Tamarillo

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Scientific Name and Introduction

The tamarillo or "tree tomato" (*Cyphomandra betacea* [Cav.], or as renamed by Sendtner, *Solanum betaceum* [Cav.]) is a fruit-bearing subtropical tree of the Solanaceae family. Fruit are smooth-skinned, oval berries capped with a calyx and stem. The three main fresh market types are based on peel and pulp color: red, dark-red, and yellow. The mucilaginous, juicy, seedy pulp has a sweet-acid taste reminiscent of the tomato, and the fruit are sometimes eaten raw; usually, however, they are cooked. Tamarillos can be produced in California, but most dark-red tamarillos in U.S. markets are imported from New Zealand.

Quality Characteristics and Criteria

Fruit should be firm and heavy with no decay or discoloration. Color should be characteristic of the variety. Good quality tamarillos are juicy when ripe with moderate sugar content (8 to 10%) and TA no higher than 1 to 2%.

Horticultural Maturity Indices

The best maturity index for tamarillo is peel and pulp color. Other indices correlated with skin color are changes in firmness, juice content, and SSC. For dark-red-skinned types, which progress from green to dark purple (color due to chlorophyll and anthocyanins) to red, harvesting at the dark purple stage is considered best. If fruit are harvested green, flavor score, juice content, SSC, and color of ripened fruit are inferior to those of fruit harvested at the dark-purple stage (Heatherbell et al. 1982, El-Zeftawi et al. 1988).

Grades, Sizes, and Packaging

There are no U.S. grade standards. Fruit are typically packed into tray packs in single cartons based on four or five fruit size catedories.

Precooling Conditions

Room-cooling to storage temperature appears to be the only way tamarillo fruit are precooled. No guidelines are available regarding maximum allowable cooling delays.

Optimum Storage Conditions

Tamarillo fruit can be stored for 4 to 8 weeks (plus an additional week for marketing) at 3 to 5 °C (37 to 40 °F) with 90 to 95% RH (Harman and Patterson 1982). Chilling injury occurs if fruit are stored below 3 °C (37 °F), and fungal decay occurs on the stem and calyx if stored above 5 °C (40 °F). Storage at 7 °C (45 °F) was superior to storage at 0 °C (32 °F) for 35 days, with more discoloration of the calyx and stem at 0 °C (32 °F) but more decay and firmness loss at 7 °C (45

°F) (Espina and Lizana 1991).

Controlled Atmosphere (CA) Considerations

No considerations can be reported at this time.

Retail Outlet Display Considerations

Fruit should be kept cool and dry throughout marketing.

Chilling Sensitivity

Tamarillos are sensitive to chilling injury if stored below 3 °C (37 °F). Symptoms include pitting and a scaldlike browning of the skin, calyx, and stem. Discoloration on the peel is observed within 15 days of storage at 0 °C (32 °F) (Espina and Lizana 1991).

Ethylene Production and Sensitivity

Ethylene production is very low (<0.1 µL kg^{-1} h^{-1}) until fruit begin to senesce (Pratt and Reid 1976). Green and partially ripe fruit respond to ethylene with increased respiration (Pratt and Reid 1976) and accelerated red color development (Prohens et al. 1996). Green fruits, however, have less color development and lower SSC:TA ratio when ripe than fruit harvested partially ripe (Prohens et al. 1996).

Respiration Rates

The respiration rate is 18 to 36 mg (10 to 20 µL) CO_2 kg^{-1} h^{-1} at 18 to 20 °C (64.4 to 68.0 °F). Heat production is 3,960 to 7,920 BTU ton^{-1} day^{-1} or 1,098 to 2,196 kcal $tonne^{-1}$ day^{-1}. Data from Pratt and Reid (1976) and Espina and Lizana (1991).

Physiological Disorders

Viral diseases attacking tamarillo plants may cause mottling on the fruit surface.

Postharvest Pathology

Decay is the single most important cause of postharvest losses in tamarillo. The most common decay is bitter rot caused by *Colletotrichum acutatum* and *C. gloeosporioides*. This fungus attacks fruit on the tree, but decay does not develop until fruits start to ripen or are stored for several weeks. A good orchard control program with postharvest applications of fungicides can control development of the disease (Blank et al. 1987). Hot water dip of 50 °C (122 °F) for 10 min, followed by waxing, is also effective (Yearsley et al. 1988). With good decay-control measures, storage life may be extended to 10 to 12 weeks at 3.5 °C (38 °F) (Harman and Patterson 1982).

Quarantine Issues

There are no known quarantine issues.

Suitability as Fresh-Cut Product

No current potential exists.

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