POST HARVEST HANDLING of FRUITS AND VEGETABLES

MFT-2001

HARVESTING

1. Hand Harvesting

2. Mechanical Harvesting

POST HARVEST HANDLING

- Post harvest technology starts immediately after the harvest of fruits and vegetables.

- The whole process of processing the commodities is categorized as Handling of fresh produce.

- Combines the biological and environmental factors in the process of value addition of a commodity.

Handling of fresh produce

1. Pre-cooling
2. Washing, Cleaning and Trimming
3. Sorting, Grading and Sizing
4. Curing
5. Waxing
6. Packaging
7. Storage

1. Pre-cooling

- Precooling (prompt cooling after harvest) is important for most of the fruits and vegetables because they may deteriorate as much in 1 hr at 32°C.
- Removal of field heat from commodities
- Reduces bruise damage from vibration during transit
- Depends on the air temperature during harvesting, stage of maturity and nature of crop

Methods of pre-cooling

- viz, cold air (room cooling, forced air cooling),
- cold water (hydro-cooling),
- direct contact with ice (contact icing),
- evaporation of water from the produce (evaporative cooling, vacuum cooling) and
- combination of vacuum and hydrocooling (hydrovac cooling).

2. Washing, Cleaning and Trimming

- For removal of soil dust, adhering debris, insects and spray residues.
- Washing: Chlorine in fresh water
- fungicides like Diphenylamine (0.1 - 0.25%) or ethoxyquin (0.2 - 0.5%) may be used as post harvest dip to control the disorders. Eg. Apple superficial scald
- Cleaning by wiping with damp cloth: some fruit type vegetables (melons, brinjals, tomatoes, cucumber)
- Trimming: Many vegetables need trimming, cutting and removal of unsightly leaves or other vegetative parts.

3. Sorting, Grading and Sizing

- Sorting: done by hand to remove the fruits which are unsuitable to market or storage due to damage by insects, diseases or mechanical injuries
- Grading: on the basis of surface colour, shape or visible defects
- E.g.- Apple packing house in India 3 grades viz. "Extra Fancy", "Fancy", "standard" and "cull" grade
- Sizing : Done either by hand or machine
- Machine sizers work on two basic principles: **weight and diameter**.
- Spherical shape (Oranges, tomato, certain apple cultivars) and
- Elongated (Delicious apples and European pears or of non-uniform shape) commodities

4. Curing

- For the reduction of water loss during storage from hardy vegetables viz, onion, garlic, sweet potato and other tropical root vegetables.
- healing of harvest injuries, reduces loss of water and prevents the infection by decay pathogens.
- Onions and garlic are cured to dry the necks and outer scales.
- For the curing of onion and garlic, the bulbs are left in the field after harvesting under shade for a few days until the green tops, outer skins and roots are fully dried.

5. Waxing

- Waxing generally reduces the respiration and transpiration rates,
- Other chemicals such as fungicides, growth regulators, preservative may be added
- Paraffm wax, Carnauba wax, Bee wax, Shellac, Wood resins and Polyethylene waxes used commercially

Advantages of wax application

- Improved appearances of fruit.
- Reduced moisture losses and retards wilting and shrivelling during storage of fruits.
- Less spoilage specially due to chilling injury and browning.
- Creates diffusion barrier as a result of which it reduces the availability of O_2 to the tissues thereby reducing respiration rate.
- Protects fruits from micro-biological infection.
- Considered a cost effective substitute in the reduction of spoilage when refrigerated storage is unaffordable.
- Wax coating are used as carriers for sprout inhibitors, growth regulators and preservatives.

Disadvantage of wax coating

- Development of off- flavour if not applied properly.

- Adverse flavour changes have been attributed to inhibition of O_2 and CO_2 exchange thus, resulting in anaerobic respiration and elevated ethanol and acetaldehyde contents.

6. Packaging

- Protection from mechanical damage, pilferage, dirt, moisture loss and other undesirable physiological changes and pathological deterioration during the course of storage, transportation and subsequent marketing
- Does not improve quality but maintains it

Packaging

- Traditional methods
  gunny bags, grasses and stem leaves

- Modern methods
  wooden boxes,
  baskets woven from bamboo or twigs,
  sack/jute bags and
  corrugated fibre board (CFB) boxes

7. Storage

Storage techniques:

- Ground storage,
- Ambient storage,
- Refrigerated storage,
- Air cooled storage,
- Zero energy storage,
- Modified atmospheric storage,
- Hypobaric storage and
- Controlled atmosphere storage