

PRODUCE WASHING STATIONS

Introduction: A simple practice for enhancing the market value of fresh fruits and vegetables is cleaning or washing as part of preparation for marketing. Sanitation of wash water is essential, both to control the spread of disease from one item to another, and to limit spore buildup in wash water or in the packinghouse air. Chlorine treatments (100 to 150 ppm) can be used by small-scale operations in ambient temperature wash water to help control pathogen buildup during packing operations (Moline, 1984). There is some variation in the strength of registered formulations of Sodium hypochlorite bleach commercially available in different countries, but the general rule is to use 1 ml to 2 ml of 5.25% chlorine bleach per liter of clean water (1 to 2 ounces per 8 gallons). These concentrations have been reported to kill most pathogens within 1 minute. The pH of the wash water should be tested (using paper test strips) and maintained at 6.5 to 7.5 for best results. Muriatic (HCl) or citric acids are commonly used to lower pH. Additional chlorine will be required if washing is done at high temperatures or if there is a lot of organic matter in the wash water.

Wash before cooling and packing: tomatoes, cucumbers, leafy greens

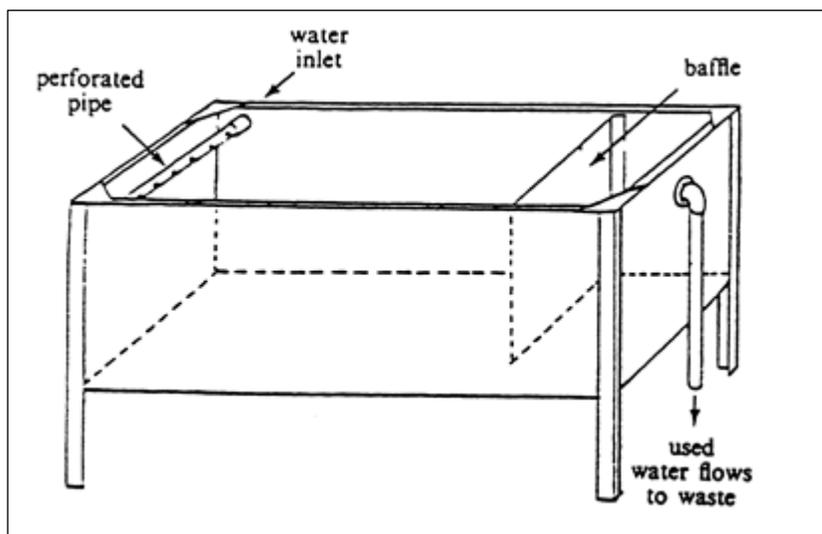
Wash to remove latex, reduce staining: mangoes, bananas

Wash after storage: sweet potatoes, potatoes, carrots

Do not wash: green beans, melons, cabbage, okra, peas, peppers, summer squash (thin peel varieties)

Do not wash – but dry brush after curing or storage: onions, garlic, kiwifruit

Design Options & Materials Needed: A big sink, an old bathtub, wash tub or large PVC plastic tank or tray with drainage holes can serve as an inexpensive washing station.



A spray nozzle on a water hose can be used to wash produce that is piled in a shallow vented plastic crate or on an open tray (Photo source: Iowa State University). The tank shown above can be made from stainless steel sheet metal (FAO 1989). A baffle made of perforated sheet metal is positioned near the drain pipe and helps to circulate water through the produce. Fresh water is added under pressure through a perforated pipe, which helps move floating produce toward the drain end of the tank for removal after cleaning.

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Improvements to this simple design might include a removable trash screen in front of the baffle, and/or a recirculating system for the wash water (with the addition of chlorine).

Costs & Benefits

The costs for washing can be very low if running water is available for spraying produce after harvest, or can cost up to \$300 to provide a large washing tank and chlorinated water recirculation system. In the following example, fresh produce, washed before packing, is rewarded with a higher market price when farmers sell directly to consumers at a local farmers market. In general, a few loads will pay for any costs incurred, and subsequent loads will generate increased profits with each use of the washing station.

Crop (1000 kg load)	Market value without washing before packing	Market value if washed before packing	Potential increase in profit per 1000 kg load
Carrots	\$0.40 per kg \$400 per load	\$0.55 per kg \$550 per load	\$150
Cucumbers	\$0.90 per kg \$900 per load	\$1.00 per kg \$1000 per load	\$100
Leafy green vegetables	\$1.00 per kg \$1000 per load	\$1.50 per kg \$1500 per load	\$500

References cited

FAO. 1989. Prevention of Postharvest Food Losses: Fruits Vegetables and Root Crops. A Training Manual. Rome: UNFAO. 157 pp.

Moline, HE. 1984. Postharvest Pathology of Fruits and Vegetables: Postharvest Losses in Perishable Crops. U.C. Bulletin 1914, University of California, Div of Agriculture and Natural Resources, Oakland, California 94608.

For further information

Chlorination practices <http://www.chlorineinstitute.org/>

Chlorine use in produce packing lines <http://edis.ifas.ufl.edu/ch160>

Small-scale postharvest handling practices: A manual for horticultural crops (Chapter 3; 5th edition 2015) http://ucanr.edu/sites/Postharvest_Technology_Center_/files/231952.pdf

Postharvest Technology Center (UC Davis) <http://postharvest.ucdavis.edu>

The Postharvest Education Foundation <http://www.postharvest.org>

Postharvest Innovations LLC <http://www.postharvestinnovations.com>

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