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Decontamination of foods and equipment by electrolyzed oxidizing water: A review

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Electrolyzed Oxidizing (EO) water has started to get much attention in recent years as a novel sanitation and cleaning agent. EO water is produced by the electrolysis of soft tap water containing sodium chloride, which yields two distinct solutions; acetic solution with a pH of 2.6-2.9, ORP of 1120-1180 mV, and 76-90 ppm free chlorine, and alkaline solution with a pH of 11.1-11.5 and ORP of -850 to -880 mV. It offers not only an effective solution for the inactivation of microorganisms but is also user and environmentally friendly; the on-site generation process needs only electricity and table salt, which eliminates the potential hazards and costs of transportation and storage of dangerous chemicals. In this paper, various studies from our lab as the applications of EO water will be summarized. EO water is an emerging technology, which has a great potential to be used for the decontamination of foods and food processing equipment. This paper will not only provide a review for the recent applications of this technology, but also increase awareness of this technology for the food industry.

Recent Publications

1. Dev S R S, K C Cheng and A Demirci (2011) Electrolyzed oxidizing water technology. Resource Magazine of American Society of Agricultural Engineers. 18(5):12-13.
2. Okull D, Demirci A, Rosenberger D and LaBorde L (2006) Susceptibility of *Penicillium expansum* spores to sodium hypochlorite, electrolyzed oxidizing water, and chlorine dioxide solutions modified with nonionic surfactants. Journal of Food Protection 69(8):1944-1948.

3. Ozer, N P and A Demirci (2006) Electrolyzed oxidizing water treatment for decontamination of raw salmon inoculated with *Escherichia coli* O157:H7 and *Listeria monocytogenes* Scott A and response surface modeling. Journal of Food Engineering 72(3): 234-241.
4. Bialka K L, A Demirci, S J Knabel, P H Patterson and V M Puri (2004) Efficacy of electrolyzed oxidizing water for the microbial safety and quality of eggs. Journal of Poultry Science. 83(12):2071-2078.
5. Sharma R R, and A Demirci (2003) Treatment of *E. coli* O157:H7 inoculated alfalfa seeds and sprouts with electrolyzed oxidizing water. International Journal of Food Microbiology. 86(3):231-237.



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Biography

Ali Demirci is teaching and his research focus on Microbiological Engineering, which has two directions: i) Bioprocessing/fermentation processes for productions of value-added products; ii) Inactivation/control of pathogenic microorganisms in foods and environment by novel non-thermal processing methods. He holds two US patents and has authored numerous refereed journal article and book chapters. He is currently serving as the Associate Editor for Transactions of ASABE and has served on editorial boards of several peer-

reviewed journals. He has received his PhD degree in Food Science and Technology with a minor in Chemical Engineering at Iowa State University in 1992. He began teaching in the Department of Food Engineering at University of Gaziantep, Turkey. Then, he worked as a Research Associate at Iowa State University until he joined to the Department of Agricultural and Biological Engineering at The Pennsylvania State University in 1999.

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