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Pork Carcass Extended Hanging Time Effect on the Microbiological Characteristics of Vacuum Packaged Blade Steaks

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Objectives

In the pork industry, the time between harvest and fabrication is typically 24 to 36 h. Some processors, particularly very small companies, may hold carcasses an extended period of time prior to fabrication. An earlier study found the microbial quality of pork carcasses was not affected when hung for 21 d at $0 \pm 1^\circ\text{C}$ and 87.3% relative humidity (RH). The objective of the current study was to assess the microbial quality of vacuum packaged pork shoulder steaks held for up to 35 d at $0 \pm 1^\circ\text{C}$ fabricated from pork carcasses previously hung for 21 d at $0 \pm 1^\circ\text{C}$.

Materials and Methods

Pork shoulder blade steaks ($n = 102$) were fabricated from the right sides of pork carcasses ($n = 17$) that had been previously hung for 21 d. Pork steaks were vacuum packaged, placed in corrugated boxes and held at $0 \pm 1^\circ\text{C}$ for up to 35 d. Cooler temperature and RH were measured every hour using a data logger. Steaks were evaluated for aerobic plate count (APC), Enterobacteriaceae (EB), and yeast and mold populations by plating in duplicate on petrifilm on d 0, 7, 14, 21, 28, and 35 of storage. Additionally, surface pH was determined at each sampling time. Data were analyzed using SAS 9.3 (SAS Inst. Inc., Cary, NC).

Results

The storage cooler temperature averaged $0 \pm 1^\circ\text{C}$ over the 35 d storage time. Although pork steaks pH varied throughout the storage time, pH on d 0 was similar ($P \geq 0.05$) to pH on d 35. There was a day effect ($P \leq 0.05$) for APC on pork steaks. The initial APC population was 1.61 log CFU/g. On d 7, APC populations declined ($P \leq 0.05$) to 1.18 log CFU/g, then increased ($P \leq$

0.05) to 2.44 log CFU/g on d 14. On d 14 and 21, APC populations were similar ($P \geq 0.05$); however, there was a 1.50 and 1.89 log CFU/g increase ($P \leq 0.05$) in APC population on d 28 and 35, respectively. On d 35, APC populations reached 5.06 log CFU/g. There was no day effect ($P \geq 0.05$) for yeast population; however, there was a day effect ($P \leq 0.05$) for EB and mold populations. The detection limit (DL) for EB and yeast and mold populations on pork steak samples was 0.70 log CFU/g. On d 0 and 7, none of the samples were above the DL for EB populations and were similar ($P \geq 0.05$) to d 14 when the proportion of presumptive positive samples for EB populations above the DL was 23.5%. The percent of presumptive positive samples above the DL for EB populations was 41.2% on d 21, and was higher ($P \leq 0.05$) than d 0 and 7, but was not different ($P \geq 0.05$) than d 14. On d 28, there was an increase ($P \leq 0.05$) for presumptive positive EB populations on pork steaks, which had the highest percent of presumptive positive EB populations above the DL (94.1%) compared to the first 21 d of storage (0, 7, 14, 21 d). However, on d 35, the percent of presumptive positive samples EB populations above the DL declined ($P \leq 0.05$) to 41.2%. For all sampling days, none of the pork steak samples exceeded 4.40 log CFU/g for EB. Mold populations were not different ($P \geq 0.05$) on d 0, 7, and 14 with 100.0% of pork steaks being below the DL. However, 18, 24, and 12% of pork steaks on d 21, 28, and 35, respectively, were above the DL for mold populations. None of the pork steak samples exceeded 2.68 log CFU/g for mold populations.

Conclusion

The results indicate that pork blade steaks, from pork carcasses previously hung for 21 d, can be stored up to 35 d, and had a similar microbial quality to pork cuts from pork carcasses hung for 24–36 h.t