
ABSTRACT

Studies have demonstrated that electrolyzed oxidizing (EO) water is effective in reducing foodborne pathogens on fresh produce. This study was undertaken to determine the efficacy of EO water and two different forms of chlorinated water (chlorine water from Cl2 and Ca(OCl)2 as sources of chlorine) in inactivating Salmonella on alfalfa seeds and sprouts. Tengram sets of alfalfa seeds inoculated with a five-strain cocktail of Salmonella (6.3 x 10^4 CFU/g) were subjected to 90 ml of deionized water (control), EO water (84 mg/liter of active chlorine), chlorine water (84 mg/liter of active chlorine), and Ca(OCl)2 solutions at 90 and 20,000 mg/liter of active chlorine for 10 min at 24 +/- 2 degrees C. The application of EO water, chlorinated water, and 90 mg/liter of Ca(OCl)2 to alfalfa seeds for 10 min reduced initial populations of Salmonella by at least 1.5 log10 CFU/g. For seed sprouting, alfalfa seeds were soaked in the different treatment solutions described above for 3 h. Ca(OCl)2 (20,000 mg/liter of active chlorine) was the most effective treatment in reducing the populations of Salmonella and non-Salmonella microflora (4.6 and 7.0 log10 CFU/g, respectively). However, the use of high concentrations of chlorine generates worker safety concerns. Also, the Ca(OCl)2 treatment significantly reduced seed germination rates (70% versus 90 to 96%). For alfalfa sprouts, higher bacterial populations were recovered from treated sprouts containing seed coats than from sprouts with seed coats removed. The effectiveness of EO water improved when soaking treatments were applied to sprouts in conjunction with sonication and seed coat removal. The combined treatment achieved 2.3- and 1.5-log10 CFU/g greater reductions than EO water alone in populations of Salmonella and non-Salmonella microflora, respectively. This combination treatment resulted in a 3.3-log10 CFU/g greater reduction in Salmonella populations than the control (deionized water) treatment.