

Postharvest Handling of Horticultural Products: Keeping Principles in Perspective

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For all fresh produce, variety selection, climatic conditions and growing practices will greatly affect the quality at harvest. Successful marketing of fresh fruits and vegetables depends on maintaining the quality harvested. Fresh products are alive and respire (e.g. enzymatically converting sugars and acids in the presence of oxygen to carbon dioxide and heat). Careful postharvest handling aims to reduce the rate of respiration and the rate of other processes that cause deterioration and quality loss (water loss, many biochemical changes, softening, etc). Careful, clean, and efficient handling is more important than the sophistication of the postharvest equipment used.

Basic Postharvest Principles

Harvest at the optimum maturity for best eating quality. Immature products have higher postharvest water loss and shrivel during marketing. Harvesting fruits such as apples, tomatoes and melons too soon results in nonuniform ripening and poor flavor. Harvesting products overmature may cause toughness (asparagus, beans), rapid yellowing (cucumbers), undesirable starchiness (sweet corn) or other undesirable flavors (bitterness in lettuce), or short shelf-life (apples, peppers). Harvesting fruit vegetables too ripe (tomatoes) makes physical injury more likely and reduces shelf-life.

Harvest during the coolest part of the day. The product is coolest at sunrise, and harvesting when it is cool minimizes deterioration and water loss. It is easier and cheaper to keep a product cool than to cool a product that has heated up. To minimize the spread of disease, harvest should begin once the foliage has dried. Use clean harvest containers, cutting equipment and gloves. Keep harvested products out of the sun (use an empty container, shade cloth, or other protection) to avoid direct sun injury and unnecessary heating of the product.

Harvest and handle gently. Injured areas on products lead to increased postharvest decay and water loss. Cuts, punctures, abrasions, crushing and bruising all cause significant quality losses. In some cases, products may appear undamaged, but may be bruised internally (melons). Reduce physical damage by reducing the number of steps in which the product is directly handled. The ideal situation is to harvest and directly pack the product into the container in which the product will be marketed (strawberries is the classic example).

Pack carefully: do not overpack or underpack. Packing too tightly causes compression bruises; packing too

protect the product from high temperatures, high air velocities, and low

Examples of Postharvest Requirements for Selected Vegetables and Melons

Product	Harvest Quality	Storage		Shelf-Life Days	Ethylene Sensitivity	Observations
		°F	% RH			
Artichoke, globe	size, tender bracts	32	95	14	Low	sprinkle lightly
Asparagus	bracts at tip closed	36	95	14	Low	stand in water
Basil	fresh, tender leaves	55	95	7	Moderate	stand in water
Beans, Lima	seeds developed, plump	40	95	7	Moderate	sprinkle lightly
Beans, pole & snap	crisp pods, seeds immature	40	95	7	Moderate	sprinkle lightly
Beets, bunched	firm, deep red roots	32	95	14	Low	sprinkle, cut tops
Broccoli	firm head, buds not open	32	95	14-21	High	sprinkle; ice
Brussel sprouts	firm sprouts	32	95	21-28	High	sprinkle; ice
Cabbage	crisp, firm, compact head	32	95	30-180	High	sprinkle lightly
Cantaloupe Melons	stem separates; rind color	36	95	14	Moderate	ice
Carrots, topped						

Sources of Information on Postharvest Handling:

1. Cantwell, M. (compiler). 2003. **Fresh-cut Products: Maintaining Quality and Safety**. UC Davis Postharvest Horticulture Series No. 10. Binder of articles, bulletins, etc. for 3 day annual fresh-cut workshop. (UC