Title	Efficacy of sanitizers on pathogen reduction of fresh-cut carrots under simulated commercial processing conditions
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Abstract

Chlorine is widely used as a sanitizer to maintain the microbial quality and safety of fresh-cut produce; however, chlorine treatment lacks efficacy on pathogen reduction, especially when the fresh-cut processing water contains heavy organic loads. A more efficacious sanitizer that can tolerate the commercial processing conditions is needed to maintain microbial safety of fresh-cut produce. This study evaluated the efficacy of *Escherichia coli* 0157:H7 reduction on fresh-cut carrots using new and traditional sanitizers with tap water and fresh-cut processing water scenarios. Fresh carrot shreds were inoculated with *E. coli* 0157:H7 (Nal') to reach an initial inoculum level of 10^6 cfu/g. Samples were washed in the following sanitizer solutions: 200 ppm chlorine, 1% Pro-San, 100 ppm Tsunami, 1000 ppm SANOVA. Sanitizers were prepared in fresh tap water and simulated processing water with a COD level of approximately 3500 mg/L. Samples were packaged and stored at 5°C. Microbial analyses were performed at days 0, 7 and 14. Triplicate samples were homogenized in PBS buffer. Serial dilutions of the homogenate were plated on MacConkey Sorbitol agar for the enumeration of *E. coli* 0157:H7, TSA for total plate count, and PDA for yeasts and molds. The results indicate that the organic load in the process water significantly affected the efficacy of chlorine on pathogen removal, especially evident on samples tested during storage. SANOVA provided a strong pathogen reduction in both tap water as well as process water conditions with greater than a 5.0 log reduction. E *coli* 0157:1-17 was not recovered on samples during the entire 14 d storage. No colonies were detected on the SANOVA treated samples even following an enrichment step, while *E. coli* 0157:H7 on samples treated with all other sanitizers grew to 10^7 — 10^{10} cfu/g. Clearly, SANOVA holds considerable promise as a sanitizer of fresh-cut produce.