

Passion Fruit

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Scientific Name and Introduction: Purple passion fruit (*Passiflora edulis* Sim.) and yellow passion fruit (*P. edulis* f. *flavicarpa* Deg.) should more correctly be referred to as the passion flower fruit, but the trade more commonly uses passion fruit. Hybrids of the two subspecies freely form and have characteristics between the two parents. A tough outer skin surrounds a fleshy, acidic, yellow pericarp and aril surrounding small edible black seeds (Pruthi, 1963).

Quality Characteristics and Criteria: Size, shape, skin color, acidity and SSC are the major criteria used to evaluate quality. The yellow egg-shaped passion fruit is 6 to 8 cm (2.5 to 3 in) wide by 7 cm (2.7 in) long and weighs from 50 to 150 g (1.8 to 5.3 oz). The smaller purple fruit weighs from 25 to 50 g (1 to 2 oz). Fruit should be blemish free. SSC is 10 to 18% in yellow and 10 to 20% in purple, with the yellow type having a more acidic flavor.

Horticultural Maturity Indices: Fruit are harvested when they are $\geq 75\%$ turning yellow or purple (Chan, 1980). Purple passion fruit at the light-purple stage are more suitable for long distance transport. Normally, the respiratory climacteric occurs on the vine. Fruit harvested earlier have an unripe flavor (Campbell and Knight, 1983). In some cases, fruit are allowed to abscise and fall, and are then picked up from the ground.

Grades, Sizes and Packaging: Fruit should have a diameter of 5 to 8 cm (2 to 3 in) for purple and 6 to 8 cm (2.5 to 3 in) for yellow. Skin color should be full yellow or purple, unless a hybrid. Fruit are packed in 6 (13.2 lb) and 4.5 kg (9.9 lb) fiberboard cartons, sometimes in one- or two-layer trays or cell packs.

Pre-cooling Conditions: Room or forced-air cool to 10 °C (50 °F).

Optimum Storage Conditions: Yellow passion fruit should be stored at 7 to 10 °C (45 to 50 °F) with 90 to 95% RH. They will have a potential storage-life of 2 weeks (Arjona et al., 1992). Purple passion fruit are chilling tolerant and can be stored at 3 to 5 °C (37 to 41 °F) for 3 to 5 weeks.

Controlled Atmosphere (CA) Consideration: Modified atmospheres (MA) have been tested on yellow passion fruit, and a fungicide treatment first before storage is desirable. Fruit held at 6 to 10 °C (43 to 50 °F) for 3 to 4 weeks had less shrivel (Campbell and Knight, 1983). Film-bagging and various coatings reduce water loss in yellow and purple passion fruit (Mohammed, 1993; Arjona et al., 1992; Bepete et al., 1994). Response to coatings and film bagging may be associated with control of water loss, rather than MA effects.

Retail Outlet Display Considerations: Display at ambient temperature, do not mist or ice.

Chilling Sensitivity: Symptoms of chilling injury on yellow passion fruit are skin discoloration, pitting, water soaked areas, uneven ripening and increased decay. Discoloration can penetrate skin into the exocarp.

Ethylene Production and Sensitivity: Passion fruit produce very high levels of ethylene at 160 to 400 $\mu\text{L kg}^{-1} \text{h}^{-1}$ at 20 °C (68 °F) at their climacteric peak (Shiomi et al., 1996). Exposure to 100 $\mu\text{L L}^{-1}$ ethylene for 24 h accelerates ripening (Arjona and Matta, 1991; Akamine et al., 1957).

Respiration Rates: The climacteric of this fruit normally occurs on the vine (Biale, 1975).

Temperature	mg CO ₂ kg ⁻¹ h ⁻¹
5 °C	29 to 58
10 °C	39 to 78
20 °C	87 to 194
25 °C	175 to 349

To get mL kg⁻¹ h⁻¹, divide the mg kg⁻¹ h⁻¹ rate by 2.0 at 0 °C (32 °F), 1.9 at 10 °C (50 °F), and 1.8 at 20 °C (68 °F). To calculate heat production, multiply mg kg⁻¹ h⁻¹ by 220 to get BTU per ton per day or by 61 to get kcal per metric ton per day.

Physiological Disorders: Shriveling, pulp fermentation and fungal attack are the major postharvest problems (Pruthi, 1963). Shriveling is due to moisture loss without initially significantly affecting pulp quality.

Postharvest Pathology: Normally a minor problem. Most common is brown spot (*Alternaria passiflorae*), whose symptoms include circular, sunken, light-brown spots on ripening fruit (Inch, 1978). This disease is most severe following warm, wet periods. Septoria spot (*Septoria passiflorae*) infects fruit in the field and leads to uneven ripening of the skin. Phytophthora fruit rot (*Phytophthora* spp.) causes water soaked dark-green patches that dry up on the skin. Orchard sanitation, reduction in high RH by pruning to open the canopy and the application of fungicides can minimize these diseases.

Quarantine Issues: Fruit are a fruit fly host and may require treatment. Irradiation has been successful.

Suitability as Fresh-cut Product: No current potential.

Special Considerations: None.

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