

# Ginseng

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## Scientific Name and Introduction

American ginseng (*Panax quinquefolium* L.), Chinese sanch'i ginseng (*Panax notoginseng*), Japanese ginseng (chikusetsu-ningin) (*Panax japonica*), and Korean ginseng (*Panax ginseng* C.A Meyer) are all perennials of the Araliaceae family (Bae 1978). The edible portion is the main root with two to five lateral roots. Ginseng is used as a cure-all medicine in Asia (Proctor 1990). Ginseng is grown primarily between latitudes 30° to 48° N in Canada, China, Korea, and the United States.

## Quality Characteristics and Criteria

High-quality ginseng has a firm main root without defects. It should be clearly defined to show a head (rhizome), body (main root), and legs (lateral roots).

## Horticultural Maturity Indices

Ginseng is usually harvested 3 to 5 years after transplanting 1-year-old seedlings. The optimum time for harvest in Korea is August to October, when its medicinal value is highest.

## Grades, Sizes, and Packaging

Ginseng is first classified by the age of the root and then by external appearance. Size grades are “first”—over 6 cm (2.4 in) long and 60 g (0.13 lb), “second”—4 to 6 cm (1.8 to 2.7 in) long and 40 to 60 g (0.09 to 0.13 lb), and “third”—3 to 4 cm (1.2 to 1.8 in) long and 30 to 40 g (0.07 to 0.09 lb). Packaging varies greatly.

## Precooling Conditions

Ginseng roots are commonly hydrocooled or forced-air cooled to below 5 °C (41 °F). Cooling generally retards subsequent deterioration such as weight loss and decay.

## Optimum Storage Conditions

Ginseng should be stored at 0 °C (32 °F) with 95% RH or higher. Roots retain good quality for 2 mo at 0 °C (Yun 1998) and 20 days at 25 °C (77 °F) (Oh et al. 1979).

## Controlled Atmosphere (CA) Considerations

Reduced microorganism growth and attenuated cavitation are the major benefits of CA. Optimal CA is 1% O<sub>2</sub> with >5% CO<sub>2</sub> (Lee and Kim 1979, Yun and Lee 1998). Cavitation is significantly reduced at 15% CO<sub>2</sub> (Yun 1998).

## **Retail Outlet Display Considerations**

Ginseng roots are displayed with green leafy vegetables, and water loss is controlled by humidification or packaging.

## **Chilling Sensitivity**

Ginseng is not chilling sensitive and should be stored as cold as possible without freezing.

## **Ethylene Production and Sensitivity**

Ginseng roots produce only minute amounts of ethylene and are not sensitive to ethylene.

## **Respiration Rates**

Temperature	mg CO <sub>2</sub> kg <sup>-1</sup> h <sup>-1</sup>
0 °C	5.5
10 °C	15.0
15 °C	33.0
25 °C	95.0

Data from Lee and Kim (1979).

To get mL CO<sub>2</sub> 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 tonne per day.

## **Physiological Disorders**

The formation of cavities within the root is a common problem caused by cultural conditions and starch breakdown (Park et al. 1986, Yun 1998). Other disorders include discolored skin and flesh and splitting of the main root.

## **Postharvest Pathology**

Gray mold (*Botrytis cinerea*) is common in ginseng (Oh et al. 1981). Lesions frequently begin in wounds and spread to other areas of the roots. Storage at low temperatures or using CA slows the rate of spread of the disease and should be maintained to minimize pathological disorders and prolong shelf-life.

## **Quarantine Issues**

None.

## **Suitability as Fresh-Cut Product**

No current potential.

### **Special Considerations**

Careful handling is mandatory because it is easy to bruise the surface of main roots and break lateral roots. Damaged areas provide a route for entry of microorganisms.

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