

EFFICACY OF CHEMICAL TREATMENTS FOR INACTIVATING *ESCHERICHIA COLI* O157:H7 ON WHOLE APPLES AND LETTUCE

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Current practice of washing fresh produce in chlorinated water produces only minimal reductions in microbial numbers that range from approximately 10 to 100-fold (1 to 2 logs). Studies were conducted to determine the antimicrobial efficacy of selected chemical sanitizers for destroying or substantially reducing *Escherichia coli* O157:H7 on whole apples and lettuce leaves. Red delicious apples and leaves of iceberg lettuce were spot-inoculated with *E. coli* O157:H7 B914, air-dried in a laminar flow hood at room temperature (23 °C) for 1 hour, then held overnight at 4 °C until application of sanitizer treatments. Inoculated apples and lettuce were immersed for 2 minutes in distilled water or the following sanitizers at 25 °C: 200 ppm hypochlorite, hydrogen peroxide (H₂O₂, 5% wt/vol), sodium hydroxide/bicarbonate buffer (NaOH-NaHCO₃; pH 11.6), Tsunami 100 (80 ppm), and Pro-San (2% wt/vol). Inoculated samples which were not immersed in water of sanitizer served as no-wash controls. Following each treatment samples were rinsed for 5 seconds in sterile distilled water. After rinsing, samples were placed in separate plastic bags each containing 50 ml of sterile buffered peptone water (BPW) and vigorously shaken and rubbed to dislodge surviving cells into the BPW. Microbiological analyses were conducted on the BPW to determine the number of *E. coli* O157:H7 survivors. Numbers of *E. coli* O157:H7 on no-wash controls were 6.42 logs and 6.36 logs, respectively, per apple and lettuce leaf. The water-wash, which reduced numbers of *E. coli* O157:H7 on apples and lettuce by 1.43 logs and 1.20 logs, respectively, was the least effective of all the treatments. Except for the hypochlorite treatment, all sanitizers tested resulted in log reductions ranging from 2.84 to 3.27 logs for apples and from 2.36 to 3.08 logs for lettuce. These reductions are significant with respect to the numbers of pathogenic bacteria that may occur on fresh produce. Hypochlorite (200 ppm) reduced numbers of *E. coli* O157:H7 on apples and lettuce by 1.65 logs and 1.28 logs, respectively. However, the antimicrobial effect of this treatment differed significantly from that of the most effective treatments which were H₂O₂ (5%) and **Pro-San (2%)**. **H₂O₂ or Pro-San, a biodegradable foodgrade sanitizer, seems to have good potential for destroying foodborne pathogenic bacteria on whole apples and lettuce. The development of novel, effective food grade sanitizers is crucial for ensuring the microbial safety of fresh fruits and vegetables for astronauts in space as well as for consumers on earth.**