

Cranberries

Revised 2024

Thermal Properties

	English	Metric
Moisture, %	86.54	--
Protein, %	0.39	--
Fat, %	0.20	--
Carbohydrate, %	12.68	--
Fiber, %	4.20	--
Ash, %	0.19	--
Specific Heat Above Freezing	0.93 Btu/lb*°F	3.91 kJ/(kg*K)
Specific Heat Below Freezing	0.46 Btu/lb*°F	1.93 kJ/(kg*K)
Latent Heat of Fusion	124 Btu/lb	289 kJ/kg

Storage Conditions

	Fresh	Frozen
Temperature	36°F (2.2°C)	0°F (-17.8°C)
Relative Humidity	90 to 95%	Vapor-proof packaging
Storage Period	2 to 4 months	12 to 18 months
Chilling Sensitive Point	30.4 to 35°F (-0.9 to 1.7°C)	
Highest Freezing Point	30.4°F (-0.9°C)	

Fresh Cranberries

Fruit red color intensity, glossiness, uniformity and freedom from defects are the major quality characteristics for fresh and frozen cranberries.

Fruit red color, which is due to anthocyanin pigments, is the major factor determining cranberry crop value. Cranberries are nonclimacteric, meaning they do not continue ripening after harvest so must be harvested when fully ripe for optimum quality. Therefore, harvesting should be timed to achieve the maximum color without allowing the fruit to become overripe.

U.S. No. 1 is the only grade standard used for fresh cranberries, based principally on color (not less than 75% of the fruit surface pink or red), size (minimum diameter of 13/32 inches, or 10.3 mm), no soft or decayed fruit and freedom from other defects.

Cranberries can be stored for 2 to 4 months at a minimum recommended temperature 36°F (2.2°C). The maximum recommended temperature is 39 to 41°F (3.9 to 5°C), depending on the anticipated duration of storage. Optimum relative humidity (RH) is 90 to 95%. Red color can be increased after harvest by holding fruit, especially early-harvested fruit, at 45 to 50°F (7.2 to 10°C) for a few weeks rather than at the lower recommended temperatures. Cranberries at harvest are firm and have a thick waxy protective coating. However, they have great variability in their expected storage life even under refrigerated conditions. Early harvested fruit usually have a longer storage potential than late-harvested fruit. Some lots become half rotted in 3 months while others hold good quality for 4 months. This variability in storage life may be reduced by good field management, including use of appropriate fungicides, dry harvesting, and gentle handling to avoid bruising. Practically all cranberry molds enter the fruit while it is growing in the bog or during harvest if water is used. Cold storage temperature down to 38°F (3.3°C) retards this type of spoilage. However, long storage at lower temperatures around 30.5 to 33°F (-0.8 to 0.6°C) can result in rubbery, dull, and unsatisfactory "chilled" fruit.

Cranberries should be stored in slatted crates or returnable plastic containers (RPCs) with sufficient openings to allow ventilation and removal of field heat and heat of respiration generated by the fruit. Proper ventilation also can help maintain more uniform, even temperature and thus enhance keeping quality. Controlled or modified atmospheres have not been effective in extending storage life beyond that possible with conventional cold storage.

Most cranberries are still stored unscreened "in the chaff" just as they come from the field, if they are to be stored for fresh market sale. They keep better this way than if handled additionally to clean, sort, and remove field debris prior to storage. Poorly colored fruit can be held at 45 to 50°F (7.2 to 10°C) for a few weeks to permit more rapid coloring than would occur at lower temperatures.

Fresh cranberries are commonly packed in cartons containing twenty-four (24) 12-oz (340-gram) polybags or in cartons of 20, 25 or 30 lbs. (9.0, 11.4, or 13.2 kg). Occasionally, nine (9) 2-lb (0.9-kg) and four (4) 5-lb (2.3-kg) polybag cartons are used for some retail customers, and wood totes or RPCs may be used for the sale of bulk cranberries. Packaging for retail should be done as close to time of sale as economical to reduce chance of spoilage in packaged fruit. Packages should have vents or perforations for gas exchange to allow cranberries to respire. Fruit in consumer packages for retail sale should be refrigerated at 36 to 40°F (2.2 to 4.4°C) and should keep for 3 to 4 weeks.

Diseases and Disorders

Fungus Rots	Cranberries rot in storage from fungi or molds that invade the fruit during early stages of development and during harvest, if water is used. The assortment of molds is specifically adapted to the cranberry and is not generally found on other types of fruit. Some of the molds are controlled by low storage temperature, while others continue to grow and rot the fruit even at 36°F (2.2°C). Control: Field sanitation and a spray program beginning at 10% bloom must be followed. Dry harvesting followed by storage at 36 to 40°F (2.2 to 4.4°C) will keep much decay in check.
Physiological Breakdown	Cranberries can deteriorate in storage even when no mold is present. This disorder has been called physiological or sterile breakdown. Physiological breakdown can be caused by freezing, bruising, water harvesting, high and low temperature, or old age. Affected

	fruit can appear dull, feel rubbery rather than firm, and yet exhibit normal shape. Fruit flesh is flaccid and red in contrast to the crisp, white flesh of healthy fruit. Control: Physiological breakdown can be reduced by dry harvesting, avoiding late harvest of overripe fruit, maintaining recommended storage conditions, and careful handling at all times. Harvest should be completed prior to 90% red fruit in the field to ensure successful storage. Lots with 25% defective fruit or less may be effectively screened by a combination of mechanical, optical, and hand sorters to yield retail quality fruit.
Chilling Injury	Storage at less than 36°F (2.2°C) for more than about 4 weeks can result in cranberries with dull appearance, rubbery texture, and increased decay. Control: Avoid chilling temperatures. Intermittent warming to 70°F (21.1°C) for 1 day per month was shown to reduce chilling injury of cranberries stored at 34°F (1.1°C), but is not a recommended practice because slow re-cooling after warming results in reduced overall storage potential – just store the fruit at 36°F (2.2°C).

Frozen Cranberries

The great bulk of the cranberry crop (90%) is now processed into sauce or juice rather than being marketed as fresh fruit. Fruit intended for processing are water harvested, screened as rapidly as possible, and utilized or frozen at 0°F (-17.8°C) until needed without quality loss. Juice products now account for more than half of all processed cranberries. Cranberries intended for juice are deep frozen at 0°F (-17.8°C) for 30 days or longer prior to juice extraction. Freezing enhances color and juice yields during processing. Larger quantities of cranberries are now frozen than all other fruits except strawberries, cherries, and apples.

Cranberries received in standard 1,300-lb (590-kg) tote bins may be frozen, then held at 0°F (-17.8°C) for 12 to 18 months prior to processing. The initial thorough freezing of the totes may take 30 to 45 days, even under ideal storage conditions. The time to freeze will depend on moisture content, field heat temperature range, room air flow, and freezer design. Temperatures as low as -18°F (-27.8°C) have been used during the initial freezing period when additional warm product is periodically being added to the inventory. Rapid removal of field heat is recommended prior to any close, block-stacking of totes. Fruit field heat can be reduced greatly in the freezer within 2 to 3 days by using continuous ventilation and by spacing between the stacks and rows of totes.

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