Chlorine Dioxide

INTERVENTION SUMMARY	
Status	Currently available
Location	Post slaughter
Intervention type	Surface treatment of carcases or primals
Treatment time	10-15 seconds
Regulations	Approved in the EU, US and Australia In Australia, chlorine dioxide may be used as a processing aid in meat production, providing that residual chlorine compounds cannot exceed 1 ppm in the final product
Effectiveness	Reported to be effective at levels above 50 ppm Levels above 200 ppm are needed to reduce pathogenic strains of *E. coli*
Likely cost	Capital cost for spray cabinet and on-going cost for purchase of chemicals
Value for money	Reasonable to good
Plant or process changes	Space is required for installation of spray cabinet, though can modify and existing spray cabinet
Environmental impact	Rapidly neutralised, low environmental impact
OH&S	Appropriate ventilation around spray cabinet, safe handling of chemicals at point of generation
Advantages	Not corrosive at recommended concentrations Not affected by organic loading on product
Disadvantages or limitations	Full coverage of meat surface required

Chlorine Dioxide

Chlorine dioxide exists as an undissociated gas dissolved in water at near neutral pH range. It is an oxidising agent and could be used to inactivate bacteria and/or prevent further replication (bacteriostatic effect). Accordingly, chlorine dioxide has the potential application as an antimicrobial agent in ground meat and meat products, to reduce the risks associated with pathogenic bacteria and to extend the shelf life of the treated food. . A major advantage of using chlorine dioxide over chlorine for disinfection is the decreased formation of organic disinfection by-products.

To date, several studies have investigated the efficacy of chlorine dioxide in reducing pathogens. Yoder *et al.* (2012) demonstrated that chlorine dioxide at 100 or 540 ppm achieved a significant reduction of *S.* Typhimurium (up to 3.25 log cfu/cm^2), *E. coli* O157:H7 (up to 4.36 log cfu/cm^2) and Campylobacter *spp*. (up to 4.57 log cfu/cm^2) on inoculated beef plates. However, it has been reported that 200 ppm chlorine dioxide only reduced *E. coli* and *S.* Typhimurium by 0.71 and 0.61 log cfu/g, respectively, in ground beef (Stivarius *et al*., 2002). A similar reduction in *E. coli* populations on beef trimmings was observed when chlorine dioxide (at 200 ppm) was used in conjunction with 10% trisodium phosphate (0.61 log cfu/g) (Pohlman *et al*., 2002a) or 0.5% cetylpyridinium chloride (1.13 log cfu/g) (Pohlman *et al*., 2002b). It has also been reported previously that the use of chlorine dioxide as a spray wash (520 kPa, 16°C, 10 s) to decontaminate beef carcass surfaces at up to 20 ppm was as effective as water washing (Cutter and Dorsa, 1995). These reported reductions, although statistically significant in the studies performed, are likely in practice not to be significant under commercial conditions.

Proponent/Supplier Information

Integra Water

Unit B, 195 Port Hacking Road

Miranda

NSW 2228, Australia Ph: 02 9574 0000

Fax: 02 9574 0011

Email: info@integrawater.com.au

Website: http://www.integrawater.com.au/

Brand name: TwinOxide

Zychem Technologies Pty Ltd

5/14 Kohl Street

Upper Coomera

QLD 4209, Australia

Ph: 07 5580 5948

Email: lionel.freedman@zychem.net

Website: http://www.zydox.com.au/

Brand name: ZyDox

References

Cutter, C. N., Dorsa, W. J. (1995) Chlorine dioxide spray washes for reducing fecal contamination on beef. Journal of Food Protection **58**: 1294–1296.

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