02 g per 100 g (solids) and 1.5 g saturated fat per 100 g (solids) 0.01 g per 100 ml (liquids) and 0.75 g saturated fat per 100 ml (liquids) and 10% of energy of saturated fat
	Free	0.005 g per 100 g (solids) and 1.5 g saturated fat per 100 g (solids) 0.005 g per 100 ml (liquids) and 0.75 g saturated fat per 100 ml (liquids) and 10% of energy of saturated fat
Sugar	Free	0.5 g per 100 g (solids) 0.5 g per 100 ml (liquids)
Sodium	Low	0.12 g per 100 g
	Very Low	0.04 g per 100 g
	Free	0.005 g per 100 g