

# Artichoke

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## Scientific Name and Introduction

*Cynara scolymus* L., the globe artichoke, is a perennial of the Asteraceae (Compositae) family. The edible portion includes the tender immature flower bud and fleshy central base that is protected by a cone of short, thick-stemmed bracts. The main types include Green Globe, Desert Globe Imperial Star, Emerald, and Big Heart. Artichokes are primarily grown in California and are available year round.

## Quality Characteristics and Criteria

A high-quality artichoke will have tightly closed, turgid outer bracts without signs of black tip, blistering, or browning. It should be medium to dark glossy green in color, and some cultivars may have a magenta color at the base of each bract. The artichoke should not be soft when squeezed or feel heavy for its size. Both thorny and thornless cultivars are used commercially.

## Horticultural Maturity Indices

The outer bracts of an artichoke ready for harvest should be tightly closed, firm, and turgid. They are harvested when immature and selected based on size and compactness.

## Grades, Sizes, and Packaging

Grades include U.S. No. 1 and U.S. No. 2, based primarily on external appearance. Buds are classified by the number that fit into a standard carton of about 10 kg (23 lb.). For example, size 18 buds means 18 buds per carton (also referred to as “18s”). Standard grades include 18s (>13 cm diameter, 5.4 in), 24s (10 to 13 cm, 4.0 to 4.5 in), 36s (8.5 to 10 cm, 3.5 to 4.0 in), 48s (7.5 to 8.5 cm, 3.0 to 3.5 in) or 60s (6.5 to 7.5 cm, 2.75 to 3 in) buds per box. Smaller buds (2.5 to 6.5 cm, 1.0 to 2.75 in) are often “jumble packed” at an average of 100 to 175 buds per box. The fresh-produce market prefers 24s and 36s, but some retailers prefer 36s and 48s, since artichokes are generally priced by bud, not by weight.

A new grade was adopted for U.S. No. 1 long stem globe artichokes in 2006. The stems must be smoothly cut to a minimum of at least 20 cm (8 in) unless otherwise specified to a longer length in connection with a grade.

## Precooling Conditions

In order to maintain quality and storage life, artichoke buds should be precooled to below 5 °C (41 °F) within 24 h of harvest (Lipton and Stewart 1963). Hydrocooling, forced-air cooling, and

package-icing are common methods of postharvest cooling of artichokes and will generally retard deterioration such as discoloration, weight loss, and decay.

### **Optimum Storage Conditions**

The recommended conditions for storage of artichokes are 0 °C (32 °F) and >95% RH. Artichoke buds can be kept in good condition for 2 weeks at 0 °C (32 °F), 10 days at 5 °C (41 °F), and 5 days at 10 °C (50 °F) (Ryall and Lipton 1979, Saltveit 1991).

### **Controlled Atmosphere (CA) Considerations**

A reduction in browning of the outer bracts is the major benefit from CA storage when artichokes are stored at temperatures higher than 0 °C (32 °F). However, the effectiveness of CA storage depends on bud maturity, cultivar, temperature, and the particular atmosphere used (Rappaport and Watada 1958, Andre et al. 1980, Ryder et al. 1983). Optimal CA conditions vary widely among cultivars, ranging between 1 to 6% O<sub>2</sub> and 2 to 7% CO<sub>2</sub> (Ryall and Lipton 1979, Saltveit 1997, Andre et al. 1980, Escriche et al. 1982). Little or no beneficial effect on quality retention can be obtained by CA storage when artichoke buds are stored at 0 °C (32 °F) (Miccolis and Saltveit 1988). Therefore, no general recommendation can be made for CA storage. O<sub>2</sub> below 2% may result in internal blackening (Suslow and Cantwell 1998).

### **Retail Outlet Display Considerations**

Use of both top ice and water sprinklers are acceptable.

### **Chilling Sensitivity**

Artichokes are not sensitive to chilling and should be stored as cold as possible without freezing.

### **Ethylene Production and Sensitivity**

Artichokes produce only very low amounts of ethylene and are not particularly sensitive to ethylene exposure.

### **Respiration Rates**

Temperature	mg CO <sub>2</sub> kg <sup>-1</sup> h <sup>-1</sup>
0 °C	16 to 44
5 °C	26 to 60
10 °C	44 to 98
15 °C	76 to 144
20 °C	134 to 252

Data from Suslow and Cantwell (1998).

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**

Splitting of the bract tip is a common problem caused by rough handling during and after harvest. The surfaces of bracts are also easily bruised and scratched, so careful handling is important. The abraded areas usually turn brown or black, which greatly detracts from appearance and quality and provides a route through which microorganisms can enter. Also, violet discoloration of inner bracts occurs, the severity of which was low when artichokes were stored at temperatures below 10 °C (50 °F) or above 25 °C (77 °F) (Bianco 1979) and may have been due to low ethylene production (Ryder et al. 1983).

### **Postharvest Pathology**

The most common decay found in artichokes is gray mold (*Botrytis cinerea*) (Moline and Lipton 1987). The lesions most frequently begin on wounds and spread to other areas of the bud. Since storage at low temperatures slows the rate of spread of the disease, fungal growth near freezing temperature is minimal. Bacterial soft rot (*Erwinia carotovora*) may be a problem in storage and distribution if optimum temperature is not maintained. Therefore, low temperatures must be maintained throughout the cold chain to minimize pathological disorders and prolong shelf-life.

### **Quarantine Issues**

There are no quarantine issues.

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

No current potential.

### **Special Considerations**

Artichokes must be handled with care to avoid mechanical damage and therefore limit discoloration and pathological problems. During winter, artichokes may have a white or bronze, blistered appearance due to being frosted in the field. The artichokes are said to have been “frost-kissed.” This is purely an appearance issue and does not affect eating quality. In fact, this condition may enhance the nutty flavor. Avoid wilted, moldy, significantly discolored, or woody (overmature) artichokes.

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Some of the information included was from the Produce Marketing Association's "Fresh Produce Manual" and the University of California, Davis, website on "Fresh Produce Facts" at [http://postharvest.ucdavis.edu/produce\\_information](http://postharvest.ucdavis.edu/produce_information).

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