



Breadfruit: Postharvest Quality-Maintenance Guidelines

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The tropical breadfruit develops from the whole inflorescence and is normally round, sometimes cylindrical, 15 to 30 cm (6 to 12 in) in diameter, and weighs from 0.5 to 3 kg (1.1 to 6.6 lb) (Nakasone and Paull 1998). The fruit receptacle (core) is surrounded by a pale yellow-white edible pulp, which is covered by a yellow-green thin reticulated skin. Most varieties are seedless (Ragone 1991); seeded varieties have 10 to 150 brown seeds, 2.5 cm (1 in) long (Bennett and Nozzolillo 1987). They are widely grown in tropical areas.



Breadfruit, (*Artocarpus altilis* [Parkins] Fosb.)

Quality Characteristics and Criteria

Fruit must be physiologically mature, have green skin and firm flesh with uniform shape, and be free from decay, sunscald, cracks, bruises, and mechanical damage.

Horticultural Maturity Indices

Fruit at different growth stages are harvested for different uses. Mature green fruit are harvested as a starch vegetable, while some people prefer to eat the ripe sweet fruit. Harvested green fruit produce copious latex, especially from the cut peduncle and injuries on the fruit. Maturity is indicated by larger size, a slight change in the skin color to a yellowish-green, small drops of latex

on the rind, firm flesh texture, and segments more rounded and smoother than on less mature fruit.

As the fruit starts to ripen, the skin changes to a yellowish green. Latex needs to be allowed to drain from the fruit after harvest before washing in water to avoid latex stain.

Grades, Sizes, and Packaging

There are no U.S. or International grade standards. They are graded according to size and packed in various weights

per fiberboard carton from 9 to 18 kg (20 to 40 lb). Fruit are sold on a weight basis. Telescoping 2-piece fiberboard cartons are generally used for packaging. Also used are 1-piece cartons having dividers to minimize fruit movement and rubbing.

Pre-Cooling Conditions

Cool and ship fruit as soon as possible after harvest. Room-cooling is generally used to 12°C (53.6°F). Do not use hydro-cooling as it leads to skin browning.

Optimum Storage Conditions

Store at 12 to 14°C (53.6 to 57.2°F) and 90 to 95% RH for a maximum of about 20 days.

Controlled Atmosphere (CA) Considerations

Film wrapping delays softening and skin discoloration of breadfruit stored at 13°C (55.4°F) (Thompson et al. 1974). The O₂ levels in film-wrapped fruit are less than 5% (Worrell and Carrington 1997), while CO₂ rose to 10 to 30%. CA studies indicated that at 12°C (53.6°F), the best storage atmosphere is 2 to 5% O₂ + 5% CO₂ for up to 3 weeks storage (Ramlochan 1991).

Retail Outlet Display Considerations

Display at 12 to 14°C (53.6 to 57.2°F); do not mist.

Chilling Sensitivity

Longterm storage is not possible. At 12°C (53.6°F) chilling injury symptoms begin to develop within 7 days (Marriott et al. 1979). Symptoms are a brown scald-like discoloration of the skin, failure to fully soften, poor flavor development, and an increase in decay.

Ethylene Production and Sensitivity

Early-maturing fruit have a production rate of 1.0 to 1.5 µL kg⁻¹ h⁻¹ and 0.7 to 1.2 µL kg⁻¹ h⁻¹ for late mature fruit (Worrell and Carrington 1997). Breadfruit are sensitive to ethylene exposure, which leads to rapid ripening.

Respiration Rates

See Table 1. To get mLkg⁻¹ h⁻¹, divide the mgkg⁻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



Disease-damaged breadfruit

(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. From Worrell and Carrington (1997) and Worrell et al. (1998).

Physiological Disorders

Mechanical injury leads to rapid deterioration, possibly due to wound ethylene inducing premature and more rapid ripening. No other reported disorders (Worrell and Carrington 1997).

Postharvest Pathology

Fruit rot due to *Phytophthora palmivora* and pink disease (*Botryobasidium salmonicola*) have been reported (Salunke and Desai 1984). Purseglove (1968) reports a fruit rot caused by *Rhizopus artocarp*i in India.

Quarantine Issues

Breadfruit is a fruit fly host and has been successfully treated by vapor heat treatment and irradiation.

Suitability as Fresh-Cut Product

No products have yet been developed.

Special Considerations

Fruit can be boiled, dried, used in breadmaking, or fermented, while slices can be fried or stored in brine (Whitney 1988, Bates et al. 1991). The sweet ripe fruit is eaten as a dessert. The cooked seeds are also eaten.

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Table 1. Respiration Rates of Breadfruit

Temperature	mg CO ₂ kg ⁻¹ h ⁻¹
13°C	94 to 564
25°C	362 to 597