

- The main fruit characteristics used to grade tomatoes are size, color, shape, appearance, and firmness.
- Tomatoes should be separated into small, medium, and large sizes.
- The fruit should have a smooth, shiny external appearance, with small blossom-end and stem-end scars.
- Finally, the fruit should be firm enough to withstand transport and distribution to market.

d. Packaging

Food packaging is defined as a mean or system by which a fresh produce or processed product will reach the ultimate consumer from the production centre in safe and sound condition. Two main functions of packaging are:

- To assemble the produce into convenient units for handling.
 - To protect the produce during distribution, storage and marketing.
- ✓ The fruit surface must be free of moisture before packing in order to reduce storage rots.
 - ✓ The type of container used for packing tomatoes depends on the market destination.
 - ✓ Tomatoes sold in the domestic market are packed in a diversity of container types. However, they should be well-ventilated, strong, and capable of being stacked without damaging the fruit.
 - ✓ They should not be over- stuffed.
 - ✓ Improper packaging can be a major source of postharvest loss.

- ✓ Sized and graded mature-green tomatoes destined for export are typically packed loose in strong well-ventilated fiberboard cartons containing a net weight of 11 kg

Precautions during packing

- Containers should not be filled either too loosely or too tightly because loose products may vibrate against each other and cause bruising
- Over-packing results in compression bruising
- Soft and over-ripe fruits should not be packed for market, as they will bruise easily and not tolerate transport and handling without suffering high amounts of postharvest losses.
- Proper filling along with cushioning can minimize bruising damage

Cushioning Materials

- Cushioning materials like dry grass, paddy straw, leaves, saw dust, paper shreds etc are used for packaging.
- It should dissipate the heat of respiration of the produce
- It should be free from infection and should be physiologically inactive
- Moulded pulp tray, honeycomb portion, cell pack are used replacing the cushioning material

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Post Harvest Handling of Tomatoes



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Tomatoes have a very short market life if harvested fully ripe. Mature-green or breaker stage fruit may last for several weeks. Tomato fruit are very delicate and can quickly be injured by rough harvesting and handling practices. The fruit is also damaged by holding at either too low or too high a temperature. Proper postharvest handling and storage methods are essential for maintaining acceptable quality and extending the market life.

Maturity indices

Tomato is ready for harvesting 73 – 75 days from planting, depending on the variety. There are several reliable external and internal indices of tomato fruit maturity. The external fruit maturity index is based on skin color, while the internal indices are based on seed development and locular gel formation. However, the most widely used index of tomato maturity is the skin color.

Stages of harvesting

Harvesting of tomatoes is done depending on the purpose to which the fruits are to be used. The different stages of harvesting are as follows-

1. **Mature dark green colour-** Harvest the fruit at mature dark green stage for distant market. Spray the fruits with ethylene 48 hours prior to shipping.
2. **Breaker stage-** Break in colour from green to yellow with pink or red skin covering observed on $\frac{1}{4}$ part of the fruit. Fruits are harvested at this stage to ensure the best quality. Such fruit are less prone to damage during shipment and fetch a higher price.

3. **Pink stage-** Pink colour observed on $\frac{3}{4}$ part of the fruit.
4. **Reddish pink-** Fruits are stiff and nearly whole fruit turns reddish pink. Fruits for local sale are harvested at this stage.
5. **Fully riped-** Fruits are fully ripened and soft having dark red colour. Harvest the fruits at this stage for processing.

How to harvest

- Harvest tomatoes by gently twisting or rotating.
- Remove the stem carefully prior to putting the fruit in the harvest container to prevent puncture of adjacent fruit.
- Do not injure the blossom end as the fruit can be easily infected by pathogens.
- Pick the tomatoes during the coolest part of the day, such as early morning or late afternoon.
- If they are picked in the morning, harvest should be delayed until the moisture has dried off the fruit surface.
- Tomatoes should never be picked during rain or when they are wet as wet fruit encourages spread of decay.
- Harvested fruits should not be thrown or dropped into the picking container, as they are very susceptible to bruise damage.

Preparing for market

a. Cleaning:

- Remove spoiled fruits to avoid contamination to other fruits.
- Clean the fruit surface to remove any dirt, surface stains or adhering leaf tissue with a soft damp cloth.

- If the tomatoes are very dirty, wash with potable water and then air dry the fruit under a shaded area.
- If there is no potable water, use Sodium Hypochlorite at a concentration of 150 ppm (15g/L) as a sanitizing agent so the water is maintained at a pH of 6.5 for effective cleaning.
- Use of cool water relative to the tomato fruit temperature can be a problem.

b. Waxing:

- A thin water-wax emulsion spray coating can also be applied to the fruit as the final step in the cleaning process.
- Waxing the fruit will enhance its appearance and make it more glossy.
- Waxing can reduce fruit shriveling and increase market life.
- Waxing also provides lubrication to the fruit surface that reduces rubbing injury during transit.
- Care should be taken to prevent heavy waxing of the stem scar because ripening will be adversely affected.
- Tomato waxes must be food-grade and are often made from plant extracts (i.e. candellila) or insect extracts (i.e. shellac, beeswax).

c. Grading

- All tomatoes must be sorted and graded before packing for market.