FDA: Peracetic Acid on Fresh Cut Produce

Analysis and Evaluation of Preventive Control Measures for the Control and Reduction/Elimination of Microbial Hazards on Fresh and Fresh-Cut Produce

2.10. Peracetic acid

The efficacy of peracetic acid against microorganisms on produce has not been extensively reported. On stainless steel chips in the presence of organic matter, peracetic acid, and peroctanoic acid inactivated mixed-culture biofilms of L. monocytogenes and Pseudomonas sp. more effectively than chlorine (Fatemi and Frank 1999). When used at 40 and 80 ppm, a sanitizer that contains peracetic acid (Tsunami TM,) significantly ($P<0.05$) reduced salmonellae and E. coli O157:H7 populations on cantaloupe and honeydew melon surfaces (Park and Beuchat 1999). These treatments were less effective on asparagus spears. The brand of sanitizer used in this study is reported by the manufacturer to maintain its efficacy over a broader pH range and organic demand than hypochlorite, although it is more expensive. Nearly 100-fold reductions in total counts and fecal coliforms on cut-salad mixtures were observed after treatment with 90 ppm peroxyacetic (peracetic) acid or with 100 ppm chlorine (Masson 1990). The subsequent inhibition of microbial growth during storage of salads was attributed to residual peracetic activity. Microbial populations on the surface of oranges were reduced about 85% after brush washing in water followed with a 15 s dip in 200 ppm peracetic acid, compared to a 60% reduction on oranges that were brush washed and dipped in plain water (Winniczuk 1994).
Confidential research results from one company indicated that a static 2-min treatment of inoculated tomatoes with a sanitizer formulation containing 60 ppm peracetic acid in combination with surfactants reduced populations of Salmonella Javiana, L. monocytogenes, and E. *coli O157:H7 by 96%, 99.96% and 99.5%, respectively, compared with treatment in sterile water. Similar results were obtained with a second* sanitizer formulation containing 40 ppm peracetic and surfactants.

An additional definition of "sanitize" is found in the FDA Guide to Minimize Microbial Food Safety Hazards for Fresh Fruits and Vegetables (FDA 1998): "to treat clean produce by a process that is effective in destroying or substantially reducing the numbers of microorganisms of public health concern, as well as other undesirable microorganisms, without adversely affecting the quality of the product or its safety for the consumer."

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Chlorine on Fresh Cut Lettuce

Studies indicate those chlorine concentrations traditionally used with produce (<200 ppm) are not particularly effective at reducing microbial populations on lettuce. Survival of E. coli O157:H7 on cut lettuce pieces after submersion for 90 s in a solution of 20 ppm chlorine at 20 or 50 °C (68 or 122 °F) was not significantly different from the non chlorine treatment (Li and others 2001). Spray treatment of lettuce with 200 ppm chlorine was no more effective at removing E. coli O157:H7 than treatment with deionized water (Beuchat 1999).

Increasing the exposure time from 1 to 5 min did not result in an increased kill. Likewise, Adams and others (1989) indicated that a standardized washing procedure for lettuce leaves was only slightly improved with inclusion of 100 ppm chlorine over tap water alone.