

**Title** Effect of aerosolized malic acid against *Listeria monocytogenes*, *Salmonella* Typhimurium, and *Escherichia coli* O157:H7 on spinach and lettuce

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**Citation** Food Control, Volume 24, Issues 1-2, March-April 2012, Pages 171-176

**Keywords** Aerosolization; Malic acid; Spinach; Lettuce; Foodborne pathogens

### Abstract

The purpose of this study is to investigate the efficacy of aerosolized malic acid for inhibiting foodborne pathogens (*Listeria monocytogenes*, *Salmonella* Typhimurium, and *Escherichia coli* O157:H7) on spinach and lettuce. Spinach and lettuce were inoculated with a cocktail containing three strains of each pathogen then treated with aerosolized malic acid at the concentration of 0.25%, 0.5%, 1% and 2% for 10, 30, 50, and 100 min at room temperature ( $22 \pm 2$  °C). The control showed that the levels of three pathogens did not significantly when treated for 50 min or less. However, the levels of three pathogens were significantly reduced by treatment with aerosolized malic acid. In particular, aerosolized 2% malic acid for 100 min was the most effective treatment to reduce the three pathogens on spinach and lettuce. The reduction levels of *L. monocytogenes*, *S. Typhimurium*, and *E. coli* O157:H7 on spinach and lettuce were 3.35, 4.10, 3.67, and 3.85, 5.02, 3.35  $\log_{10}$  CFU/g, respectively. Aerosolized malic acid was shown to be effective at killing foodborne pathogens on spinach and lettuce without deteriorating the quality. Therefore, aerosolized malic acid might be used as an alternative sanitizer to increase the microbial safety of fresh produce during transportation and storage.