

# Cherries, Sweet and Tart

Revised 2018

## Thermal Properties

	English	Metric
Moisture, %	80.76	--
Protein, %	1.20	--
Fat, %	0.96	--
Carbohydrate, %	16.55	--
Fiber, %	2.30	--
Ash, %	0.53	--
Specific Heat Above Freezing	0.89 Btu/lb*°F	3.73 kJ/(kg*K)
Specific Heat Below Freezing	0.51 Btu/lb*°F	2.12 kJ/(kg*K)
Latent Heat of Fusion	116 Btu/lb	270 kJ/kg

## Storage Conditions

	Fresh	Frozen
Temperature	30 to 31°F (-1.1 to 0.6°C)	0°F (-17.8 °C) or lower
Relative Humidity	90 to 95%	Vapor-proof packaging
Atmosphere	3 to 10% Oxygen plus 10 to 15% Carbon Dioxide	
Storage Period	2 weeks in air 3 weeks in poly-liners 4 to 6 weeks in controlled atmosphere, depending on cultivar	12 to 18 months
Highest Freezing Point	29°F (-1.7°C)	

Fresh sweet cherries are stored to a limited extent, but may be shipped long distances internationally. Tart cherries are typically stored only temporarily, if at all, prior to processing. Both types of fruit have the same postharvest requirements. The physiological changes in cherries and the decay that results in product deterioration are proportional to the amount of rough handling and total time fruit is exposed to warm temperatures. Thus, (1) cherries must be handled gently during harvesting, handling, and packing operations, and (2) fruit temperature must be reduced after harvest to an ideal 30 to 32°F (-1.1

to 0°C), ideally within 4 hours, and maintained within that range along with 90 to 95% relative humidity (RH) during the storage and distribution steps.

Only high-quality sweet cherries that are free from defects and decay should be selected for storage. Postharvest fungicidal sprays or dips are helpful in reducing decay during storage and marketing. Elevated CO<sub>2</sub> atmospheres provide a satisfactory alternative to postharvest fungicides for decay control.

Sweet cherries begin to lose their bright color after 2 weeks' storage in air. Stems dry out and darken if RH is too low. To prevent moisture loss, field containers of cherries should be shaded from the sun and covered with a tarpaulin or other moisture barrier in the orchard and during transit to the packinghouse. Hydrocooling is often used to help with retaining stem turgidity.

Polyethylene liners in shipping containers (modified atmosphere packaging) will extend the cold storage period by at least a week. Liners must be opened when the fruit are removed from cold storage to prevent development of off-flavors at higher temperatures due to accumulation of CO<sub>2</sub> and depletion of O<sub>2</sub>. Extended storage in modified atmospheres can lead to aroma volatile reduction.

## Diseases and Injuries

<b>Pitting and Bruising</b>	<p>Pitting is an indentation in the surface of the fruit caused by the collapse of cells under the skin. Pitting is the result of impact injury. Bruising is larger collapsed tissue areas resulting from compression and impact of the fruit. Symptoms are sunken or watersoaked tissue, which are often not apparent until after packing.</p> <p><b>Control:</b> Carefully handle cherries during harvesting, packing and all other handling to avoid impacts and compression.</p>
<b>Stem browning</b>	<p>Discoloration of the stem (pedicel) related to water loss, but worsened if scrapes or other injuries are present.</p> <p><b>Control:</b> Careful handling to reduce injuries to the stem; use of chlorine in hydrocooler water reduces stem browning; maintain low temperature and high RH to minimize water loss.</p>
<b>Blue Mold Rot</b>	<p>Round spots of mushy decay that can be scooped out cleanly. White tufts turning to bluish-green develop on surface. Musty odor and flavor.</p> <p><b>Control:</b> Apply recommended fungicides. Market promptly. Cool promptly to 30°F (-1.1°C).</p>
<b>Brown Rot</b>	<p>Extensive firm brown, unsunken decay, turning dark in center. May be covered with dusty spores in yellowish-gray masses. Should be controlled in orchard.</p> <p><b>Control:</b> Cool promptly to 30°F (-1.1°C). Apply recommended</p>

	fungicides. Use of 15 to 20% CO <sub>2</sub> via MAP or CA is also helpful.
<b>Gray Mold Rot (Botrytis)</b>	Light brown, fairly firm, watery decay covered with delicate dirty-white mold. On completely decayed cherries grayish-brown velvety sporulation may occur. <b>Control:</b> Cool promptly to 30°F (-1.1°C). Use 15 to 20% CO <sub>2</sub> -enriched atmospheres during transport.
<b>Green Mold Rot (Alternaria and Cladosporium Rots)</b>	Mold growth on area is dark green below and white above. Light brown, dry, firm decay lining skin breaks. Can be removed easily from surrounding healthy tissue. <b>Control:</b> Cull out cherries with cracks and other skin breaks.
<b>Rhizopus Rot</b>	Extensive soft leaking decay with little change of color. Coarse mold growth and black spores prominent under moist conditions. <b>Control:</b> Prompt cooling to 30°F (-1.1°C).
<b>Atmosphere injury</b>	Less than 1% O <sub>2</sub> can result in skin pitting and off-flavors. Greater than 30% CO <sub>2</sub> can result in brown skin discoloration and off-flavors. <b>Control:</b> Avoid exposure to <1% O <sub>2</sub> and >30% CO <sub>2</sub> . Maintain low temperature to avoid development of extreme atmospheres in MAP.

## Freezing

Cherries are washed, inspected and pitted prior to freezing. Pitting can be accomplished by punch pitting or Elliott pitting. Black cherries can be packed in a sugar medium or packed without sugar. Color deterioration has not been of concern within a non-sugar pack.

Freezing is usually accomplished in the retail or industrial package within a blast freezer. Historically, cherries were harvested, processed and put into pails with a sugar slurry and the pails would then be "room frozen". In recent years, there has been a significant trend to use of IQF tunnels to freeze cherries, transferring the frozen fruit into 40-lb (18.1-kg) boxes for storage.

Sweet and tart cherries are used in the bakery market and the yogurt and specialty preserve market. Packaging ranges from 30-lb (13.6-kg) plastic containers, 40-lb (18.1-kg) barrier containers, to 350-lb (159-kg) S.P.-55-gal (208-L) drums.

## Handling Frozen Cherries

Frozen cherries are susceptible to darkening if permitted to fluctuate in temperature up to the freezing point. Temperature fluctuation of IQF cherries has also been observed to result in "block freezing" occurring at the bottom of containers. If thawed and refrozen, cherries become dark and mushy.

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