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The Microbial Quality of Pork Carcass during Storage

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Objectives

To assess the microbial quality of pork carcasses held for up to 21 d prior to fabrication.

Materials and Methods

The right sides of 20 freshly harvested pork carcasses were held in a carcass cooler for 21 d. Cooler temperature was measured every hour using a data logger. Three carcass locations (flank, shoulder, and jowl) were surface sampled on d 1, 7, 14, and 21 after slaughter using a stainless-steel meat corer. A 21.6 cm² area corer was used to obtain flank and shoulder samples, and a 9.6 cm² area corer was used to collect jowl samples. Each location had 4 sites that were randomly assigned for each sampling day. Meat sample cores were placed in sterile stomacher bags with 50 mL peptone water for microbiological analysis. An additional sample immediately adjacent to the shoulder incised sample was collected using the 9.6 cm² area corer for moisture determination. The carcass pH was determined using a pH probe inserted 1.5 cm deep into the shoulder. Aerobic plate count (APC), Enterobacteriaceae (EB), yeast, and mold populations were enumerated in duplicate on petrifilm. APC data was analyzed as a randomized complete block design with repeated measures. The carcass side was considered to be a random blocking factor. Moisture and pH were analyzed as repeated measures over time with carcass side as the subject. Because the majority of observations for EB, yeast, and mold were below the detection limit (DL), these variables were analyzed as binary responses (1 = above DL and 0 = below DL) using Fisher's exact test in SAS Proc FREQ (SAS Inst. Inc., Cary, NC).

Results

The carcass cooler temperature averaged -0.7°C over the 21 d hanging period. The carcass surface moisture content declined ($P < 0.05$) from 65.1% on d 1 to 50.5% by d 21. The pH was 5.7 to 5.9 over 21 d, and the pH on d 1 and 7 was higher ($P < 0.05$) than d 21. There was no carcass sampling location by day interaction ($P > 0.05$) for APC. There was no day effect ($P > 0.05$) for APC; however, there was a location effect ($P < 0.01$). The jowl had the highest ($P < 0.05$) APC population with 1.2 log CFU/cm² compared to the flank and shoulder with 0.772 and 0.761 log CFU/cm², respectively. There was no location or day effect ($P > 0.05$) for EB or mold populations, but there was a location ($P < 0.01$) and day ($P < 0.01$) effect for yeast populations. The DL for EB and yeast and mold populations was 0.062 log CFU/cm² for the shoulder and flank and 0.414 log CFU/cm² for the jowl. Over 97.5 and 96.5% of EB and mold populations, respectively, for all locations and days, were below the DL. For yeast populations, 63.8, 37.5, and 45.0% were higher than the DL for the jowl, flank, and shoulder, respectively. On d 1, 60.0% of yeast populations were above the DL and by d 21 only 26.6% ($P > 0.05$) were above the DL.

Conclusion

Pork carcass sides could be held in a carcass cooler for up to 21 d at -0.7°C without compromising microbial quality.