

**Title** Development of oscillation method for reducing foodborne pathogens on lettuce and spinach  
**Author** Sung-Youn Kim, Hun-Gu Sagong, Sangryeol Ryu, Jae-Hyung Mah and Dong-Hyun Kang  
**Citation** International Journal of Food Microbiology, Volume 145, Issue 1, 31 January 2011, Pages 273-278  
**Keywords** Oscillation; Pathogen; Reduction; Produce; Lettuce; Spinach

#### **Abstract**

In this study, the efficacy of an oscillator for reducing the numbers of foodborne pathogens on lettuce and spinach was tested. A cocktail of three strains each of *Salmonella typhimurium*, *Escherichia coli* O157:H7 and *Listeria monocytogenes* cells and of *Bacillus cereus* spores was inoculated onto lettuce and spinach leaves and followed by oscillation at 10 Hz and 20 Hz for up to 30 s. After treatment of inoculated lettuce leaf with an oscillator at 20 Hz for 30 s, 2.58, 2.82, 2.21 and 2.22 Log<sub>10</sub> CFU/g reductions were obtained with the cells of *S. typhimurium*, *E. coli* O157:H7 and *L. monocytogenes* and the spores of *B. cereus*, respectively. In the case of the oscillation treatment of spinach leaf, 2.89, 3.73, 2.46 and 2.25 Log<sub>10</sub> CFU/g reductions of those pathogens were achieved under the same condition. Statistically significant reductions were observed after oscillation treatment at 20 Hz for 5–10 s. The oscillation treatment at 10 Hz led to slightly less reductions of the pathogens tested as compared to the treatment at 20 Hz. In conclusion, the oscillation method developed shows to be highly efficacious in reducing foodborne pathogens on lettuce and spinach leaves.