

Sweet Potatoes

Revised 2018

Thermal Properties

	English	Metric
Moisture, %	72.84	--
Protein, %	1.65	--
Fat, %	0.30	--
Carbohydrate, %	24.28	--
Fiber, %	3.00	--
Ash, %	0.95	--
Specific Heat Above Freezing	0.83 Btu/lb*°F	3.48 kJ/(kg*K)
Specific Heat Below Freezing	0.50 Btu/lb*°F	2.09 kJ/(kg*K)
Latent Heat of Fusion	104 Btu/lb	243 kJ/kg

Storage Conditions

Temperature	55 to 60°F (12.8 to 15.6°C)
Relative Humidity	85 to 95%
Storage Period	3 to 10 months, or longer, depending on variety
Freezing Point	30°F (-1.1°C)
Chilling Temperature	Below 55°F (12.8°C)

Sweet potato cultivars vary in color from white to cream to orange to purple, in flavor from sweet to non-sweet; mild to intensely flavored, and in texture from firm to very soft.

Sweet potatoes are graded into U.S. Extra No. 1, U.S. No. 1, U.S. Commercial, U.S. No. 2, and Unclassified based largely on size, condition, and absence of defects. Desired sizes are 3.25 to 3.5 inches (8.3 to 8.9 cm) in diameter and 18 to 20 oz (0.53 to 0.59 kg). During storage in the U.S., roots are commonly handled in 800 lb (364 kg) bulk bins but are generally marketed in 40 lbs (18.2 kg) boxes, but at the retail level, roots are typically displayed loose unrefrigerated, at about 70 °F (21.1°C).

Storage

Long term storage for up to 10 months of fresh roots is possible if storage conditions are held at 55 to 60°F (12.8 to 15.6°C) and a relative humidity (RH) of 85 to 95%. Air circulation in order to prevent temperature stratification is important because close control of temperature is necessary for the

maintenance of high-quality sweet potatoes. Temperatures higher than 60°F (15.6°C) may result in sprouting and pithiness and temperatures lower than 55°F (12.8°C) may result in chilling injury (CI).

In published research, cured sweet potato roots stored 50 weeks at 60°F (15.6°C) with 90% RH had total weight losses of 7 to 16% depending on the cultivar. Centennial was well adapted to storage for up to 38 weeks.

Chilling Injury

Sweet potatoes are sensitive to temperatures below 55°F (12.8°C). The relationship between time and temperature is such that several weeks at 50°F (10°C) may result in a similar degree of injury as 1 or 2 days at 35 to 40°F (3 to 4.4°C). Chilling injury is frequently not apparent until the roots are held for several days at warmer temperatures. If CI is severe, the symptoms may appear as sunken areas, susceptibility to fungal diseases not usually associated with sweet potatoes, and an increased tendency of the interior to darken if the roots are broken and exposed to air. Darkening and off-flavors have been noted in cooked roots which have been chilled. Less severe CI may be manifested in a condition known as "hard core." No external or internal symptoms are noted until the roots are cooked. Roots affected may have one or more hard spots generally near the center of the root or occasionally nearly a whole root remains hard and appears to be uncooked. Because of the cryptic symptoms of CI, it is a good practice to avoid storage or transport temperatures less than 55°F (12.8°C).

Storage after Grading

Sweet potatoes are usually removed from storage, washed, and re-graded prior to marketing. Because washing and re-grading may injure the roots, this results in a product that from a storage standpoint is similar to uncured roots. Therefore, during the grading process, the roots are often treated with a fungicide to reduce rot incidence and lightly waxed to limit moisture loss. Washed and graded roots should be kept at high humidity and at temperatures above 55°F (12.8°C) and moved through marketing channels as quickly as possible. Shelf life of washed and fungicide-treated roots is only 2 to 3 weeks.

Storage for Processing

Because of the changes in pectin and starch levels which occur during curing and storage, uncured sweet potato roots are often preferred for canning and some frozen products, since uncured roots produce a firmer product. The better flavor and texture of cured and stored sweet potatoes is evident in pureed products, including baby food, dehydrated flakes, and some frozen products. Sweet potatoes stored for such uses should be held in the same conditions as those stored for marketing as fresh roots.

Diseases and Injury

Diseases and other defects can be of field or storage origin. A number of diseases appear during curing and storage, but most are not under the control of the storage operator. The best precautions are careful control of curing and storage conditions, and good sanitation procedures. Roots cured immediately after

harvest under proper conditions and harvested during good field conditions with minimum harvest injury nearly always give fewer problems and less storage loss than poorly handled roots.

<p>Black Rot</p>	<p>Of field origin. Circular brown, slightly sunken superficial spots initially, enlarging to black or greenish-black areas, ½ to 2 inches, possibly appearing rough with tiny bristles. Diseased tissues are firm and bitter tasting. Non-diseased tissue also bitter when cooked.</p> <p>Control: Disinfection of seed roots. Propagation with vine or bed cuttings. Keep stock from diseased fields separate. Market sweet potatoes from infected fields promptly. Careful handling to avoid wounding. Washing or waxing sweet potatoes may spread disease. Treatment of roots with a registered effective fungicide and sanitizing grading equipment between lots can greatly reduce losses.</p>
<p>Charcoal Rot</p>	<p>Initially irregular-shaped, light brown discoloration with sharp line of demarcation between diseased and sound tissues. Later, dark brown and firm, the skin shriveling. Final stage shows a hard, dry, charcoal-like mummy. Three distinct color zones in diseased tissues when potato is cut. Disease progresses slowly in storage.</p> <p>Control: Do not store, ship or use as seed any sweet potatoes showing the slightest decay at tips. Curing helps control decay through cork formation in injuries.</p>
<p>Dry Rot</p>	<p>First dark brown and firm, usually at end of sweet potato; later becoming withered black and hard. Surface of diseased areas seems covered with black pimples. Develops in storage.</p> <p>Control: No definite control method except in seed stock selection.</p>
<p>Surface and End Rot</p>	<p>A considerable variety of rots with firm dry tissues, initially small, circular, light brown, superficial spots and withering of ends of potatoes. Invasion occurs through wounds and through tissue broken down by other organisms. Decay develops slowly, shriveling follows severe infection.</p> <p>Control: Careful handling to avoid wounding of tissues especially tips. Prompt curing under optimal temperature and humidity conditions to promote rapid healing of wounds made during harvest. Where possible, avoid wet-weather harvest.</p>
<p>Foot Rot</p>	<p>Firm to spongy dark brown, especially at attached end of potato. Resembles black rot but is not bristly.</p> <p>Control: Sweet potatoes showing evident decay should not be stored or shipped to distant markets or used in seed stock selection.</p>
<p>Growth Cracks</p>	<p>Moderately deep lengthwise and crosswise fissures due to growing conditions primarily. Often caused by nematodes in the field soil.</p> <p>Control: Most growth cracks heal without becoming infected. Best not to store if doubtful about subsequent rotting.</p>
<p>Internal Cork</p>	<p>A virus disease of sweet potatoes that causes the development of dark brown to blackish corky spots in the flesh which vary in size and shape and may occur singly or in groups. Some spotted roots may be found when dug, but the problem may show a considerable increase after 4 to 6 months storage.</p>

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	<p>Control: Proper storage at 55 to 60°F (12.8 to 15.6°C). Avoid storage at 70°F (21.1°C) or above. Use resistant cultivars or varieties. Sweet potatoes suspected of being infected with internal cork should be marketed soon after harvest.</p>
Java Black Rot	<p>Initially brown and moderately firm, turning to black and firm with pimply surface. Eventually dry black mummy. More prevalent in the South than elsewhere, develops slowly in transit or storage only after harvest.</p> <p>Control: Careful handling and proper curing.</p>
Rhizopus Soft Rot	<p>Rhizopus Soft Rot is a very destructive and rapid developing transit and storage rot, evidenced by a soft and watery appearance with a yeasty odor. Later tissues become cinnamon-brown to light chocolate color, but never black. Final stage a hard brown mummy. Coarse, stringy "whiskers" with white and black spore balls are often characteristic. Wet soil increases this decay.</p> <p>Control: Careful handling and prompt curing at harvest. Treat crowded roots with Botran or other recommended fungicides before shipment, especially those coming out of storage.</p>
Scurf	<p>Very common, causing skin-deep small grayish spots and blotches, later merging into brown areas. Spots often occur in field but may enlarge in storage. Unless extensive, usually overlooked by trade. Does not grow on plant parts above ground.</p> <p>Control: Disinfect seed roots. Propagate by vine or bed cuttings.</p>
Soil Rot (Pox)	<p>Soil rot of field origin causes dry, brown pits or pox marks, of irregular size and shape, 1/4 to 1 inch (0.64 to 2.54 cm) in diameter, on root surface spots. May become rough with irregular margin as they mature, always firm and dry not followed by other decay. Most serious during dry seasons.</p> <p>Control: Do not use as seed any potatoes showing symptoms. Plant in disease-free soils, if possible; 7 to 9-year rotation reduces problem if severe. Also, addition of sulfur to make soil acid (pH 5.0) reduces incidence.</p>

The sweet potato weevil [*Cylas formicarius* (F.) (Coleoptera: Brentidae)] is a serious field and storage insect pest, where no adequate control is available and therefore infested roots should not be stored. Roots should not be shipped from weevil-infested production sites to other areas of the country. Fruit flies (*Drosophila* spp.) and soldier flies [*Hermetia illucens* (Diptera: Stratiomyidae)] can be problems when there are diseased, soured or damaged roots in storage, but both can be controlled with sanitation and/or appropriate insecticide treatment. Viruses and the sweet potato weevil are serious quarantine issues. Viral diseases are of concern if roots are used for propagation material.

Freezing

To avoid browning discoloration, peeled, sliced or diced sweet potatoes should be blanched in such a manner that they are heated to a center temperature of 190°F (87.8°C) as rapidly as practicable. Following such treatment, they can be frozen satisfactorily as such, or after further cooking. Much of the commercial

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pack is sugar glazed, although the sweet potatoes can be mashed, pureed, baked or just sliced and packed as such, or as a component of frozen food dinners or canned soup. Cooked and glazed sweet potatoes retain a satisfactory shelf life at 0°F (-17.8°C) for 8 months. If not thoroughly cooked, or if unglazed, shelf life may be limited to 4 to 6 months.

Sweet potato roots intended for canning or freezing may be held without curing at 35 to 40°F (1.7 to 4.4°C) for up to 10 days. However, roots held at field temperatures for just 3 to 4 days will result in a decrease in firmness of the processed product.

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