Title Utilization of ozone for the decontamination of small fruits

Author Katherine L. Bialka and Ali Demirci

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Abstract

Each year there are approximately 76 million foodborne illnesses and fresh produce is the second most common vehicle for such illnesses. Small fruits have been implicated in several outbreaks although none have been bacterial. Prior to market small fruits are not washed or treated in any manner so as to extend their shelf life. Washing alone is not a viable option and the use of novel technologies needs to be investigated. One such technology is ozone which has been used to treat drinking water since the late nineteenth century. The efficacy of gaseous ozone to decontaminate pathogens on strawberries, which were used as a model for small fruits, was investigated in this study. Strawberries were artificially contaminated with 5 strains of E. coli O157:H7 and Salmonella. Fruits were treated with 4 ozone treatments; i) continuous ozone flow for 2, 4, 8, 16, 32, and 64 min, ii) pressurized ozone (83 kPa) for 2, 4, 8, 16, 32, and 64 min, iii) continuous ozone (64 min) followed by pressurized ozone (64 min). Maximum reductions of 1.81, 2.32, and 2.96 log10 CFU/g of E. coli O157:H7 were achieved for continuous, pressurized, and continuous followed by pressurized ozone, respectively. For Salmonella reductions of 0.97, 2.18, and 2.60 log10 CFU/g were achieved for continuous, pressurized, and continuous followed by pressurized ozone, respectively. It was concluded that continuous ozone was the least effective treatment, and that there was no significant difference between pressurized ozone treatment and continuous followed by pressurized ozone treatment. These results demonstrate that gaseous ozone has the potential to be used a decontamination method for small fruits.