
Supporting Documentation for Critical Limits in Hot-Water Spraying of Beef Carcasses

During January – September, 2006 we made seven visits to Wisconsin beef slaughter plants that use a hot-water carcass intervention treatment. On each of the visits, we obtained carcass sponge samples before the hot-water spray treatment and after (the next day). Overall, 47 carcasses were tested.

We analyzed the samples for generic *E. coli*, coliforms, and Enterobacteriaceae. These types of bacteria are called “indicator” bacteria because their presence usually indicates fecal contamination. Until further notice, you can regard these indicator groups as “stand ins” for pathogenic *E. coli* O157:H7. We also did the Aerobic Plate Count test, which is for “all” bacteria, actually those that can grow in the presence of oxygen at body temperature.

It was clear from the results that there was usually some low-level fecal contamination of carcasses before the hot-water spray intervention. For example, generic *E. coli* was detected on 42 out of the 47 carcasses (89%) sampled before hot-water spray treatment.

It is also clear from the results that the combination of the hot-water spray treatment and overnight cold storage consistently resulted in a decrease in the three indicator groups of bacteria (generic *E. coli*, coliform, and Enterobacteriaceae). For example, generic *E. coli* was only detected on 6 of the 47 carcasses (13%) sampled the day after hot-water spray treatment.

These results validate hot-water spraying as an easy and effective beef carcass intervention treatment IF the following 5 Critical Limits are met.

1. Water temperature (at nozzle) should either be at least 120°F [if 1,000 pounds per square inch (psi) spray is used] OR at least 150°F (standard spray pressure).
2. The spraying should be done for at least 75 seconds per carcass.
3. The carcass cooler temperature must reach 41°F or colder by 8:00 a.m. on the morning after the slaughter day.
4. The carcass cooler should be equipped with a fan to create air movement.
5. The carcass cooler temperature must be maintained at 41°F or colder until the carcass is processed further.

It is recommended that you adjust your HACCP plan to include these Critical Limits. You also should develop monitoring and recordkeeping procedures to ensure that the Critical Limits are met.

Survey of Antimicrobial Effects of Beef Carcass Intervention Treatments in Very Small State-Inspected Slaughter Plants. 2007. R. Algino, S.C. Ingham, and J. Zhu. *Journal of Food Science*. Vol. 72. M173-179.

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