Harvest Maturity Indices

There is no fail-safe measurement for watermelon ripeness. It is recommended to use all the methods described below to make sure that the fruit is harvested at the correct stage for the best possible eating quality.

A good measure of fruit ripeness is the condition of the tendril (small curly stem attached to the fruit stem slightly above the fruit). As the fruit become mature and ripe, the tendril will wilt and change from a healthy green colour to brown as the tendril dries.

The ground spot (the portion of the melon resting on the soil) changes from pale white to a creamy yellow as the fruit become ripe. Also, the side and top surfaces may change from glossy to dull.

Experienced workers can determine ripeness stage based on the sound produced when the fruit is thumped or rapped with a knuckle. Immature fruit will give off a metallic ringing sound, whereas mature fruit will sound dull or hollow.

Several destructive methods can be used on randomly selected fruit to predict harvest maturity of the remaining fruit in the field of similar size. When the fruit is cut in half lengthwise, the entire flesh should be well-coloured and uniform red to dark red (unless it is a yellow-flesh type). In addition, the flesh of mature fruit should be firm, crisp, and free of hollow heart. Immature melons have pink-coloured flesh and over-mature fruit have reddish-orange flesh.

For seeded cultivars, fruit is mature when the jellylike covering around the seed is gone and the seed coat is hard and either black or brown in colour. A fruit with a lot of white seeds is not mature and not ready for harvest.

The soluble solids (SS) content (sugars) of the juice is another commonly used measurement of harvest maturity. SS content in the center of the fruit of at least 10% is a judge of good maturity. The SS is determined by squeezing a few drops of juice on a hand-held refractometer.

Harvest Methods

Watermelon fruit do not come off the vine easily. The stems should be cut off with a sharp knife. A short stem about 2.5 cm (1 in) should be left on the fruit to prevent stem-end rot. The fruit should not be pulled, twisted, or broken off the vine. This can result in the removal of a small piece, or plug, of rind tissue, which is likely to decay.

Large sized watermelons are usually put in rows in the field before being picked up with a vehicle. Otherwise, a group of workers can go through the field and toss the melons from one worker to the next, eventually arriving to a person on the transport vehicle. Fruit of small sized cultivars (less than 5 kg or 11 lbs per fruit) can be put in strong wooden field containers and carried out of the field. Watermelons should be handled gently to avoid bruising. Any fruit that is dropped during handling should not be loaded.

Due to their large size and vulnerability to splitting or cracking under stress, watermelons should not be harvested in the early morning, when they hold the most water. Also, do not pick wet fruit, as the dirt on the watermelon surface will spread to other fruits during handling.

Harvested watermelons should be taken out of the field as soon as possible. Sitting in direct sunlight in the heat of the afternoon can result in sunburn of the fruit surface within a few hours. The damage is more obvious in varieties with dark rinds.

Watermelons should not be stacked on the stem end or blossom end during transport. The internal flesh is more at risk to damage from shaking if the fruit are stacked in this manner. Keeping the depth of the stack to less than 1 meter (3 ft) will minimize fruit bruising during transport.

Watermelons can be loaded directly for transport to a domestic market destination, or brought to a packinghouse to be graded for export.

Grading

Watermelons are graded according to external appearance. Fruit shape should be symmetrical and uniform in size within the same container. The surface should be clean and have no blemishes, scars, sunburn, and decay. The National Bureau of Standards has established three different grades for domestic marketed watermelons (Grade 1, Grade 2, and Grade 3) based on various fruit quality characteristics. Domestic marketed fruit are also classified by size and weight:
- Small: less than or equal to 3.2 kg (7 lb)
- Medium: 3.3 kg to 4.5 kg (7 lb to 10 lb)
- Large: greater than or equal to 4.6 kg (10 lb)

Randomly selected fruit should be cut open and checked for internal quality. The flesh in the fruit center should have a minimum 10% SS content, a uniform red colour, and a crisp texture.

Packing

Watermelons sold domestically may be loaded directly from the field onto the bed of a truck or trailer and transported to market. Watermelons destined for export should be packed in a strong, well-ventilated container. The typical container is a double-walled corrugated carton containing from three to eight watermelons, depending on fruit size and shape. The cartons weigh between 25 kg to 35 kg (55 lb to 77 lb). Dividers should be put inside the carton to separate the fruit and strengthen the carton.

Preparation for Market

Cleaning

Any soil in the ground spot area or other surface stains should be removed at the time of harvest with a soft cloth or cotton gloves. Watermelons are usually not washed, but this may be needed to remove excess soil or to enhance the appearance for a particular market. The wash water should be clean and properly sanitized to prevent the spread of postharvest disease. The wash water should be sanitized with 150 ppm hypochlorous acid (household bleach) maintained at a pH of 6.5. This is equal to 2 oz of household bleach (such as Marvex) per 5 gallons of water, or 0.3 liters of bleach per 100 liters of water. As the wash water becomes dirty with soil and organic matter, the cleaning ability of the hypochlorous acid weakens. The wash water should be changed when necessary.

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The first grading for market quality fruit should be done in the field at the time of harvest. Deformed, insect damaged, decayed, or cracked fruit should not be sent to market.

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Temperature Control

The best temperature for storage and transport of watermelon is 10°C (50°F). Market life is up to 21 days at 10°C. Warmer storage temperatures, lessens market life and the fruit lose their sweetness. Watermelon market life is usually 14 days at 15°C (59°F). Watermelons held at temperatures around 29°C (84°F) should be sold right away, before the flavour changes.

Watermelons should not be held below 10°C (50°F) because they are at risk to chilling injury (CI). Injury becomes greater as the temperature decreases and the length of time of storage at below 10°C increases. Symptoms of CI include sunken depressions on the fruit surface (pitting), brown staining of the rind, loss of flesh colour, loss of flavour, and increased decay. Conditioning fruit at 30°C (86°F) for about 4 days before cooling at 10°C (50°F) will help reduce the risk of CI.

Watermelons should be held at 90% to 95% relative humidity (RH). Storage at low RH will result in shrivelling of the rind and a loss of external shine. Skin abrasions incurred during harvesting and handling become more noticeable at a low RH.

Principal Postharvest Diseases

A number of bacteria may cause postharvest decay of watermelon. The best defense against decay is good field sanitation practices, careful harvesting and handling to avoid bruising and injury to the fruit, and holding the fruit at 10°C.

**Anthracnose**

Symptoms of anthracnose are sunken spots on the rind, which eventually become black. Red or orange coloured spores may appear in the decayed areas.

**Phytophthora Fruit Rot**

Phytophthora fruit rot appears as greasy blotches on the outer rind. A whitish mould is likely to be present on the greasy tissue. This disease is most likely to occur during or after periods of excessive rain when water remains in the field. Foliar sprays of the systemic fungicide Ridomil provide some protection against this disease.

**Fusarium**

Symptoms first appear as spots on the underside of the fruit, and eventually spread to the upper surface. Infected tissue is usually spongy or soft. Under humid conditions, the fruit may become covered with a white or pink mould. The decay may be shallow or extend deep into the flesh. Usually there is a sharp outline between healthy and rotted tissue.

**Stem-end Rot**

Stem end rot is first seen as a withering and drying of the stem followed by browning of the area around the stem, which progressively enlarges as the disease develops. The cut flesh is noticeably softened and light brown in colour. In order to minimize the incidence of this disease, at least 2.5 cm of stem should remain attached to the fruit at harvest.

For additional information contact:

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National Agricultural Research Institute (NARI)
Mon Repos, East Coast Demerara, Guyana
Tel: 220 2950

WATERMELON

Postharvest Handling and Market Preparation

Information Sheet

With the assistance of

The United States Agency for International Development

This information sheet provides growers and agriculture extension personnel with a summary of the recommended harvest and postharvest handling practices for watermelon. A more technical and detailed bulletin is available from the New Guyana Marketing Corporation (NGMC) and the National Agricultural Research Institute (NARI).