Effectiveness of chlorine, organic acids and UV treatments in reducing *Escherichia coli* O157:H7 and *Yersinia enterocolitica* on apples

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SUMMARY

This study assessed the effectiveness of 200 and 500 ppm of chlorine and organic acids (0.5 % lactic acid and 0.5% citric acid) in wash solutions, and UV radiation for reducing *Escherichia coli* O157:H7 and *Yersinia enterocolitica* on apples contaminated by two different methods. Residual levels of these pathogens after different treatments were compared. On dip inoculated apples, *Y. enterocolitica* reductions of 2.66 and 2.77 logs were obtained with 200 and 500 ppm chlorine combined with 0.5% lactic acid, respectively. The *E. coli* O157:H7 population decreased 3.35 log with 0.5% lactic acid wash solution, and 2.72 and 2.62 logs after 500 ppm chlorine and 500 ppm chlorine plus 0.5% lactic acid treatments, respectively.

Similar reductions were obtained with UV radiation. On spot inoculated apples, significant ($p<0.05$) decreases of 4.67 and 4.58 logs were observed in *E. coli* O157:H7 and *Y. enterocolitica* levels, respectively, after 500 ppm chlorine plus 0.5% lactic acid treatment as compared with the control. In sectioned apples, microorganisms infiltrated in inner core region and pulp were not significantly ($p<0.05$) affected by disinfection treatments. No pathogens were detected in the natural microflora on apples. Reductions such as those obtained with 500 ppm chlorine plus 0.5% lactic acid solution were very proximal to the 5-log score required by FDA for apple disinfection.

Key words: Escherichia coli O157:H7, *Yersinia*, apples, disinfection, chlorine, UV radiation, organic acids

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