

PORK QUALITY

Title: Continued selection for rapid growth: Implications for pork quality - NPB #05-097

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Abstract

The objective of this study was to investigate if genetic selection of sires for improved growth rate is associated with changes in fresh pork quality. A sample derived from the cross between a commercial line of Duroc sires and white line dams was subdivided according to the sires' estimated breeding value (EBV) for age at 125 kg. Differences in age at 125 kg were achieved by assigning pigs sired by High EBV growth boars (n=48), Low EBV growth boars (n=48) or a control group (n =32). Loin pH and temperature decline were monitored on each carcass. Fresh pork quality characteristics and water holding capacity were monitored at 2 d postmortem. Sensory traits (juiciness, tenderness, chewiness, flavor, and off-flavor) and star probe texture were measured 10 d postmortem. Proteolysis was estimated by desmin degradation and μ -calpain autolysis at 2 d postmortem.

Fresh pork quality characteristics and water-holding capacity was monitored at 2 d postmortem. Sensory characteristics (juiciness, tenderness, chewiness, flavor, and off-flavor) and star probe texture were measured 10 d postmortem. Pigs in High (Fast Growth) EBV for growth were younger at 125 kg (153 d vs. 177 d), which established that our criteria was successful in separation of growth rate. Growth rate group did not affect pH decline in the longissimus dorsi, however, temperature at 6 h was significantly lower in the slow growth line. Loin color and drip loss were not affected by growth rate. Loins from carcasses in the fast growth group had higher subjective marbling scores and higher lipid content than loins from carcasses in the slow growth group. Growth rate did not affect star probe or sensory quality of fresh pork loin. Selection for rapid growth by improving days of age at 125 kg did not significantly affect the quality of fresh pork loin. Therefore this method of selection can be used without compromising fresh pork quality. The genotypes for MC4R, and PRKAG3 (I199V) were determined. Associations between the genotypes and the phenotypic traits were tested using the general linear model procedure with a model including EBV group, genotype, sex, sire within EBV group, dam within sire and EBV group, interaction between EBV group and genotype, and slaughter day. PRKAG3 genotype 22 had lower ($P<0.05$) pH at 10 d postmortem (5.65) compared to genotype 11 and 12 (pH =5.75 and 5.71). PRKAG3 genotype 22 also resulted in higher ($P<0.05$) off-flavor score (4.3) than genotypes 11 or 12 (3.0 and 3.6 respectively). A significant interaction between growth EBV and PRKAG3 was demonstrated as genotype 11 resulted in higher ($P<0.05$) subjective color score (3.5) than genotype 12 or 22 (2.5 and 2.6) in loins from pigs sired by fast growing boars. MC4R genotype 12 had higher pH at 48 hr (5.68 vs. 5.62), darker L values (45.95 vs. 47.01) and less drip loss (2.1 % vs. 2.7 %) than genotype 22 ($P<0.05$). There was an interaction between growth EBV and MC4R genotype for marbling scores (genotype 12, 2.2; genotype 22, 1.5) observed in loins from pigs sired by fast growing boars ($P<0.05$). These results confirm main effects of the selected genes but also that these genotypic effects depend on the background genetic merit for growth. *Key Words:* Pork, Quality, Growth

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