

Title Chlorine dioxide and chlorine effectiveness to prevent *Escherichia coli* O157:H7 and *Salmonella* cross-contamination on fresh-cut Red Chard

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Abstract

Washing procedures applied to fresh produce have the potential to reduce contamination from the surface of the product. However, the wash water may also serve as a source of contamination or has great potential to result in cross-contamination. The objective of this study was to evaluate process handling cross-contamination potential and pathogen removal of initially low numbers of attached cells of *Salmonella* and *Escherichia coli* O157:H7 during the washing-disinfection, rinsing, and de-watering steps of fresh-cut Red Chard baby leaves as affected by NaClO and ClO₂. The efficacy and stability of liquid ClO₂ applied to the water as the disinfectant treatment was also evaluated. Non-inoculated leaves were mixed with inoculated leaves (about 3–5% of total weight) and processed as a unit. After processing, no confirmed colonies on selective media were recovered from the non-inoculated leaves and qPCR was used for detection below the limit of quantitative recovery. ClO₂ substantially prevented *E. coli* O157:H7 cross-contamination but was not effective for the inoculated *Salmonella*. Large populations of *Salmonella* were recovered from centrifugation discharge effluent water whereas no colonies were detected from water in contact with inoculated leaves collected from preceding washing unit operations. At an industrial level, this represents a potential risk of cross-contamination to product and equipment at the step immediately prior to packaging. These results suggest that the centrifugation effluent water could be used as a potential sample point to evaluate lot contamination and cross-contamination in the processing chain, even at low levels of pathogens, as were used in this study, undetectable by conventional sampling methods.