Title Effects of different sanitizing treatments on biofilms and attachment of *Escherichia coli* and *Listeria monocytogenes* on green leaf lettuce

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Citation LWT - Food Science and Technology, Volume 43, Issue 6, July 2010, Pages 964-970

Keywords Biofilm; Lettuce; *Escherichia coli*; *Listeria monocytogenes*; SEM

Abstract

The effects of ozone (2 mg/L), chlorine (100 mg/L) and organic acid (0.25 g/100 g citric acid plus 0.50 g/100 g ascorbic acid) treatments at 10 °C for 2 min on the removal of *Escherichia coli* and *Listeria monocytogenes* cells embedded inside biofilms on the surface of lettuce leaves were studied. None of the sanitizing treatments were found effective in removing the bacterial biofilms. Initiation of biofilms was observed after 24 h of incubation. Bacterial cells appeared as individual cells, rather than clusters after 6 h incubation, thus 99.9% reductions in both *E. coli* and *L. monocytogenes* counts were achieved with all the three treatments. However, after 48 h incubation, none of the treatments resulted in higher than 90% reduction in microbial counts. Biofilm formation was demonstrated for the 48 h incubated samples with SEM images.