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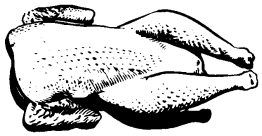


PROCESSING TIP . . .

WATER REUSE IN POULTRY PROCESSING MUST NOW BE ADDRESSED IN THE HACCP PROGRAM

In a letter dated January 19, 2005, the USDA-Food Safety Inspection Service (FSIS) indicated that if water is to be reused in a poultry processing facility, then this reuse water must be accounted for in the plant's HACCP program. This requirement may cause some difficulties as processors consider the associated hazard analyses.

When water is used to chill or rinse broiler carcasses, fat, protein, blood, fecal material and ingesta may be deposited into the water. Additionally, pathogenic bacteria commonly found on broiler carcasses, may end up in the water as well. To prevent processors from using spray or chiller rinse waters directly upstream as reuse water, and thereby possibly contaminating chickens upstream, USDA has enacted new regulations described in CFR 416.2 (g) (3). This regulation requires that, for reuse water to be used upstream, measures be taken to reduce physical, chemical and microbiological contamination to a level appropriate for use in their process to prevent contamination or adulteration of product. Some poultry plants interpret this to mean that as long as they are somewhat reducing the number of bacteria in the rinse or chill waters prior to reuse, it is acceptable to use upstream. Although the USDA is aware of this practice, no new regulations have been enacted to disallow it.

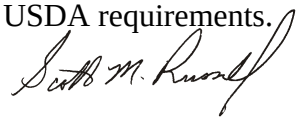
What impact may the new ruling have on processors? The following potential scenario may occur. One chicken contaminated with thousands of *Salmonella* may go down the processing line and the *Salmonella* may be rinsed off into water intended for recycling. The contaminated water may then be filtered using a course screen (through which bacteria easily pass) as is common practice in some plants today, and then sprayed onto *Salmonella* negative carcasses upstream of the original rinse (for example post-picking). This increases the number of *Salmonella* positive carcasses and is clearly a hazard when evaluating the plant's flow diagram for the HACCP program. This has been shown to be a hazard in a field research study (Russell, Poultry USA, October 2003).

Many processors feel that if the water is appropriately sanitized with chlorine, then the

bacteria will be eliminated before it is sprayed back onto the carcasses upstream. However, this is not the case. In our study, the water was commercial chiller water from a processing plant containing 39 ppm of total chlorine and 1 ppm free chlorine. So, why didn't the chlorine kill the *Salmonella* in the reused water? The reason is that the chlorine was bound to the large amounts of organic material contained in the recycled water and was unavailable to kill *Salmonella*. The chlorine demand of an average poultry chiller is 400 ppm. This means that 400 ppm of total chlorine must be used to achieve enough residual that is capable of killing bacteria. The kits that show a 0.5 to 1.0 ppm residual of chlorine in the chiller water are not correct. Technically, it is impossible for there to be any residual in normally chlorinated chiller water. Additionally, the *Salmonella* was likely protected by being encased in fat. This may be further explained by the following scientific studies.

Dickson (1990) showed that for beef tissues, cross-contamination with *Listeria* monocytogenes and *Salmonella* Typhimurium could occur much more frequently when the tissues were fatty as opposed to lean tissues, and that transfer occurred much more quickly with fatty tissues. Diaz et al. (2002) demonstrated in water samples containing foam and fat much longer treatment times with ozone were required to disinfect reuse water than for non-turbid water. Thus, there is a two-fold reason why chlorine has difficulty disinfecting poultry chill or rinse waters prior to reuse: 1) the chlorine is bound by the high organic load and is unavailable for use, and 2) the *Salmonella* and other pathogens may be protected by the high concentration of fat and foam in these waters.

For these reasons, turbidity of the reuse water is extremely important in terms of how easily the water can be disinfected using chlorine or other oxidizing chemicals. When including reuse water systems in their HACCP programs, poultry processors should conduct a thorough evaluation to determine how turbidity (caused by fat, foam, etc.) impacts the efficacy of their disinfectants. Turbidity monitoring may need to be included in the monitoring section of their HACCP programs based on the results they achieve in the evaluation. Efforts will be made over the next few months to provide poultry processors guidelines in how to ensure that poultry reuse waters are safe and meet USDA requirements.



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References:

Dickson, J. S., 1990. Transfer of *Listeria* monocytogenes and *Salmonella* Typhimurium between beef tissue surfaces. Journal of Food Protection 53:51-55.

Diaz, M. E., D. M. Birt, and S. E. Law, 2002. Microbiological benefits of removing foam formed after UV enhanced ozonation of poultry processing chiller water for recycling. Journal of Food Science 67:1036-1042.

Russell, S. M., 2003. Water Reuse in Processing: Pushing the Envelope Too Far? Poultry USA Magazine, Watt Publishing, October.