

Title Combined treatment of fumaric acid with aqueous chlorine dioxide or UV-C irradiation to inactivate *Escherichia coli* O157:H7, *Salmonella enterica* serovar Typhimurium, and *Listeria monocytogenes* inoculated on alfalfa and clover sprouts

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Abstract

Effect of fumaric acid, chlorine dioxide (ClO₂), and UV-C treatment was examined on the inactivation of microorganisms in alfalfa and clover sprouts. Clover sprouts were irradiated with UV-C light (1–10 kJ/m²), and the treatment decreased the population of total aerobic bacteria by 1.03–1.45 log CFU/g. Clover sprouts inoculated with pathogenic bacteria were treated with various concentration of fumaric acid, and 0.5 g/100 ml fumaric acid treatment was the most effective. In addition, the combined treatment of fumaric acid (0.5 g/100 ml)/UV-C (1 kJ/m²) reduced the populations of *Escherichia coli* O157:H7, *Salmonella enterica* serovar Typhimurium, and *Listeria monocytogenes* inoculated on clover sprouts by 3.02, 2.88, and 2.35 log CFU/g. Alfalfa sprouts were treated with ClO₂, fumaric acid, and the combination of fumaric acid/ClO₂. The combined treatment was the most effective, and it reduced the total aerobic bacteria by 3.18 log CFU/g as well as the initial populations of *E. coli* O157:H7, *S. typhimurium*, and *L. monocytogenes* inoculated on alfalfa sprouts by 4.06, 3.57, and 3.69 log CFU/g. These results suggest that the combined treatment of fumaric acid with UV-C or ClO₂ can be useful for improving the microbial safety of alfalfa and clover sprouts.