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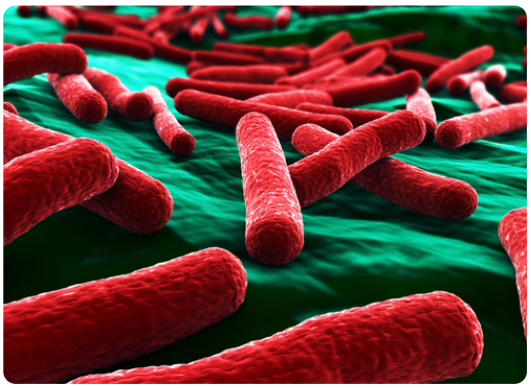
INDUSTRY NEWS - AM

Processed saltwater solution effective against STECs, research suggests



By Dani Friedland on 8/20/2013

Researchers at the University of Georgia have found that a processed saltwater solution may be an effective intervention against a variety of Shiga toxin-producing E. coli strains.

The substance is made by putting a saltwater solution through electrolysis, separating the positive and negative ions into a very acidic water, or electrolyzed oxidizing (EO) water, and a very alkaline water, or electrolyzed reduced water. The acidic water sanitizes, while the alkaline water serves as a detergent. EO water can be quickly made onsite and has GRAS status.

A team from the University of Georgia's Department of Food Science and Technology recently tested EO water on a variety of E. coli strains to gauge their resistance to the acidic water, which has previously been used to control salmonella, Listeria monocytogenes and E. coli O157:H7 on vegetables, seafood, poultry and eggs. In a previous experiment,

researchers used EO water as an intervention to reduce the prevalence of E. coli O157:H7 on cattle hides and observed a reduction from 82 percent to 35 percent.

All of the bacterial strains studied were more resistant to a sodium hypochlorite treatment than they were to an EO water treatment containing the same amount of free chlorine—that is, the EO water was more effective against the STEC. These results mirror a 2009 study in which EO water with a smaller amount of free chlorine (50 mg per liter) reduced E. coli O157:H7 from leaf lettuce as effectively as a sodium hypochlorite solution with 200 mg of chlorine per liter.

That said, researchers noted that the serotype of a given bacterial strain had an impact on its resistance to treatments. However, overall, they found that an EO water treatment that was effective against E. coli O157:H7 was equally effective against other non-O157 STECs they tested.

The research appears in the April 2013 edition of *Food Control* and was funded by state and federal funds allocated to the University of Georgia Agricultural Experiment Station, Griffin Campus, and an Agriculture and Food Research initiative grant from the USDA's National Institute of Food and Agriculture, Food Safety: Food Processing Technologies to Destroy Foodborne Pathogens Program.

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A Very Modest Reduction

As I understand it then, the prevalence of STEC on cattle hides in this experiment was 82%. After treatment with the acidic version of electrolysed water (EO), the STEC prevalence dropped to "only" 35%. Is such a modest reduction going to make any difference to anyone's HACCP plan? Firstly, the "effectiveness" measure between chlorine and EO make use of the Minimal Inhibitory Concentration (MIC) which speaks to the capacity of a substance to inhibit the growth of bacteria and tells you nothing about killing them (i.e., sanitation). Secondly, STEC are, in the literature, generally referred to as non-invasive. The problem lies with the nasty toxin they carry. The switch from lysogeny to lytic cycle of the bacteriophage that carries the Shiga toxin genes toxin may be turned on by a variety of treatments, perhaps even exposure to EO water. The paper provided no indication of Shiga toxin formation in response to EO water exposure. So, for all we know, anyone using this treatment as a "sanitizer" may well be taking a leap out of the frying pan and into the fire. Thirdly, how can one even speak of "sanitation" without having first estimated the decimal reduction time (D-time) of the presumed "sanitizer?"

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Now the question is how do you make EO water and can you do it cheaply?

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