

Filling in the: **G**ood **A**gricultural **P**ractices

Maintaining the cold chain

Taste, appearance and shelf life are important to your clients whether you are selling at a farm market, tailgate market or have a Community Supported Agriculture operation. What you do after you harvest your fruits and vegetables affects these. Your produce may look good as you put it on display, but if you handle it improperly it will not last when the consumer gets it home and your repeat business will decline. Harvest as early in the day as possible. Shade produce during harvest operation. Remove field heat as soon as possible. Once cool, keep it cool! How do you cool it and keep it cool without spending a fortune?

On the market is a temperature over-ride device that can be used with an ordinary home air conditioning unit that allows fruits and vegetables to be cooled to their optimum stage temperature. The temperature control unit costs around \$250.00; the air conditioner cost depends on the BTU rating of unit. Below is a table recommending size of air conditioner unit required for storage space. One farmer's experience in 2007, maintaining a 40F temperature in a 12 x 12 well insulated room with floor insulation showed energy costs of \$150-165/month, throughout the hot summer months and into the fall.

Dimensions of Cooler	Size of Air Conditioner Unit
6 ft x 8 ft	10,000 BTU
8 ft x 8 ft	12,000 BTU
8 ft x 10 ft	15,000 BTU
8 ft x 12 ft	18,000 BTU
10 ft x 12 ft	21,000 BTU
10 ft x 14 ft	25,000 BTU

Once the produce is cold, how do you keep it cold if you take it to a tailgate market? If you do not have, a refrigerated truck insulate it. Use large ice chests, lined with bubble wrap and food grade ice pack for the most perishable commodities, i.e. leafy greens, herbs, berries. Be aware of which commodities are damaged by direct contact with ice and provide protection between produce and ice.

Use clean, wet towels, beach towels (used only for produce) to take advantage of evaporative cooling. As the towel dries, the air around the towel is cooled. This works well for keeping sweet corn cool and fresh (even the super sweets benefit).

Keeping it clean/ Chlorination: Chlorination is a generally accepted, low cost and effective means of disinfecting produce, tools and packing lines. Sanitize food grade ice

packs after

each use. Ice packs can be placed in new, food grade plastic storage bags, as well. Sanitize bubble wrap and towels after each use. Hang to dry in the sun; don't put in the clothes drier where you do your laundry. Also, clean and sanitize ice chests after each use.

Chlorine concentrations: High concentrations of chlorine will kill most pathogens in less than a minute; however concentrations of 100 to 150 ppm chlorine will kill most pathogens in a minute.

Water pH: Household bleach or sodium hypochlorite is a 5.25% solution that can be used for disinfecting. When added to water, sodium hypochlorite forms sodium hydroxide (NaOH) and hypochlorous acid (HOCL). **Hypochlorous acid is what kills the pathogens.** The pH of the water affects the concentration of hypochlorous acid. In high pH water, there is less hypochlorous acid; therefore it is recommended to **maintain a pH of 6.5 to 7.** Below pH 6, the chlorine concentration becomes very corrosive to equipment.

pH 7, ppm HOCL	Pints of Household Bleach per 100 gallons water	Fluid ounces of Household Bleach per 10 gallons water	Fluid ounces of Household Bleach per gallon of water
100 ppm	2.5 pts	4 fl oz	0.8 fl oz
125 ppm	3.2 pts	5 fl oz	1.0 fl oz
150 ppm	3.8 pts	6 fl oz	1.2 fl oz
175 ppm	4.4 pts	7 fl oz	1.4 fl oz
200 ppm	5.1 pts	8 fl oz	1.6 fl oz