Cetylpyridinium Chloride (CPC)

INTERVENTION SUMMARY	
Status	An emerging technology
Location	Post-slaughter – hide-on
Intervention type	Surface treatment of hide
Treatment time	10-30 seconds
Regulations	Approved for use on raw poultry in the US but not yet approved for beef
Effectiveness	1.5-5 log
Likely cost	Cost of setting up water supply, pumps, chemical storage and effluent treatment for a plant of 500 head per day would be hundreds of thousands of dollars
Value for money	Other technologies likely to be more effective if applied after hide removal
Plant or process changes	Significant space would be needed for installation of baths or cleaning units
Environmental impact	Production of water effluent and chemicals Large amounts of water and energy would be required
OH&S issues	Concentrate would need to be properly stored and handled Concentrate may be irritant
Advantages	Reduces visible soil entering the process Cleaner skins allows slaughter personnel to keep their hands and tools cleaner A freshly washed hide may have less loose hairs
Disadvantages or limitations	Residues may remain if applied directly to meat surface Could stress animals if applied to the live animal, which would result in tougher meat

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Cetylpyridinium Chloride (CPC)

Cetylpyridinium chloride (CPC) is a quaternary ammonium compound and is the active chemical in some human mouthwashes on the market. The antimicrobial activity is due to an interaction of basic cetylpyridinium ions with acidic molecules on bacteria, which subsequently inhibits bacterial metabolism by forming weak ionic compounds that interfere with bacterial respiration.

CPC has been shown to be effective for poultry washes at concentrations of 0.5%, giving reductions of up to 2.5 log in *S.* Typhimurium levels, and also reducing cross-contamination (Kim and Slavik, 1996). Research by Ransom *et al*. (2003) and Cutter *et al*. (2000) showed that spray-washing of beef fat with a solution of 1% CPC immediately reduced inoculum levels of *E. coli* O157:H7 and *S.* Typhimurium to virtually undetectable levels, from 5-6 log cfu/cm² initial counts. Unfortunately, residual CPC levels after treatment were considered excessive for human consumption. Ozdemir *et al.* (2006), treated beef muscle samples with 0.5% CPC or acidified sodium chlorite and found significantly higher reductions in *L. monocytogenes* when used in combination with hot water than alone. A 0.5% CPC solution has also been trialled for use as an antimicrobial treatment applied to beef trimmings before grinding. Microbial reductions were less than 1 log and there was improved colour during simulated retail display without negatively impacting sensory odour characteristics (Pohlman *et al*., 2002). CPC has also been found to be very effective (almost 5 log microbial reduction after 24 hours) under conditions that simulated the spray-chilling process of beef carcases (Stopforth *et al.*, 2004). A 0.5% solution of CPC, alone or in combination with acidified sodium chloride was found to be effective in reducing *E. coli* O157:H7, *L. monocytobenes* and *Staphyloccus aureus* by at least 4 log cfu/cm^2 on sliced roast beef (Lim and Mustapha, 2007).

CPC has also been proposed as a hide intervention to be used after stunning and before hide removal. Bosilevac *et al*. (2004a) tested the potential of a combined water wash and 1% CPC treatment under conditions simulating a hide-wash cabinet. Total aerobic bacteria were reduced by 1.5 log on pre-evisceration carcasses. There was no detectable CPC transfer to the chilled carcasses. Baird *et al*. (2006) trialled the application of 1% CPC to the brisket of carcasses, which had been clipped in this area prior to evisceration. They reported 3.8, 3.3 and 3.0 log cfu/100cm^2 reductions in aerobic plate count, coliforms and *E. coli* on the carcass immediately post-treatment, respectively.

CPC is approved for use in the US to treat the surface of raw poultry carcasses prior to immersion in a chiller (21 CFR 173.375: FDA 2003). CPC has yet to receive approval for use on beef carcasses in the US and EU. It may first get approval as a hide intervention treatment prior to slaughter.

CPC is marketed to the US poultry industry as Cecure™ by Safe Foods Corporation.

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