



Carrots - Post-Harvest Handling and Storage

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Maturity

Carrots accumulate sugars as they mature in the field. A high sugar content improves eating quality, increases storage potential and maintains moisture in the roots during storage. At harvest, carrots must be firm and bright orange in colour, should have achieved sufficient size to fill in the tips, and should have uniform taper from shoulder to tip.

Harvesting, Handling & Storage

Harvesting carrots in cool weather will extend their shelf life and maintain post-harvest quality. Low soil temperatures improve the storage potential of carrots by (1) cooling the roots before they are harvested, and (2) creating conditions that are not conducive for the growth of pathogens.

Freshly harvested carrots must be sorted to remove defective roots; undersized, broken, diseased, green core, split/cracked and sunburnt carrots should also be discarded. Careful handling is necessary to avoid bruising and tip breakage during these grading steps.

Depending on the market requirements, carrots can be sold as topped or bunched carrots (tops left on). Bunched carrots respire faster, and therefore deteriorate faster, than topped carrots. Topped carrots have a storage life of up to 9 months at 0-1°C and 98-100% relative humidity whereas bunched carrots have a storage life of only 2 weeks under optimum conditions. Carrots being marketed as topped must be properly trimmed such that the length of the tops is approximately 2.5 cm.

High humidity is necessary to prevent dehydration and loss of crunchiness of stored carrots. Carrots can be rehydrated prior to marketing by spraying cold water on the roots or by covering the roots with ice.

Where artificial cooling is needed prior to long term storage, hydrocooling is the preferable method for carrots. Hydrocooling involves spraying or immersing carrots in cold water. The water is cooled by mechanical refrigeration or by adding ice to chill the water. Hydrocooling washes the carrots and also prevents dehydration of freshly harvested roots.

Carrots stored below 0°C for prolonged periods of time are susceptible to chilling injury. Carrots exposed to ethylene during storage develop a bitter flavour. During storage, avoid mixing carrots with ethyleneproducing commodities such as apples, peppers or melons.

Storage Diseases

Major post-harvest losses in carrots are due to Sclerotinia rot, Botrytis rot, Bacterial soft rot (*Erwinia*) and Sour rot (*Geotrichum*). Of these, Sclerotinia rot is the most prevalent. The Sclerotinia fungus infects the carrot roots in the field through the crown. During storage, the Sclerotinia fungus produces a white, cottony mycelium which covers the roots. Infected roots are usually soft and watery.

Storage losses to *Sclerotinia* can be minimized by:

1. pre-harvest application of a registered fungicide such as Bravo 500

2. rapid removal of field heat from freshly harvested roots
3. increasing row width to increase ventilation since prolonged periods of leaf wetness induce rot
4. crop rotation
5. post-harvest application of a registered antimicrobial such as Dovicide (Ophenylphenol) at a concentration of 98 g/L.

For further information on registered fungicides, contact your Rural Service Centre or the Provincial Vegetable Specialist, Saskatchewan Agriculture and Food.

Further Reading

Finlayson, J.E., S.R. Rimmer, & M.K. Pritchard. 1989. Infection of carrots by *Sclerotinia sclerotiorum*. Canadian Journal of Plant Pathology 11:242-246.

Finlayson, J.E., S.R. Rimmer, & M.K. Pritchard. 1989. Electrolyte leakage and storage decay of five carrot cultivars in response to infection by *Sclerotinia sclerotiorum*. Canadian Journal of Plant Pathology 11:313-316.

Pritchard, M.K., D.E. Boese, & S.R. Rimmer. 1992. Rapid cooling and field-applied fungicides for reducing losses in stored carrots caused by cottony soft rot. Canadian Journal of Plant Pathology 14:177-181.

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