

Global Cooling

Precooling, Postharvest, & Ripening Systems
The Forced-Air Cooling Experts™



Preserving
Freshness

Part 7 in a Series of Informative Articles about Forced-Air Precooling

We are pleased to present an article by Jim Thompson, who has been an adviser to our company for a number of years, and a great help to us. (To contact Jim, eMail to jmfthompson@gmail.com, or see UC Davis page [here](#).)

Recooling

by Jim Thompson, October 22, 2014

Recooling

There are several situations where perishables are cooled more than once before reaching destination market. The cause for this second cooling, which we are calling “recooling”, is a break in the cold chain or a step in the chain that does not maintain product temperature. For example, in hot summer conditions perishables often warm during highway transport and should be re-cooled. In some operations, product is only partially cooled, then processed in some fashion, and then cooled to the final temperature. Forced-air cooling is usually the preferred method for recooling,

Air Transport

Precooled cut flowers transported by airfreight are rarely maintained at their desired holding temperature during their journey. They warm in unrefrigerated storage at the departure airport, are shipped in unrefrigerated cargo holds, and then upon arrival at the destination airport can often sit unrefrigerated for hours waiting for required governmental inspections. At the end of this journey, the flowers are often close to ambient temperature and need to be re-cooled to optimum holding temperature before continuing their transport in refrigerated trucks. Failure to do so dramatically reduces vase life of cut flowers.

Some operations use vacuum cooling at the arrival airport, but vacuum cooling causes more water loss than forced-air cooling and the capital cost of a 24 pallet vacuum cooler can approach \$1,250,000. Their advantage is the speed at which they re-cool, which can be as short as 15 minutes for cut flowers.

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As long as the flowers are packed in vented boxes and interior packaging materials are placed to allow good airflow, forced-air cooling is a very effective method of recooling. It also evaporates condensed water in the package and helps reduce decay development on the flowers.

Quarantine Fumigation

Perishables in international trade often must be fumigated before they can be distributed in the destination country. Methyl bromide, requires most products to be warmed to above 40°F (4.4°C) prior to fumigation. After fumigation the product must be re-cooled prior to re-entering the cold chain. Most items in international trade are packed in corrugated fiberboard boxes and cannot be hydro or ice cooled. Fruits and many vegetables are not suited to vacuum cooling, leaving forced-air cooling as the only viable option. The treatment process is speeded with the use of forced-air recooling after fumigation.

Temporary Storage before Packing

Two-stage cooling is sometimes used with produce that has significant delay time between picking and cooling. The product will be initially cooled from field temperature to 45° to 50°F (7°-10°C) immediately upon arrival at the packing facility. Hydrocooling or forced-air cooling methods are typically used depending on the product's ability to withstand water contact. The product is then stored temporarily in a cold room. After packing the product is finish cooled in its final package. This is usually done with forced air because final packing is usually in corrugated cartons.

This system is advantageous because the initial product cooling significantly slows product respiration and water loss and allows temporary storage before packing. Initial cooling to final temperature is not warranted because product will rewarm in the room-temperature packing facility. The intermediate temperature is sometimes selected to be high enough to prevent condensation on the product during packing.

Refrigeration Capacity

In most circumstances the final cooling step does not require much additional refrigeration capacity because the product begins the recooling process at a relatively low temperature. In many situations the existing refrigeration in a temporary storage room is adequate and forced-air recooling can be accomplished with the addition of a fan and tarp system. For a relatively small investment in a top-quality forced-air pre-cooler to pay for itself in less than one season, and to keep on generating additional profits for the entire life of the equipment. A good quality pre-cooler can be a lot like a goose that lays golden eggs year after year!

END OF THIS ARTICLE.

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