

Part 2 of a Series of Informational Articles about Forced-Air Precooling

Dear Friend:

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 jamfthompson@gmail.com, or see UC Davis page [here](#).)

How to Cool Produce

by Jim Thompson

The previous section discussed the importance of quickly bringing produce to its recommended storage temperature. This section will look at how to best accomplish timely temperature management.

The simplest approach is to just put the product into a refrigerated storage, called room cooling. Cooling can be quite fast if the product has good access to the cold air. For example, flowers in vases will cool in as little as 15 minutes. But if the product is packed in boxes and the boxes are stacked on a pallet, cooling time will be a minimum of 24 hours and may take many days.

Faster cooling is achieved by:

- 1) Forced-air cooling where cold air is forced through the pallet load.
- 2) Hydrocooling that uses refrigerated water to cool the product.
- 3) Vacuum cooling, a process that uses low atmospheric pressure to cause rapid water loss from the product that results in evaporative cooling.

Vacuum cooling is used primarily for leafy green vegetables that release water quickly and can be cooled in 30-minute cycles. Fruits and larger diameter vegetables take much longer to cool and cannot be cost effectively cooled in the expensive equipment needed in vacuum cooling.

Hydrocooling is a relatively fast and effective cooling method, but is less commonly used because requires product to be packaged in water resistant materials, like waxed corrugated fiberboard or plastic. boxes Because of this limitation it is often used in a packing line before produce is placed in a box. It also requires careful attention to water sanitation to prevent spreading decay organisms between lots of product. In addition some products have shortened postharvest life when exposed to water and are not suited to hydrocooling.

Forced-air cooling is used for a wide range of produce items. It can be as simple as using a small fan to force cold air through a few boxes. It can also be a high-capacity, dedicated cooling facility that can cool hundreds of pallet loads per day. Cooling times are about an hour for small items like cut flowers or berries. Larger diameter products may take several hours to cool and use of packaging materials that impeded airflow though boxes can cause cooling time to be as long as 8 to 12 hours.

For many operations forced-air cooling can be set up with the addition of a fan system in an existing cold room. As capacity needs increase, additional refrigeration capacity is needed to handle the product heat load.

END OF THIS ARTICLE.



Illustration 1: Tarp Tunnel Precoolers are the Front-Line in Rapidly Cooling Fresh Produce