Title Inactivation kinetics of inoculated *Escherichia coli* O157:H7, *Listeria monocytogenes* and *Salmonella enterica* on strawberries by chlorine dioxide gas

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Abstract

Inactivation kinetics of inoculated *Escherichia coli* O157:H7, *Listeria monocytogenes* and *Salmonella enterica* on strawberries by chlorine dioxide gas at different concentrations (0.5, 1, 1.5, 3 and 5 mg l^{-1}) for 10 min were studied. A cocktail of three strains of each targeted organism (100 μl) was spotted onto the surface of the strawberries (approximately 8–9 log ml^{-1}) separately followed by air drying, and then treated with ClO_2 gas at 22 °C and 90–95% relative humidity. Approximately a 4.3–4.7 log CFU reduction per strawberry of all examined bacteria was achieved by treatment with 5 mg l^{-1} ClO_2 for 10 min. The inactivation kinetics of *E. coli* O157:H7, *L. monocytogenes* and *S. enterica* were determined using first-order kinetic models to establish *D*-values and *z*-values. The *D*-values of *E. coli*, *L. monocytogenes* and *S. enterica* were 2.6±0.2, 2.3±0.2 and 2.7±0.7 min, respectively, at 5 mg l^{-1} ClO_2. The z-values of *E. coli*, *L. monocytogenes* and *S. enterica* were 16.8±3.5, 15.8±3.5 and 23.3±3.3 mg l^{-1}, respectively. Furthermore, treatment with ClO_2 gas significantly ($p \leq 0.05$) reduced the initial microflora (mesophilic, psychrotrophic bacteria, yeasts and molds) on strawberries. Treatment with ClO_2 gas did not affect the color of strawberries and extended the shelf-life to 16 days compared to 8 days for the untreated control.