

# Jicama

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**Scientific Name and Introduction:** Jicama (*Pachyrhizus erosus* (L.) Urban) is a root crop of the Legume family (Leguminosae). It is also called Yam Bean and is a brown skinned turnip-shaped root eaten raw or cooked as a substitute for water chestnut. The root only forms under warm, short days. Therefore, most jicama in U.S. markets is imported from Mexico where it is a native crop. Jicama is also produced to a limited extent in Hawaii. Roots are about 85% water, <1% fiber, < 1.5% protein, <0.5% ash and about 10% carbohydrate, of which about 10% is sucrose.

**Quality Characteristics and Criteria:** Good quality jicama roots should be smooth and firm, with uniform shape and size, be free from mechanical damage, and have a crisp, succulent, white sweet-starchy flesh.

**Horticultural Maturity Indices:** Jicama roots can be harvested at various stages of development. Young tender roots harvested from green plants (100 to 150 g; 3.5 to 5.3 oz) are found in specialty markets. Fully mature roots, however, weigh from 250 to 1500 g (0.55 to 3.3 lb). Mature roots are characterized by size and well-developed periderm as well as their starchy-sweet flavor. To promote hardening of the periderm, plant tops are removed mechanically or irrigation is stopped.

**Grades, Sizes and Packaging:** There are no U.S. Grades for jicama. In Hawaii, however, two grades are recognized based on size and freedom from defects (dirt, discoloration, growth cracks, roughness, insect damage, mechanical injury). After transport in bulk, jicama roots are typically packed in wooden crates of 9 kg (20 or more lb), or in carton boxes of about 4.5 kg (10 lb) for export to the U.S.

**Optimum Storage Conditions:** Jicama can be stored for 2 to 4 mo at 12.5 to 15 °C (54 to 59 °F) with 80 to 90% RH. However, leaf and stem sprouts develop after 2 mo with loss of weight and juiciness of the pulp. Minimizing mechanical damage to the periderm during harvest will reduce decay incidence during storage.

**Controlled Atmosphere (CA) Considerations:** No information is available on the potential benefits of CA storage of intact jicama roots. Based on work with other root crops, however, it would not be expected to provide much benefit. Decay development and discoloration of fresh-cut pieces was reduced by 5 to 10% CO<sub>2</sub>-modified atmospheres (Aquino-Bolaños et al., 2000).

**Retail Outlet Display Considerations:** Keep roots cool and dry to reduce water loss and superficial decay.

**Chilling Sensitivity:** Depending on variety and production area, jicama may develop symptoms of chilling injury after 1 to 3 weeks of storage at 10 °C (50 °F) (Cantwell et al., 1992; Mercado and Cantwell, 1998). No chilling injury is observed on roots stored at 12.5 °C (54.5 °F). Decay is the main external symptom of chilling injury, and discoloration and loss of crisp texture are the main internal symptoms. The roots eventually become “rubbery” in texture when severely chilled. Internal discoloration typically occurs from the skin inwards and is more common and more severe in moderately chilled roots stored at 10 °C (50 °F). At lower temperatures, the pulp will take on a translucent appearance but not necessarily develop brown discoloration; these roots probably also exhibit external decay.

**Ethylene Production and Sensitivity:** Jicama produces only very low amounts of ethylene at < 0.1 µL kg<sup>-1</sup>

h<sup>-1</sup>, although higher rates may be observed after chilling at 10 °C (50 °F), about 0.5 μL kg<sup>-1</sup> h<sup>-1</sup>. Jicama is not sensitive to ethylene exposure.

**Respiration Rates:**

Temperature	Intact roots	Fresh-cut pieces
	(mg CO <sub>2</sub> kg <sup>-1</sup> h <sup>-1</sup> )	
0 °C	4 to 8	4 to 8
5 °C	10 to 12	8 to 12
10 °C	9.5 to 19	11 to 19
12.5 °C	4 to 8	-
20 °C	5 to 7	-

To get mL kg<sup>-1</sup> h<sup>-1</sup>, divide the mg kg<sup>-1</sup> h<sup>-1</sup> 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<sup>-1</sup> h<sup>-1</sup> by 220 to get BTU per ton per day or by 61 to get kcal per metric ton per day. Data for intact commercial size roots are from Cantwell et al. (1992).

At 5 °C and 10 °C, respiration rates increase during storage; rates decrease during storage at temperatures > 10 °C. Less mature roots may have higher rates (Bergsma and Brecht, 1992). Respiration rates for fresh-cut pieces were from 2 x 3 cm cylinders (Aquino-Bolaños et al., 2000).

**Physiological Disorders:** See chilling injury.

**Postharvest Pathology:** The most common decay organisms found externally on jicama roots are species of *Penicillium*, *Rhizopus*, and *Cladosporium* (Bruton, 1983; Cantwell et al., 1992). Most postharvest decay of jicama is a consequence of mechanical or chilling injury.

**Quarantine Issues:** None.

**Suitability as Fresh-cut Product:** Fresh-cut jicama is incorporated in mixed vegetable snack trays because of its crisp texture and sweet-starchy flavor. Fresh-cut jicama should be stored below 5 °C (41 °F) to reduce microbial growth and discoloration. A shelf-life of 4 to 8 days can be expected at 5 °C (41 °F) in air. MA with 5 to 10% CO<sub>2</sub> maintain quality and extend shelf-life of fresh-cut jicama (Aquino-Bolaños et al., 2000).

**Special Considerations:** *Curing.* The periderm of jicama roots is easily damaged during harvest and transport, and this leads to an unsightly appearance, high rates of water loss, and increased susceptibility to decay. Wound healing or curing can be achieved by holding jicama roots at 20 to 25 °C (68 to 77 °F) under 95 to 100% RH for at least 1 week. These conditions are similar to those described for curing sweetpotatoes and other tropical root and tuber crops.

**References:**

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