

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 form freely 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). The yellow, egg-shaped type of passion fruit is 6 to 8 cm (2.5 to 3 in) wide by 7 cm (2.7 in) long and weighs 50 to 150 g (1.8 to 5.3 oz). The smaller purple fruit weighs 25 to 50 g (1 to 2 oz).

Quality Characteristics and Criteria

Size, shape, skin color, acidity, and SSC are the major criteria used to evaluate quality. Fruit should be free of blemishes. SSC is 10 to 18% in yellow fruit and 10 to 20% in the purple type, with the yellow type having a more acidic flavor.

Horticultural Maturity Indices

Fruit are harvested when ≥ 75 % are turning yellow or purple (Chan 1980). Purple passion fruit at the light-purple stage is 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-kg (13.2-lb) and 4.5-kg (9.9-lb) fiberboard cartons, sometimes in one- or two-layer trays or cell packs.

Precooling Conditions

Room-cooling or forced-air cooling to 10 °C (50 °F) is desirable.

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 before storage is desirable. Film-bagging and various coatings reduce water loss in yellow and purple passion fruit (Arjona et al. 1992, Mohammed 1993, 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

Fruit should be displayed at ambient temperature and not misted or iced.

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: 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 (Akamine et al. 1957, Arjona and Matta 1991).

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 CO₂ 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 ton⁻¹ day⁻¹ or by 61 to get kcal tonne⁻¹ day⁻¹.

Physiological Disorders

Shrivel, pulp fermentation, and fungal attack are the major postharvest problems (Pruthi 1963). Shrivel is caused by moisture loss without initially significantly affecting pulp quality.

Postharvest Pathology

Postharvest disease is 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 of high RH by pruning to open the canopy, and application 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 potential currently exists.

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