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. They 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 and feel heavy for their 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 subjectively on external appearance. Sizes are defined as: Small ($\leq$ 2 in in diameter); Medium (8 to 10 oz.); and Large (over 15 oz.). Buds are classified by the number that fit into a standard carton of about 23 lb; eg., size 18 buds (18 buds per carton, or >18s). The fresh market prefers 24s and 36s, but some retailers prefer 36s and 48s since they are generally priced by bud, not by weight.

Pre-cooling conditions: In order to maintain quality and storage-life, artichoke buds should be pre-cooled to below 5 °C (41 °F) within 24 h of harvest (Lipton and Stewart, 1963). Hydro-cooling, 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 is dependent on bud maturity, cultivar, temperature and the particular atmosphere used. (Andre et al., 1980; Rappaport and Watada, 1958; Ryder et al., 1983). Optimal CA conditions vary widely among cultivars, ranging between 1 to 6% O_2 and 2 to 7% CO_2 (Andre et al., 1980; Escriche et al., 1982; Ryall and Lipton, 1979; Saltveit, 1997). 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. $O_2 < 2\%$ 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 temperatures 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_2 kg^{-1} h^{-1}
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

To get mL 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 per ton per day or by 61 to get kcal per metric ton per day. Data from Suslow and Cantwell, 1998.

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 provide a route through which microorganisms can enter. Also, violet discoloration of inner bracts occurs, the severity of which was low when artichokes were stored < 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: None.

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 (over-mature) artichokes.

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