RESEARCH ABSTRACT

PORK QUALITY

Title: Genomic control of pork loin color, myoglobin concentration, marbling, water-holding capacity, and slice shear force, pork fat quality and fatty acid profile, and ham lean color, ham "halo" severity, and myoglobin concentration – **NPB #17-060**

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Scientific Abstract:

A genome-wide association study was conducted to determine if pork quality trait selection could be enhanced with genomic selection. Genomic regulation of pork quality was investigated using loins (n = 4,025) which were evaluated during large-scale industrial research projects (n = 4) in which loins were evaluated between 2009 and 2016. Additionally, biceps femoris samples from pigs (n = 1,019) harvested by a commercial seedstock supplier were used to study the genetic regulation of a ham muscle color defect referred to as ham halo. Additionally, fatty acid profile was determined for clear plate samples from the carcasses (n = 818) of one study. Genomic regulation of fatty acid profile in pork. SNP on Chromosome 14 effected fatty acid profile traits, particularly the ratio of 18:1 to 18:0 and the ratio of 16:1 to 16:0. The gene underlying this peak was hypoxia inducible factor 1 subunit alpha inhibitor (HIF1AN). Additional SNP were genotyped for HIF1AN and other genes located on the same region of Chromosome 14 as HIF1AN, including Stearoyl-CoA Desaturase (SCD) and Fatty Acid Elongase 3 (ELOV3) and Peroxisome proliferator-activated receptor gamma (PPRC1). This analysis showed a genetic regulation of fatty acid profile for HIF1AN and SCD. Variation in these two genes impacted the proportion of saturated fatty acids and stearic acid percentage. Whereas variation in HIF1AN, but not SCD, influenced monounsaturated fatty acid percentage. Arachidic Acid percentage was very strongly regulated by genomic variation in Fatty Acid Elongase 7 (ELOVL7). Variation in PRKAG3 affected LM ultimate pH, Hunter a* (redness), purge loss and cooking loss. Variation in CAST affect slice shear force and cooking loss. Genomic control of Hunter L*, intramuscular fat percentage, and myoglobin concentration were characterized by many genes of very small effect.