

Title Optimization of aqueous ozone as disinfection treatment of *Escherichia coli* O157:H7 and the shelf life of hydroponic and organic butter head lettuce

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Abstract

Escherichia coli O157:H7 is a gram negative bacterium and can cause a bloody diarrhoea due to toxins secreted when it infects human intestinal tracts. The effectiveness of ozonation on *Escherichia coli* O157:H7 was evaluated for the improvement in produce shelf life and food safety. The effects of aqueous ozone on hydroponic and organic butterhead lettuces were evaluated by varying the aqueous ozone concentrations applied as a potential food sanitizer especially for lettuce which is normally consumed raw. The produce quality was assessed by comparing the changes in texture or firmness, colour, chlorophyll content and vitamin C after treatment with aqueous ozone at 0, 3 and 5 μLL^{-1} and stored at 5°C for 12 days. The analysis was conducted on day 0, 4, 8 and 12 days of storage. The number of *E. coli* O157:H7 in organic lettuce was found to be higher than hydroponic lettuce. The aqueous ozone treatments were effective in reducing the *E. coli* O157:H7 contamination on the day of treatment applied but the effectiveness decreased as the storage period progressed. The aqueous ozone at 5 μLL^{-1} treatment resulted in the highest reduction of *E. coli* O157:H7 but the quality characteristics were negatively affected. The aqueous ozone at 5 μLL^{-1} was found to be the potential concentration for reducing *E. coli* O157:H7 without compromising the quality.