

Kanokthip Sapcharoenkul 2007: Efficacy of Chlorine Dioxide and Acidic Electrolyzed Water to Eliminate Biofilms of *Bacillus cereus*, *Staphylococcus aureus* and Attached *Bacillus cereus* Spores on Food Contact Surfaces. Master of Science (Food Science), Major Field: Food Science, Department of Food Science and Technology. Thesis Advisor: Mrs. Warapa Mahakarnchanakul, Ph.D. 127 pages.

The objective of this research was to investigate the efficacy of chlorine dioxide (ClO_2) and acidic electrolyzed water (AcEW) in inactivating of *Bacillus cereus*, *Staphylococcus aureus* and spore of *B. cereus* in planktonic state and biofilms on food contact surfaces. In the planktonic state, the results showed that ClO_2 (5 ppm) and AcEW (total available chlorine 30 ppm) completely eliminated *B. cereus* and *S. aureus* cells in 0.1% peptone water within 5 min (both low inoculums; 3.3 log CFU/ml and high inoculums; 6.3 log CFU/ml), whereas spores (initial load 3.2 log CFU/ml) were eliminated by 30 ppm ClO_2 for 5 min and AcEW 30 ppm for 20 min. However, the same concentration of both sanitizers tested in the peptone solution showed less effective in eliminating cells when tested in either Trypticase Soy Broth (TSB) or chicken broth. To determine the effect of both sanitizers on biofilms, then biofilms were grown on stainless steel, rubber and plastic coupons ($2 \times 5 \text{ cm}^2$) immersed in TSB for 48 hours at ambient temperature ($28 \pm 2^\circ\text{C}$). The rubber was the most difficult to eliminate by sanitizer compare to other surfaces. Using of ClO_2 10 ppm 30 min and AcEW 30 ppm 30 min or 52 ppm 10 min could effectively reduce *B. cereus* and *S. aureus* biofilms on rubber (99.83-99.95%). Spores of *B. cereus* attached on rubber were reduced by ClO_2 15 ppm for 30 min only 83.40%, however they could be eliminated by AcEW in 30 min. Efficacy of both sanitizers decreased when washed the biofilms and attached spores coated with chicken broth. The resistant to sanitizers of biofilms at low temperature ($15 \pm 1^\circ\text{C}$) were not increased. Alkaline electrolyzed water enhanced the bactericidal effect of AcEW on biofilms. The results showed that biofilm cells and attached spores on surface were hard to eliminate compared to planktonic state. Organic matters also affected to the efficacy of both sanitizers.

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