



## Postharvest Sweet Corn Handling and Storage

- » Sweet corn is highly perishable and requires constant cooling from harvest to consumer to deliver a high quality product.
- » There are several cooling methods available depending on operation size and transport time including: hydrocooling, package icing, vacuum cooling, and forced air cooling.
- » Continued temperature maintenance after initial cooling is critical to help maintain sweet corn quality.

Sweet corn has a high rate of respiration, which can lead to the conversion of sugar into starch, reducing quality. To prevent loss of sweetness, it is important to cool sweet corn quickly after harvest.<sup>1</sup> Sweet corn products containing the supersweet, or *sh2*, gene can reduce the conversion of sugar into starch. This allows *sh2* sweet corn to be stored 2-9 days longer than traditional sweet corn products.<sup>2,3,8</sup>

### Postharvest Cooling

**Hydrocooling.** This sweet corn cooling process is the most common method used for small and large operations. Sweet corn is either showered with or immersed in cold water (32 to 38° F) to cool down sweet corn after harvest. Complete immersion may be able to cool sweet corn faster and more efficiently than showering. Hydrocooling helps to reduce crop water loss, but costs may be higher as containers must tolerate exposure to water.<sup>1</sup> Sweet corn may be hydrocooled by bulk or in crates. Bulk hydrocooling can cool sweet corn from 86 to 41° F in about 60 minutes, whereas crated sweet corn takes about 80 minutes for the same cooling.<sup>2</sup> Sweet corn packed in wirebound crates can prevent cooled water from contacting the cobs, reducing cooling potential, and loading crates onto pallets prior to hydrocooling can further prevent cooling.<sup>4</sup> It is important to monitor cob temperatures during hydrocooling to establish a minimum temperature of 50° F. Top icing, or adding a 2- to 4-inch layer of crushed ice on top of loaded pallets<sup>5</sup>, is recommended after hydrocooling to maintain cooling.<sup>3</sup>

**Package icing.** For local and direct shipments, sweet corn containers can be filled with crushed ice as sweet corn is being packaged and transported. As the ice melts, cooling decreases, so additional ice may be needed to maintain cooled temperature. The amount of ice required for initial cooling equals 20-30% of the weight of the sweet corn being cooled. This method of



Figure 1. Sweet corn being harvested, packed, and loaded on a truck to be cooled.

cooling is effective, but the additional weight from the ice can increase shipping costs.<sup>1</sup>

**Vacuum cooling.** Sweet corn is placed into air-tight containers and wetted and top-iced prior to steam-jet pumps removing air from the containers. This removal of air causes moisture to evaporate, reducing the temperature of the sweet corn. This method can reduce the temperature of large loads from 86 to 41° F in about 30 minutes. This cooling method is quick, but can be expensive.<sup>1,2</sup>

**Forced air cooling.** Small operations can cool sweet corn by forced air cooling. This method is not as efficient as other methods and involves more cooling time, resulting in infrequency of use.<sup>1</sup>

Although decay is not typically a major problem, it is recommended to use ice made from potable water, and use chlorinated (at 50 ppm, or pH 7) potable water when hydrocooling, to help reduce the risk of pathogenic organisms causing decay in sweet corn.<sup>3</sup>

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## Storage Facility

To maintain quality, sweet corn should be stored immediately after postharvest cooling and for the shortest time possible, with a maximum of 2 weeks including transit time. Sweet corn is not sensitive to chilling; and as such, it should be stored as cool as possible (32 to 34° F) without freezing. High humidity (95% to 98% relative humidity) helps reduce moisture loss and kernel denting.<sup>1,2,6</sup>

## Refrigerated Transport

To continue to help maintain quality, transport sweet corn in a refrigerated truck and package with additional ice to help reduce moisture loss and maintain temperature.<sup>1</sup> The recommended temperature during transit is 32° F, with a relative humidity between 95 to 98 percent.<sup>7</sup>

There are two main containers used for packaging and shipping sweet corn: wirebound crates and fiberboard boxes. Wirebound crates can be shipped by loading them in rows, allowing space between crates for top icing. Crates may also be loaded with no space between them for the first two or three layers, followed by offset rows and wooden strips between layers to help keep the shipment from shifting. A large amount of

top ice may then be applied, eventually melting and cooling the lower layers. Fiberboard boxes resistant to moisture can be stacked directly on top of each other to allow top ice to melt and flow between boxes. Loads that will not have top ice should be loaded so that adequate airflow exists between crates or boxes.<sup>7</sup>

For additional agronomic information, please contact your local seed representative. Developed in partnership with Technology, Development & Agronomy by Monsanto.

### Sources:

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- <sup>4</sup> Kemble, J.M. and Dangler, J.M. 2001. Commercial sweet corn handling. Alabama Cooperative Extension System. ANR-584. <http://www.aces.edu/>.
- <sup>5</sup> Boyette, M.D. and Estes, E.A. Crushed and liquid ice cooling. North Carolina Cooperative Extension Service. AG-414-5. <http://www.bae.ncsu.edu/>.
- <sup>6</sup> Suslow, T.V. and Cantwell, M. 2013. Corn, sweet: Recommendations for maintaining postharvest quality. University of California Postharvest Technology Center. <http://postharvest.ucdavis.edu/>.
- <sup>7</sup> Ashby, B.H. 2008. Protecting perishable foods during transport by truck. United States Department of Agriculture. <http://www.ams.usda.gov/>.
- <sup>8</sup> Hochmuth, G.J. et. al. 1999. Sweet corn production in Florida. University of Florida. HS737.

Web sources verified 07/13/15.

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