Combination of Slightly Acidic Electrolyzed Water, Ultrasound and Water Wash to Maximize the Sanitization Effect against Microbial Contamination on Lettuce

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Abstract: Microbial contamination of fresh produce is still a major concern to the food industry regardless of all recent improvements in food safety technologies. Among the numerous technologies used slightly acidic electrolyzed water (SIAEW) and ultrasound, are both known as environmental friendly technologies. Although, SIAEW still needs more improvement to be used in food sanitization and ultrasound alone does not effectively reduce microbial numbers in food samples. Hence, the aim of this study was to develop an improved hurdle for fresh produce sanitization using combined treatments of SIAEW (pH 5.4, available chlorine concentration 22 mg/L, oxidation reduction potential 544-592 mV) with ultrasound. Lettuce samples were treated with distilled water (DW), SIAEW, SIAEW followed by water wash (SIAEW + WW), SIAEW with ultrasound (SIAEW + US) and SIAEW with ultrasound followed by water wash (SIAEW + US + WW) at room temperature (24 ± 2 °C), respectively. Following treatments, number of yeasts and molds (YM), total bacteria (TBC) and artificially inoculated *Escherichia coli* O157:H7 were enumerated. The results showed that ultrasound and water wash alone did not significantly increase the sanitation efficacy of SIAEW. However, treatment of the sample with SIAEW and ultrasound simultaneously, followed by water wash (SIAEW + US + WW) resulted in a great enhancement in microbial reduction. This combined treatment resulted in the reduction of 3.7, 4.1 and 3.8 log CFU/g in YM, TBC and *E. coli* O157:H7 respectively. Therefore, there is a great chance that this simple hurdle technology can be used in fresh produce as well as other types of food industry to improve the safety of product. Furthermore, addition of mild heat or other treatments should be investigated. This can result in higher numbers of microbial inactivation with cheap, easy to operate and environmental friendly technology.

Key words: Slightly acidic electrolyzed water (SIAEW), ultrasound, food sanitization, microbial reduction, lettuce.