

Parsnip

Peter M.A. Toivonen

Toivonen is with the Pacific Agri-Food Research Centre, Agriculture and Agri-Food Canada, Summerland, British Columbia, Canada.

Scientific Name and Introduction

The parsnip (*Pastinaca sativa* L.) is a native of Europe and Asia. The plant is a biennial, belonging to the Apiaceae (Umbelliferae), or parsley, family. The crop is grown as an annual, and the thickened, cream-colored root is the edible portion. It is a long-season crop (~100 days) and thrives best in cool growing climates. Parsnips are generally available from mid August to March.

Quality Characteristics and Criteria

A high-quality parsnip will be firm, reasonably clean, and fairly smooth-surfaced (not deeply ridged, no secondary rootlets). Parsnips are topped after harvesting but should not be trimmed into the crown.

Horticultural Maturity Indices

Parsnips are harvested when root diameter is between 2.5 and 7.6 cm (1 and 3 in) at the shoulder.

Grades, Sizes, and Packaging

There are two grades, U.S. No. 1 and U.S. No. 2, based on shape, external appearance, and size. Parsnips are commonly packaged in 11.4-kg (25-lb) perforated polyethylene bags or 5.5-kg (12-lb) cartons holding 12 cello bags of 0.5 kg (1 lb) each.

Precooling Conditions

Parsnips are similar to carrots in requirements and should be cooled using hydrocooling or package-icing. Rapid cooling to 5 °C (41 °F) or below immediately after harvest is essential to minimize decay and moisture losses during extended storage.

Optimum Storage Conditions

Parsnip roots can be stored 4 to 6 mo at 0 to 1 °C (32 to 34 °F) with 98% RH (van den Berg and Lentz 1973). Only healthy roots with no damage should be placed in storage.

Controlled Atmosphere (CA) Considerations

Little work has been done, but limited results suggest that there are no benefits to controlled-atmosphere storage (Stoll and Weichmann 1987).

Retail Outlet Display Considerations

Water sprinklers and top-icing are acceptable for nonpackaged product. Packaged products should be held in a cold display case with no ice or water sprinklers.

Chilling Sensitivity

Parsnips are not chilling sensitive.

Ethylene Production and Sensitivity

Parsnips produce very little ethylene: $<0.1 \mu\text{L kg}^{-1} \text{ h}^{-1}$ at 20 °C (68 °F). Exposure to low levels of ethylene in cold storage causes bitterness, likely due to accumulation of xanthotoxin (8-methoxypsoralen) (Johnson et al. 1973, Shattuck et al. 1988).

Respiration Rates

Temperature	mg CO ₂ kg ⁻¹ h ⁻¹
0 °C	8 to 16
5 °C	8 to 18
10 °C	19 to 25
15 °C	30 to 43

Data from Smith (1957) and van den Berg and Lentz (1972).

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

Surface browning is a significant problem that is largely associated with bruising and abrasion injury during harvest (Kaldy et al. 1976, Toivonen 1992). Crops grown on coarse sandy soils are more susceptible, and there are cultivars resistant to browning (Kaldy et al. 1976, Toivonen 1992). Surface browning also increases with length of storage (Kaldy et al. 1976). Postharvest dips reduce browning during storage (Toivonen 1992). Waxing parsnips, to reduce moisture loss, will increase browning (Plantenius 1939).

Postharvest Pathology

Diseases of importance during storage, transit, and marketing are parsnip canker (*Itersonilia perplexans* Derx.), gray mold rot (*Botrytis cinerea* Pers.:Fr.), bacterial soft rot (*Erwinia carotovora* (Jones) Bergey et al.) and watery soft rot (*Sclerotinia sclerotiorum* [Lib.] de Bary) (Smith et al. 1982). Some cultivars are resistant to parsnip canker (Davis et al. 1989).

Quarantine Issues

There are no known quarantine issues.

Suitability as Fresh-Cut Product

No potential exists.

Special Considerations

The highest freezing temperature is -0.9 °C (30.4 °F). An important component of parsnip quality is sweetness, which is enhanced if exposed to fall frosts before harvest. However, early-harvested parsnips can also be induced to sweeten using short-term cold storage (Shattuck et al. 1989).

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Acknowledgments

Some information included was taken from the Oregon State University website “Commercial Vegetable Production Guides” at <http://horticulture.oregonstate.edu/content/vegetable-production-guides> and the British Columbia Vegetable Marketing Commission website at <http://www.bcveg.com>.

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