



Reduction of *Salmonella* in Pork Trimmings

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Objectives

The objective of the current study was to determine the efficacy of dipping pork trimmings in acetic acid on *Salmonella* reduction.

Materials and Methods

Pork loins were purchased from a commercial purveyor and trimmed of external fat and connective tissues, leaving only the *longissimus* muscle, which was further cut into 2.5 cm (W) × 2.5 cm (L) × 1.3 cm (H) cubes. Pork cubes were randomly assigned to a negative control (no inoculation, no dipping; NEG), a positive control (inoculation, no dipping; POS), acetic acid dipping at 21°C (ACC) and acetic acid dipping at 50°C (ACH) with a 15-, 45-, or 75-s dipping duration ($n = 10$ per treatment × time combination). Two inoculation levels, 10⁸ Colony Forming Unit (CFU)/cube of bioluminescent gene-modified (Lux) or 10⁵ CFU/cube of nalidixic acid-resistant *Salmonella enteritica* serovar Typhimurium, were inoculated onto pork cubes to determine the antibacterial effects of each treatment condition by in vivo bioluminescence imaging system (IVIS) or direct CFU measurement on XLD agar, respectively. In Experiment 1, the cubes were dipped for 15 s to measure the reduction effects by employing both

IVIS and CFU. In Experiment 2, cubes were dipped with three dipping durations and the CFU were calculated. The common logarithm of Lux and CFU were calculated and analyzed by the GLIMMIX procedure of SAS v9.4 (SAS Institute Inc., Cary, NC). Actual probability values were reported.

Results

In Experiment 1, at 10⁸ inoculation level, ACC and ACH reduced the growth of *Salmonella* by 1.8 and 1.6 log, respectively ($P < 0.001$) without treatment difference ($P = 0.207$). However, at 10⁵ inoculation level, ACC and ACH reduced *Salmonella* by 0.2 and 0.3 log, respectively ($P \leq 0.026$). In Experiment 2, at 10⁵ inoculation level with three dipping durations, the ACH treatment reduced *Salmonella* by 0.9 log more than the ACC treatment ($P < 0.001$). The 75-s dipping duration was the most effective, providing a reduction of 0.7-log more than the 15-s duration ($P = 0.001$). No 2-way treatment × time interaction was observed ($P = 0.104$).

Conclusion

The present study suggests that the pork trimmings be dipped into 3% acetic acid solution at 50°C for at least 75 s to ensure the safety of further processed pork products.