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Predicting Pork Quality Measures at the 10th Rib Using Measurements Collected from Various Locations on the Boneless Loin

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Objectives

Many U.S. pork export markets demand high quality pork with darker color and higher marbling content than domestic markets. Although, the U.S pork industry does not have a quality grade program through the USDA-Agricultural Marketing Service, application of voluntary quality grade standards may result in financial benefits to the pork industry as well as enhanced eating experiences for consumers. This study analyzed quality measurements collected at locations along the surfaces of boneless pork loins to determine the relationship between these measures and traditional pork quality measures collected at the 10th rib.

Materials and Methods

Market hogs (n = 83) from 2 genetic lines and 2 sexes were slaughtered at 113.4, 136.1, and 158.8 kg endpoints. One genetic line was selected for increased lean yield, while the other was selected for meat quality attributes. Seven litters from each line with at least 6 pigs (3 barrows and 3 gilts) were used in the study. When the pigs reached their preassigned endpoint, they were transported to the University of Georgia Meat Science and Technology Center and slaughtered under federal inspection. Following a 24-hr chill period, carcasses were ribbed between the 10th and 11th ribs, bloomed for 20 min and the following pork quality attributes were measured on 10th rib surface: Hunter L*, a*, b* (D_{65}); Minolta L*, a*, b* (D_{65}); and NPPC color and marbling score. Carcasses were then fabricated and the boneless loin (IMPS# 413C, trimmed to 0.64 cm of fat) was weighed. The loin was allowed to bloom, ventral side up, for at least 20 min before collection of the previously listed loin quality attributes collected at the following 5 locations anterior to posterior: blade-end and sirloin-end (cross-section), and at approximately the 7th/8th rib, 12th/13th rib, and first/second lumbar regions on the ventral surface of the loin.

Results

These locations were evaluated since they would allow assessment of quality attributes without devaluing the loin. Pearson correlations were calculated between 10th rib color and marbling scores and all other loin measures and Max R^2 regression was used to determine the best variables to predict 10th rib color and marbling scores (SAS Inst. Inc., Cary, NC). Sirloin end marbling score had the strongest correlation with 10th rib marbling score (r = 0.78; $P < 0.01$), followed closely by the 7th/8th rib location on the ventral surface (r = 0.77; $P < 0.01$). Instrumental L* values were more highly correlated to 10th rib color than subjective color scores. For regression, subjective measures collected on the ventral surface of the loin were better predictors of 10th rib marbling score (R^2 = 0.61) than 10th rib color score (R^2 = 0.30), with marbling score and color score collected at the 7th/8th rib region being the most valuable predictor. Inclusion of all subjective measures slightly increased the prediction accuracy for 10th rib marbling score (R^2 = 0.71) and 10th rib color score (R^2 = 0.35). In contrast, instrumental measures were better predictors of 10th rib color ($R^2 > 0.41$) than 10th rib marbling score ($R^2 < 0.29$).

Conclusion

These results suggest that the U.S. pork industry could use measures on the intact loin to predict 10th rib color and marbling scores, providing the potential to sort loins into quality-based grades.

