Worthwhile Operational Guidelines & Suggestions

BROILER PROCESSING TIMELY INFORMATION – MARCH 2008

Improving immersion scalding hygiene

pH (at 52 C or 126 F)	*D*52 C value (minutes)
4.0	<1
4.5	2.3
5.0	4.6
5.5	21.6
5.9	34.5
7.6	6.1
8.0	2.9
8.5	2.5
9.0	1.25
9.5	<1
Adapted from: Humphrey et al., 1981	

Immersion scalding is a critical intervention step during processing to improve the microbiological quality of fresh poultry and to reduce food-borne pathogens, such as *Salmonella*. The utilization of multi-stage and counter-current immersion tanks, uniform application of temperature and agitation, maintenance of ample water overflow, and use of carcass scrubbers and/or showers to remove adhering organic material prior to immersion have greatly improved the scalding process in recent years. Obviously, the temperature of the water alone is lethal to *Salmonella* provided there is sufficient dwell-time. The *D*-value ((i.e., time needed to reduce bacterial numbers by 90%) at pH of 5.9 C for *S. typhimurium* increases from 34.5 min at 52 C (126F) to 8 min at 54 C (130 F), 2.3 min at 56 C (133F) and <1 min at 58 C (136F). However, in recent years many plants have reduced scald water temperatures to improve skin quality and/or to enhance processing yields. Immersion scalding hygiene can be enhanced even at soft scalding conditions by adjusting the pH of the water by an alkali. Altering the scald water pH to 9.0 by adding an alkali (sodium or potassium hydroxide, sodium carbonate) significantly reduces the *D*-value of *S. typhimurium* at 52 C (126 F). In addition, the total aerobic bacteria and coliforms in the scald water are also reduced. High scald pH also helps in fat saponification and improves the washing action of water. More organic material is removed from the carcass and likelihood for visible and microbial cross-contamination is reduced. A number of commercial alkali-based scalding additives have been introduced in recent years based on this concept. As always, equipment corrosion and employee safety is of concern when handling highly caustic chemicals during processing.

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