

Prickly Pear

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Scientific Name and Introduction

Prickly pear fruit are harvested from various species of the prickly pear cactus, genus *Opuntia* of the cactus family (Cactaceae). Fruit are also called cactus pears or cactus fruit, though these names can result in confusion with fruits from other cactus species. The fruit is a berry, typically weighs 100 to 200 g (0.2 to 0.4 lb), and consists of a thick fleshy skin or rind surrounding a juicy pulp that contains many hard-coated seeds. Fruit vary considerably in color, size, and flavor. Prickly pear fruit are produced in California or are imported from Mexico (“tunas”) and Chile.

Quality Characteristics and Criteria

Fruit of high quality need to be harvested near full ripeness to have color and flavor typical of each variety. They should have a high percentage of pulp, low seed content, and peel that is easy to remove. Fruit typically have high sugar content (12 to 17% SSC) and low acidity (0.03 to 0.12% TA). Cactus pears contain considerable amounts of vitamin C (200 to 400 $\mu\text{g g}^{-1}$). If harvested at maturity from good varieties, fruit have a delicate sweet flavor that differs by variety.

Horticultural Maturity Indices

Stage of maturity or ripeness at harvest is very important for fruit quality since sugar content and sweetness do not increase after harvest. Maturity indices include fruit size and fullness, changes in peel color, abscission of the small spines (glochids), fruit firmness, and flattening of the floral cavity or receptacle. Peel color is the single most important index for commercial harvest.

Grades, Sizes, and Packaging

There are no U.S. grades. Fruit are packed according to color, size, and condition in 4.5 kg (10 lb) cartons or may be packed in single- or double-layer tray cartons. Large fruit may be wrapped in tissue paper to reduce scuffing and other physical injury. Fruit may also be packaged in cartons with perforated plastic liners to reduce water loss under dry storage conditions.

Precooling Conditions

Fruit should be cooled to 5 °C (41 °F) to reduce loss of visual appearance (shiny surface) resulting from water loss. Fruit are usually room-cooled, but may also be forced-air cooled. Cooling may be delayed if fruit undergo curing treatment (see *Special Considerations*).

Optimum Storage Conditions

Depending on variety, ripeness stage, and harvest season, fruit can be kept for 2 to 5 weeks at 5 to 8 °C (41 to 46 °F) with 90 to 95% RH. Factors limiting storage life are decay, dehydration,

and chilling injury.

Controlled Atmosphere (CA) Considerations

Limited research indicates that holding cactus pear at 5 °C (41 °F) in 2% O₂ and 2 to 5% CO₂ delays ripening and extends storage life (Kader 2000).

Retail Outlet Display Considerations

Fruit should be kept cold to reduce dehydration. At retail, the surface of cactus fruit may appear dull due to water loss.

Chilling Sensitivity

Cactus pear fruit are especially chilling sensitive when stored at <5 °C (41 °F), but chilling injury may occur in some varieties at <10 °C (50 °F). Symptoms include pitting, surface bronzing and dark spots on the peel, and increased susceptibility to decay. Chilling occurred in a red-fruit variety after only 2 weeks at 6 °C (43 °F), but fruit from other varieties were held for several weeks without signs of chilling. Summer-harvested fruit are more chilling sensitive than autumn-harvested fruit (Schirra et al. 1999). Application of calcium chloride, conditioning, and intermittent warming have had variable success in reducing chilling injury.

Ethylene Production and Sensitivity

Prickly pear fruit produce very low amounts of ethylene, about 0.2 µL kg⁻¹ h⁻¹ at 20 °C (68 °F). They are not sensitive to ethylene exposure.

Respiration Rates

Fruit are nonclimacteric and respiration rates are low during storage. The respiration rate at 20 °C (68 °F) is 27 to 36 mg (15 to 20 µl) CO₂ kg⁻¹ h⁻¹. Heat production is about 7,000 BTU ton⁻¹ day⁻¹ or 1,900 kcal tonne⁻¹ day⁻¹.

Physiological Disorders

See section above on *Chilling Sensitivity*.

Postharvest Pathology

Harvest damage to the peel and stem-end of cactus fruit will lead to attack by numerous pathogens and result in fruit decay. Common postharvest pathogens on cactus fruit are mostly fungi and include *Fusarium* spp., *Alternaria* spp., and *Penicillium* spp., but yeasts and bacteria also cause decay. Hot water dips at 53 to 55 °C (127 to 131 °F) for 5 min and fungicide-containing waxes may reduce surface decay, but are not effective when there is damage to the stem-ends. For control of decay on stem-ends, see *Special Considerations*. Preharvest calcium sprays result in less postharvest decay (Schirra et al. 1999).

Quarantine Issues

There are no known quarantine issues.

Suitability as Fresh-Cut Product

Even after brushing and washing, the peel of intact cactus fruit may have irritating small spines, and a peeled packaged fruit product could be a useful option. A mixture of cactus fruit of different colors and types could be a potentially attractive product.

Special Considerations

Fruit can be bruised easily by finger compression during harvest, but damage at the stem-end is by far the most serious mechanical injury. Damage at the stem-end can be eliminated by careful harvesting (twisting fruit from the stem or cutting fruit with a small piece of stem attached). Fruit harvested with a bit of stem may be packed that way or cured under moderate temperature of 15 to 20 °C (59 to 68 °F) with airflow so that the bit of stem dries and falls off before fruit are packed. This prevents damage to the stem end and greatly reduces decay incidence. High-gloss fruit waxes are often used to improve appearance and reduce dehydration. This is especially important if fruit are dry-brushed to remove small tufts of spines or glochids.

References

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Further Reading

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