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POST-HARVEST TECHNOLOGY OF HORTICULTURAL CROPS

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INTRODUCTION

Horticulture is very important in Indian agriculture. It generates 30% of its GDP from 11.7% of its arable land area. India is the world's second largest producer of fruits and vegetables (52.85 Mt and 108.20 Mt, respectively).Fruits and vegetables are extremely important to humans. Fruits have been given a place of honour in India when offered to God at every festival, and have also been mentioned in our epics such as the Mahabharata, Ramayana, and the writings of Sushrutha and Charaka. These are an important part of our daily diet because they are high in carbohydrates, minerals, vitamins, and dietary fibre. Dietary fibres have a number of direct and indirect benefits.A significant amount of fruits and vegetables produced in India are lost due to improper post-harvest operations, resulting in a significant gap between gross production and net availability. Furthermore, compared to other countries, only a small percentage of fruits and vegetables are processed (less than 1%) and exported (Fruits - 0.5% and Vegetables - 1.7%). Fruit and vegetable post-harvest losses are extremely high (20-40%). Fresh fruits and vegetables shrivel and decay at a rate of 10-15%, lowering their market value and consumer acceptability.Minimising these losses can increase their supply without requiring additional land to be planted. Tissue breakdown occurs as a result of improper handling and storage. Bruising, cracking, cuts, and microbial spoilage by fungi and bacteria are examples of mechanical losses, whereas physiological losses include changes in respiration, transpiration, pigments, organic acids, and flavour.

POST-HARVEST LOSSES: NATURE AND CAUSES

Post harvest losses are losses that occur after harvesting. It begins in the field, continues after harvest, in grading and packing areas, in storage, during transportation, and concludes in wholesale and retail markets. Several losses occur as a result of poor facilities, a lack of know-how, poor

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management, market dysfunction, or simply farmer carelessness.

Important post-harvest loss locations:

- Farmer's field (15-20%)
- Packaging are important sites in India where post-harvest losses are observed.
- Transportation (30-40% of total)
- Marketing (30-40% of total)

Fruit loss estimated

- Crop loss estimate (%)
- Grapes 27%
- Bananas (20-28%).
- Citrus juice (20-95%).
- 43% Avufado 43%
- Apple 14%

Estimated vegetable loss

Onion 25-40%

Garlic (08-22%).

Potato(30 to 40%)

Tomatoes (5-34.7%)

Cauliflower and cabbage (7.08-25.0%)

Chilli (4-35%)

Radish 3%

Carrot (5-9%).

Post-harvest losses and their causes:

Horticultural crops not only provide nutritional and healthy foods to humans, but they also generate a significant cash income for growers. Horticultural crops, on the other hand, have a high moisture content, tender texture, and high perishability. A high-value nutritious product can deteriorate and rot in a matter of days or hours if not handled properly. Postharvest losses can be classified into several categories.

Consumption- These losses can be attributed to insufficient home preservation methods, cooking and preparation methods such as peeling, consumption habits, and so on.

Lack of market demand- Poor planning or inaccurate production and market information may result in an overabundance of certain fruits and vegetables that cannot be sold in time. This situation is most common in areas with insufficient transportation and storage facilities. Produce may rot in production areas if farmers are unable to transport it to people in remote locations who require it.

Physiological deterioration- Fruit and vegetable cells remain alive after harvest and continue to function physiologically. Physiological deterioration can also occur spontaneously by enzymatic action leading to over-ripeness and senescence, a simple ageing phenomenon.

Parasitic diseases- Fungi, bacteria, insects, and other organisms cause significant post-harvest losses. Microorganisms attack and spread quickly on fresh produce because it lacks a natural defence mechanism and has plenty of nutrients and moisture to support microbial growth.

Mechanical- Because of their tender texture and high moisture content, fresh fruits and vegetables are highly susceptible to mechanical damage. Inadequate handling, inappropriate containers, insufficient packaging, and transportation can easily lead to bruising, cutting, breaking, impact wounding, and other types of injury.

Metabolic- Fresh horticultural crops are all living organs. The natural process of respiration includes the depletion of food reserves as well as the ageing of these organs.

Others

- Lack of clear concept of packing house operations.
- Lack of awareness among the growers, contractors and even the policy makers.
- Lack of infrastructure.
- Late realization of its importance,
- Inadequate technical support.
- Wide gap in technologies available and in vogue.
- Inadequate post-harvest quality control.
- Unorganized marketing.
- Absence of pre-cooling and cold storage.
- Inadequate market facilities, market intelligence and market information service (MIS)
- Poor storage facilities.

The effect of post-harvest losses:

Post-harvest losses in horticultural crops have an impact on both the nutritional status of the population and the country's economy.

Nutrition- Fruits and vegetables are high in vitamins and minerals, which are essential for human nutrition. These that are lost in transit from harvest to consumer represent a loss of a valuable food. This is significant not only in quantitative terms, but also in terms of nutritional quality.

Economy- Inadequate harvesting and handling of perishables bruise and scar the skin, lowering quality and market price. Such damaged produce also fails to attract international buyers, resulting in less profit and a bad reputation for the exporting country. As a result, the country suffers significant economic losses.

Technologies for reducing losses:

Waxing- It is used as a protective coating for fruits and vegetables, reducing moisture loss and the rate of respiration, resulting in a longer storage life.

Evaporative cool storage- It is the most effective short-term storage method for fruits and vegetables at the farm level. It assists farmers in receiving higher returns on their produce. Horticultural crops reduce shrivelling and extend storage life in this structure.

Ediblecoatings- These are continuous matrices made from edible ingredients like proteins, polysaccharides, and lipids. They can be used as film wraps and become an ingredient of the food when consumed with it.

Irradiation- Newer technologies can be used profitably during storage to reduce post-harvest losses and extend the storage life of fruits and vegetables. When it comes to fruits and vegetables

Cold chain- The following cold chain handling system for fresh horticultural crops is used. It aids in the reduction of waste and the preservation of commodity quality.

Controlled Atmosphere (CA) storage- It is based on the principle of maintaining an artificial atmosphere in the storage room that has a higher concentration of CO2 and a lower concentration of 02 than normal air.

Modified atmosphere packaging (MAP)- By respiration, these packaging change the composition of the atmosphere inside the package.This technology has been successful in extending the shelf life.

Cold storage- These structures are widely used to store fruits and vegetables for an extended period of time and use the principle of maintaining a low temperature, which reduces the rate of respiration.

Pre-packaging- This technology regulates the rate of transpiration and respiration, keeping the commodity fresh at both ambient and low temperatures. Because of its low cost and ready availability, it has the potential to revolutionise our trade practises while also benefiting consumers and producers.

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