

**Title** Efficacy of chlorine, acidic electrolyzed water and aqueous chlorine dioxide solutions to decontaminate *Escherichia coli* O157:H7 from lettuce leaves

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### Abstract

This study compared the efficacy of chlorine (20–200 ppm), acidic electrolyzed water (50 ppm chlorine, pH 2.6), acidified sodium chlorite (20–200 ppm chlorite ion concentration, Sanova<sup>®</sup>), and aqueous chlorine dioxide (20–200 ppm chlorite ion concentration, TriNova<sup>®</sup>) washes in reducing populations of *Escherichia coli* O157:H7 on artificially inoculated lettuce. Fresh-cut leaves of Romaine or Iceberg lettuce were inoculated by immersion in water containing *E. coli* O157:H7 (8 log CFU/ml) for 5 min and dried in a salad spinner. Leaves (25 g) were then washed for 2 min, immediately or following 24 h of storage at 4 °C. The washing treatments containing chlorite ion concentrations of 100 and 200 ppm were the most effective against *E. coli* O157:H7 populations on Iceberg lettuce, with log reductions as high as 1.25 log CFU/g and 1.05 log CFU/g for TriNova<sup>®</sup> and Sanova<sup>®</sup> wash treatments, respectively. All other wash treatments resulted in population reductions of less than 1 log CFU/g. Chlorine (200 ppm), TriNova<sup>®</sup>, Sanova<sup>®</sup>, and acidic electrolyzed water were all equally effective against *E. coli* O157:H7 on Romaine, with log reductions of ~ 1 log CFU/g. The 20 ppm chlorine wash was as effective as the deionized water wash in reducing populations of *E. coli* O157:H7 on Romaine and Iceberg lettuce. Scanning electron microscopy indicated that *E. coli* O157:H7 that was incorporated into biofilms or located in damage lettuce tissue remained on the lettuce leaf, while individual cells on undamaged leaf surfaces were more likely to be washed away.