PROCESSING CHARACTERISTICS BETWEEN COMMERCIAL DUROC-SIRED AND HERITAGE BREED LARGE BLACK PIGS

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I. OBJECTIVES

Heritage-bred pork is praised as premium pork for its unique quality characteristics; however, there are very little data evaluating Large Black pork quality or processing characteristics and commercial breeds. Therefore, the objectives of this study were to examine differences in pork processing characteristics between commercial Duroc-sired (DS) genetics and Large Black (LB) genetic lines fed high forage or commercial diets.

II. MATERIALS AND METHODS

Fifty pigs were utilized in the study: DS ($n = 25$ pigs) and LB sired ($n = 25$ pigs). All the pigs were weighed and allocated to 2 dietary treatments: Fiber (Fib) or Control (Con), (LB Fib, $n = 14$; LB Con, $n = 11$; DS Fib, $n = 14$; DS Con $n = 11$). Dietary treatments were fed throughout the grow-finish period (101 or 140 d) in 6 phases. Con diet was corn-soybean meal distillers dried grains with solubles based, and Fib diet used increasing amounts of wheat middlings (1%–10%) and dehydrated alfalfa meal (7.5%–20%) replacing corn and soybean meal in the Con diet, from phase 1 to 6. Pigs were harvested at a common age, but body weight varied between genetics (DS 125 ± 2.23 kg, LB 99 ± 2.28 kg; $P < 0.001$). Bellies (Institutional Meat Purchase Specifications 408) were measured for thickness, length, and firmness. Lean and fat trim was obtained from the shoulder of each carcass, formulated to 80% lean:20% fat, ground, seasoned, and mixed to create individual sausage batches. Sausage patties (136 g each) from each batch were placed in polyvinyl chloride packaging under retail display lighting for 0, 3, and 7 d. Fat smear was determined on day 0 by a trained evaluator using a scale of 1 (excessive fat smearing) to 8 (little/no fat smearing). Retail display effect on color (Minolta colorimeter) and lipid oxidation (thiobarbituric acid reactive substances) were examined each display day. Data were analyzed with breed and diet as fixed effects using R software (version 1.2.1335) with least-squares means separated at $P < 0.05$.

III. RESULTS

Results showed differences in L^* ($P = 0.0051$), a^* ($P < 0.001$), and b^* ($P < 0.001$) among display days, consistent with color deterioration over time. DS patties were lighter (L^*, $P < 0.001$) and less red (a^*, $P < 0.001$) than LB patties with no breed differences in patty b^* ($P = 0.71$). No diet differences were found for patty L^* ($P = 0.47$), a^* ($P = 0.13$) or b^* ($P = 0.77$). Breed × diet showed no differences for patty L^* ($P = 0.53$), a^* ($P = 0.50$), or b^* ($P = 0.74$). For patty fat smear, Fib had better particle definition than Con ($P = 0.0064$), but no differences were observed in breed ($P = 0.36$), or breed × diet ($P = 0.27$). DS bellies were longer ($P < 0.001$) but thinner ($P = 0.0035$) than LB. Fib bellies were longer ($P < 0.001$) but thinner ($P < 0.001$;) than Con. No breed × diet interactions were found in belly length ($P = 0.63$) or thickness ($P = 0.40$). Partial thiobarbituric acid reactive substances analysis showed days under retail display ($P < 0.001$) and breed × diet interaction ($P = 0.0043$) to be significant. LB Con had the most lipid oxidation, and DS Con had the least amount of lipid oxidation, particularly at day 3.

IV. CONCLUSION

This experiment found variations in processing characteristics between DS and LB genetic lines and their diets. DS and Fib bellies were longer but thinner when compared to LB and Con bellies, respectfully. Fib patties had more fat smearing than Con patties. This provides novel insight into the comparison between these breeds and diets. Further studies focusing on fatty acid analysis in LB to improve their lean quality could lead to enhanced and diverse marketing products.

Keywords: heritage breed, pork quality, processing characteristics