Title Treatment of *Escherichia coli* O157:H7 with lactic acid, neutralized electrolyzed oxidizing water and chlorine dioxide followed by growth under sub-optimal conditions of temperature, pH and modified atmosphere

Author Nada Smigic, Andreja Rajkovic, Eszter Antal, Helga Medic, Barbara Lipnicka, Mieke Uyttendaele and Frank Devlieghere

Citation Food Microbiology, Volume 26, Issue 6, September 2009, Pages 629-637

Keywords *Escherichia coli* O157:H7; Lactic acid; Chlorine dioxide; Neutral electrolyzed oxidizing water; Modified atmosphere packaging; Sub-lethal injury

Abstract

The utilization of sub-lethal decontamination treatments gains more and more interest due to the increased consumers' demand for fresh, minimally processed and convenient food products. These products rely on cold chain and hurdle (combination) technology to provide microbiological safety and quality during their shelf life. To investigate the ability of surviving cells to resuscitate and grow in a food simulating environment, sub-lethal decontamination treatments were coupled with subsequent storage under sub-optimal growth conditions. For this purpose chlorine dioxide (ClO_2) and neutralized electrolyzed oxidizing water (NEW)-treated cultures of *Escherichia coli* O157:H7 were inoculated in TSB-YE of pH 5.8 and a_w 0.99, and stored at 10 °C, 12.5 °C and 15 °C, under four different atmospheres (0%, 30% and 60% CO_2 balanced with N_2, and air). Due to the severity of injury, lactic acid-treated cells were inoculated in TSB-YE pH 7.0. Data obtained reveal that the fraction of sub-lethally injured *E. coli* O157:H7 undergoes an additional inhibitory effect during the storage period under of sub-optimal conditions. Observed extension in the lag growth phase was a direct consequence prior sub-lethal injury. The effects of liquid ClO_2 and NEW were less pronounced in comparison to lactic acid. The current study signifies the potential utilization of appropriate combination of different extrinsic and intrinsic factors in the elimination or growth inhibition of food-borne pathogens.