

Title Elimination by ozone of *Shigella sonnei* in shredded lettuce and water
Author María Victoria Selma, David Beltrán, Ana Allende, Eliseo Chacón-Vera and María Isabel Gil
Citation Food Microbiology, Volume 24, Issue 5, August 2007, Pages 492-499
Keywords Disinfection; Fresh-cut; Microbial inactivation; Pathogen; Sanitation

Abstract

Several outbreaks of shigellosis have been attributed to the consumption of contaminated fresh-cut vegetables. The minimal processing of these products make it difficult to ensure that fresh produce is safe for consumer. Chlorine-based agents have been often used to sanitize produce and reduce microbial populations in water applied during processing operations. However, the limited efficacy of chlorine-based agents and the production of chlorinated organic compounds with potential carcinogenic action have created the need to investigate the effectiveness of new decontamination techniques. In this study, the ability of ozone to inactivate *S. sonnei* inoculated on shredded lettuce and in water was evaluated. Furthermore, several disinfection kinetic models were considered to predict *S. sonnei* inactivation with ozone. Treatments with ozone (1.6 and 2.2 ppm) for 1 min decreased *S. sonnei* population in water by 3.7 and 5.6 log cfu mL⁻¹, respectively. Additionally, it was found that *S. sonnei* growth in nutrient broth was affected by ozone treatments. After 5.4 ppm s ozone dose, lag-phases were longer for injured cells recovered at 10 °C than 37 °C. Furthermore, treated cells recovered in nutrient broth at 10 °C were unable to grow after 16.5 ppm s ozone dose. Finally, after 5 min, *S. sonnei* counts were reduced by 0.9 and 1.4 log units in those shredded lettuce samples washed with 2 ppm of ozonated water with or without UV-C activation, respectively. In addition, *S. sonnei* counts were reduced by 1.8 log units in lettuce treated with 5 ppm for 5 min. Therefore, ozone can be an alternative treatment to chlorine for disinfection of wash water and for reduction of microbial population on fresh produce due to it decomposes to nontoxic products.