

ICAR-CIPHET Advisory for Handling of Mango

Mango harvesting has started in south India and about to start in Central and North India. The growers are facing problems related to transportation, storage and processing. Just by following simple tips, post-harvest losses for mango may be minimized.

There are losses in mango supply chain due to poor harvesting, improper packaging, poor transportation, rough handling and improper storage conditions. In addition to these, total soluble solids and acidity govern the taste of mango, whereas dry matter content gives an idea of total solids in them and maturity. These parameters govern the pricing for both mango processors as well as consumers. Higher the TSS, higher is sweetness and higher yield of processed products. In order assure quality and safety, following advisory is recommended to growers, traders, transporters and exporters.

Harvesting

1. In case of manual field operations of harvesting/ picking, accomplish the operation in 4-5 feet spaced strips assigning one strip to one person. This will ensure adequate spacing between the engaged labour.
2. All the persons engaged should use masks and ensure hand washing with soap at reasonable intervals.
3. Maintain safe distance of 3-4 feet during rest, taking of meals, transfer of produce at collection point, loading/unloading.
4. Stagger the field operations wherever possible and avoid engaging more number of persons on the same day.
5. Engage only the healthy persons to the extent possible and after reasonable enquiry as to avoid the entry of any suspect or likely carrier during field activity.
6. Prefer mechanized operations over the manual ones wherever feasible. Only the essential numbers of persons should be allowed to accompany the machine.
7. All machines should be sanitized at the entry point and at regular intervals. All transport vehicles, gunny bags or other packaging material should also be sanitized.
8. The collection of the produce may be done in small heaps spaced at 3-4 feet and field level processing should be assigned to 1-2 persons/heap to avoid crowding.
9. In case the farm level storage is possible, avoid immediate rush to the market.
10. Follow the standard safety measures during the visit to market for the purchase of inputs/sale of produce.
11. Fruits should be handled very carefully and should never be dropped in any manner during harvesting.
12. Harvesting at optimum maturity, prompt cooling, the use of optimum temperature, and optimum storage conditions, can maintain most mango cultivars for 2-4 weeks.
13. Fruits should not be picked all at the same time, especially when harvesting is done at earlier stages of maturity. Repeated Harvesting from the same tree should be carried out to ensure that only mature fruit is picked each time.

14. Care should be taken to reduce mechanical injury.
15. The time of day at which mangoes are harvested should be selected carefully. There are benefits from picking in the coolest hour of the day due to lower field heat, respiration, and heat damage.
16. Harvesting should be conducted by experienced pickers in case of manual harvesting. The harvest operation should be conducted carefully to avoid mechanical damage to the fruit such as peel abrasion and flesh fracturing.
17. Leave 2-3 cm of the stem (pedicel) attached to divert latex flow away from the fruit.
18. Remove the stem and allow desapping by placing mangoes inverted on plastic/steel wire mesh for about 30 minutes.
19. Follow pre-export vapour heat treatment (VHT) or hot water dipping treatment (HWDT) for managing the quarantine risk of fruit fly species for export of mangoes

Transportation

1. Pre-cooled the chamber before loading the pre-cooled fruit.
2. Refrigeration capacity should be adequate for the quantity of fruit to be transported.
3. Proper control of the chamber environment during transportation depending on the mangoes physiological condition.
4. Do not use calcium carbide, a banned chemical, for ripening of fruits. Such fruits do not ripen uniformly and quality of fruits is inferior.
5. Ripe fruits with ethylene gas (100 ppm or 0.1 %) in airtight room by exposing them for 24 –48 hrs under controlled conditions of temperature and humidity
6. Do not throw the packages during loading or unloading. Maintain distance of 4-5 feet while loading and unloading.
7. Labour or handlers should wear proper masks, gloves and ensure hand sanitation frequently.
8. Stack 4 – 8 containers, as per their strength, in pallets.
9. Arrange the boxes in the truck to allow proper air circulation
10. Transport the produce during the cooler part of the day, i.e., during night.
11. Cover the truck with tarpoline leaving proper ventilation.
12. Avoid using large containers for packaging and transport of fruits.
13. Transport cold stored fruits in a reefer van.

Sorting and Grading

- In case of manual sorting, the operation should be done on tables to insure a better work environment for workers and less problems for the fruit.
- Fruit should be selected, and only good-quality fruit should be packed.
- Sorting of fruits should be done depending on uniform categories (according to size, shape, color and ripening stage, and absence of defects), and to divert low-quality fruit to other uses such as pulp making.

Packaging

- Mango packages commonly used in the world are usually one piece cartons, and fruits are packed in a single layer.
- Packages should be well ventilated, but with a sufficient stacking strength. Ventilation openings are essential for adequate cooling and for heat and gas exchange. The recommended openings are to be at least 8% of the overall outer surface area of the package.
- They should protect the fruit from mechanical damage and from contaminants, and not cause injury.
- Packages should have a sufficient strength. These packages will commonly be in contact with a humid atmosphere, and that should not weaken the structure of the package.
- Packages should be attractive, and should provide sufficient information including promotional data. The information needed to be printed on the package includes product name, source, and class. Required information includes product name, source, and class. Optimum temperatures for transport/storage (12.5 °C) and ripening (20–22 °C) should be indicated on the packaging.
- Size and capacity of packages should be in accordance with the requirements of the market, and the available infrastructure, transport, shipping facilities, etc.
- They should be easily opened and closed.
- Preferably, packages should be recyclable.
- Packages should be designed according with the requirements of the export market in regard to the material used and the size.
- Regulations of countries should be checked before using the package.

Refrigeration and Storage

- Mangoes are not commonly stored for prolonged periods. However, after pre-cooling, the fruit should be moved immediately to a cold room or refrigerated transport container.
- Fruit should be picked, packed, precooled, and placed into cold storage or cold transport containers within no more than 24 hours.
- The ideal postharvest temperature for long term storage or transport of mangoes is the chilling injury threshold temperature of 12.5 °C. However, in most export operations, mango cold storage rooms are maintained at 10–14 °C, depending on the cultivar and holding period, with the relative humidity (RH) maintained in the range of 85–90%
- Fruit should be stacked in a way that can permit adequate circulation of cold air.
- A temperature of 12.5 °C is generally considered to be optimum for unripe mango storage and transport.
- Shelf life decreases markedly with increasing delay in time of fruit placement in cool storage. So harvested fruit should be placed in cool storage immediately after harvest.