

Effects of Electrolyzed Oxidizing Water on Microbial Growth, Lipid Oxidation and Color of Displayed Beef during Refrigerated Storage

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Electrolyzed oxidizing water (EO water) produced by the electrolysis of water containing sodium chloride has been reported to possess strong antimicrobial properties. The major antimicrobial elements in EO water include a low pH of 2.7, an oxidation-reduction potential of $>1,100$ mV, and a free-chlorine level of 10 to 80 ppm. The effects of EO water on microbial growth, lipid oxidation and color of displayed beef during 4°C storage were evaluated. Beef cores (3cm diameter 1.5cm thick) from longissimus muscle were prepared, and then dip-treated in distilled water (pH 7.2; control) or EO water (pH 2.5; treatment) for 1, 5 and 10 min at 23°C. Total plate counts, lipid oxidation (TBARS) and color (CIE L*a*b*) were measured at 0, 1, 3, 6 and 9 days of storage at 4°C. Microbial growth on beef cores was not affected by EO water treatment. The population of all samples was approximately 7 log CFU/cm² after 6 days of display. However, TBARS values of samples subjected to 5 and 10 min of EO water treatment tended to be higher than those of control and 1 min EO water treatment after 6 days. Differences in TBARS between control and 1 min EO water treatment appeared negligible. Samples subjected to EO water treatment showed slightly higher CIE a* values compared to controls, while CIE L* and b* values did not appear to differ among treatments during 9 days of storage. Results were not as conclusive as earlier demonstration of antimicrobial effects of EO water on fruit/vegetables and kitchen cutting boards.