Electrolysed Oxidising Water

TECHNOLOGY SUMMARY	
Status	An emerging technology
Location	Pre- or post-slaughter
Intervention type	Surface treatment of hide or warm carcase
Treatment time	15-30 seconds
Regulations	Approved in US and considered safe in Japan and Australia, but awaiting full approval. Not approved for the EU for carcass washing, but approved for treatment of drinking water. Approved for water treatment and equipment sanitising in New Zealand
Effectiveness	1.5-3 log reduction
Likely cost	Packaged units range from AU$20,000 to AU$75,000
Value for money	Substantially cheaper than other treatments (e.g., organic acid chemicals are more expensive than salt). However, even though salt would be cheaper, the equipment costs would be similar to any surface treatment equipment
Plant or process changes	Minimal change; can use existing plumbing. Space may be required for a spray cabinet treatment area if none existing
Environmental impact	Environmentally friendly solution, may in fact improve quality of effluent Energy would be required to produce the current
OH&S	Solution is harmless, unit is fully enclosed so little safety issue from electric current generated as part of process
Advantages	Salt is the only chemical used Little corrosion of stainless steel and carbon steel when using EO water
Disadvantages or limitations	Need a spray cabinet to apply treatment to carcases Depending on the pressure of application, there may be issues with water penetration into the fat surfaces

Disclaimer

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Electrolysed (EO) water is produced by passing a current of electricity through a dilute saltwater solution. One product of the reaction is sodium hydroxide (NaOH) and the other is hypochlorous acid, which has a low pH, contains active chlorine, and has a strong oxidation-reduction potential similar to that of ozone. The properties of EO water can be optimised by increasing the voltage and increasing the salt concentration, which results in a more acidic solution and higher residual chlorine level. Three forms of the solution can be produced, an acidic form, a neutral pH form and an alkaline form. The electrolysis unit produces the solutions in a concentrated form, which is then diluted through an automatic dosing system to the required concentration.

EO water has been shown to be effective against several pathogens. Rahman *et al.* (2013) have reported that EO water alone or in combination with calcium lactate reduced *E. coli* O157:H7 on pork carcasses by up to 3.0 log units. The use of EO water in a hide washing system was found to reduce hide aerobic plate count by 3.5 log units, and *Enterobacteriaceae* counts by 0.9 log., and reduced *E. coli* O157:H7 prevalence from 82% to 35% (Bosilevac *et al*., 2005). It has also been demonstrated that EO water could achieve good reductions of *L. monocytogenes* (4.3–5.2 log) and *Staphylococcus aureus* (1.7–1.9 log units) on rubber gloves and stainless steel, and of *Campylobacter jejuni* on poultry carcasses (4.9 log units) (Ayebah *et al.*, 2005a, 2006; Kim *et al.*, 2005; Liu and Su 2006; Park *et al.*, 2002). Similarly, a Spanish study found that the neutral EO water could reduce populations of *E. coli*, *Pseudomonas aeruginosa*, *L. monocytogenes* and *S. aureus* on stainless steel and glass by 7 log (Deza *et al*., 2005). Research by Ayebah *et al.* (2005b) has shown that EO water was relatively non-corrosive when applied to common materials used in the food industry (e.g., carbon steel, stainless steel, aluminium and PVC), and the acidic EO water has also been shown to be a good sanitiser for use when cleaning abattoirs (Bach *et al*., 2006).

Proponent/Supplier Information

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