
ABSTRACT
Acidic electrolyzed water (AcEW) was used as frozen AcEW (AcEW-ice) for inactivation of Listeria monocytogenes and Escherichia coli O157:H7 on lettuce. AcEW-ice was prepared from AcEW with 20, 50, 100, and 200 ppm of available chlorine by freezing at -40 degrees C and generated 30, 70, 150, and 240 ppm of chlorine gas (Cl2), respectively. The AcEW-ice was placed into styrene-foam containers with lettuce samples at 20 degrees C for 24 h. Although AcEW-ice generating 30 ppm Cl2 had no effect on L. monocytogenes cell counts, AcEW-ice generating 70 to 240 ppm of Cl2 significantly (P < 0.05) reduced L. monocytogenes by ca. 1.5 log CFU/g. E. coli O157:H7 cell counts were reduced by 1.0 log CFU/g with AcEW-ice generating 30 ppm of Cl2. AcEW-ice generating 70 and 150 ppm of Cl2 reduced E. coli O157:H7 by 2.0 log CFU/g. Further significant reduction of E. coli O157:H7 (2.5 log CFU/g) was demonstrated by treatment with AcEW-ice generating 240 ppm of Cl2. However, treatment with AcEW-ice generating 240 ppm of Cl2 resulted in a physiological disorder resembling leaf burn. AcEW-ice that generated less than 150 ppm of Cl2 had no effect on the surface color of the lettuce. AcEW-ice, regardless of the concentration of the emission of Cl2, had no effect on the ascorbic acid content in the lettuce. The weight ratio of lettuce to AcEW-ice required was determined to be over 1:10. The bactericidal effect of AcEW-ice appeared within the first 2 h. The use of AcEW-ice provides simultaneously for low temperature storage and inactivation of bacteria.