Peroxyacetic Acids

INTERVENTION SUMMARY	
Status	Currently available
Location	Post-slaughter
Intervention type	Surface treatment – usually spray application
Treatment time	10-30 seconds
Regulations	Approved in US, Australia, prohibited in the EU
Effectiveness	1-1.5 log
Likely cost	Upfront cost for a cabinet to apply solution, on-going costs are inexpensive, estimated cost for solution is 8¢ per beef carcass
Value for money	Literature does not support significant reductions
Plant or process changes	Spray cabinet is required
Environmental impact	Effluent must be treated
OH&S	Peroxyacetic acid is an irritant Secure storage and safe handling of the undiluted chemical is required Risk of inhalation
Advantages	Inexpensive
Disadvantages or limitations	Possible discolouration of the lean if used at high concentrations Possible residual compounds and fat oxidation depending on the concentration applied

Peroxyacetic Acids

Peroxyacetic acid (also known as peracetic acid or PAA) functions as an oxidiser and is mainly used as a carcass wash in commercial beef processing plants. It requires proper handling such as storage in a cool, well-ventilated area. The approximate cost per beef or pig carcass is indicated in Table 1.

Peroxyacetic acid (an equilibrium mix of peroxyacetic acid, octanoic acid, acetic acid, hydrogen peroxide, peroxyoctanoic acid, and 1-hydroxyethylidene-1,1-diphosphonic acid) is approved by FSIS for use on beef carcasses (21 CFR 173.368; FDA, 2013). In the US, the peroxyacetic-based process is approved (21 CFR 173.370) for washing, rinsing, cooling, or otherwise processing fresh beef carcases. The compound mixture must be no more than 0.022% peroxyacetic acid and 0.0075% hydrogen peroxide delivered at a maximum pressure of 1724 kPa and maximum temperature of 50°C (Inspexx 200, Ecolab, St. Paul, Minnesota). However, peroxyacetic acid is not permitted under EU regulations.

Under laboratory conditions, researchers have achieved 1-1.4 log reductions in *E. coli* O157:H7 inoculated onto beef carcass tissue (Ransom *et al.*, 2003). In a commercial trial, the effect of a solution of 0.02% peroxyacetic acid on chilled beef quarters was investigated at two slaughtering plants (Gill and Badoni, 2004). These researchers found little effect on total bacteria or *E. coli* on meat from one of the plants, and no effect in the other plant; a solution of 2 or 4% lactic acid was found to be more effective. Penny *et* al. (2007) achieved a 3.5log reduction in *E. coli* O157:H7 on inoculated surfaces of hot-boned beef and veal by spraying with a 180 ppm solution of Inspexx 200. A study by King *et al*. (2005) noted that peroxyacetic acid at concentrations up to three times the approved levels results in only minimal reductions on chilled beef carcasses (<0.2 log of *E. coli* O157:H7 and *S.* Typhimurium); however, reductions on hot carcass surfaces were marginally better (0.7 log). It was recommended that processors conduct their own in-plant validations for their particular process to ensure its efficacy as an intervention treatment.

Table 1: Approximate costs for organic acid spray in beef/pork processing plants (A$, adapted from Reynolds, 2005)

	List price (20 litres)	**Cost per unit (mL)**	**Cost per litre of solution**	**Cost per carcass***
Peroxyacetic Acid	$1,50	0.75¢	1.5¢	1.2¢ (pig)
200 ppm = 2 mL + 1 litre H_2O				2.4¢ (beef)

* 8 litres of peroxyacetic acid (180-200 ppm) will treat approximately 10 pigs or 5 beef carcasses.

Proponent/Supplier Information

Peroxyacetic acid (non-patented formula) can be purchased from food-grade chemical suppliers such as Redox Chemicals.

Redox Chemicals

26-30 Gilbertson Road
Laverton North VIC 3026

Ph: 03 9369 3355

Fax: 03 9369 3733

Website: http://www.redox.com/

Ecolab Australia

6 Hudson Avenue

Castle Hill

NSW 2154, Australia

Ph: 02 9680 5444

Website: http://www.ecolab.com/

References

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