



## Impacts of Anatomical Location on Postmortem Color of Pork *Longissimus* Muscle

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### Objectives

This study was aimed to determine postmortem color of *longissimus* muscle in pork carcasses at various anatomical locations from the anterior to the posterior of the pork loin.

### Materials and Methods

Six gilts at market weight were harvested at the Mississippi State University Meat Science and Muscle Biology Laboratory. The right loins were separated from the shoulder by making a straight cut between the second and third ribs, from the ham by cutting approximately 5 cm from the anterior edge of the aitch bone, and from the belly by making a straight cut from through two ventral points, 1.2 cm from the tenderloin and 2.5 cm from the *longissimus* muscle. The loins were then cut into 19 2.5-cm bone-in chops to expose the *longissimus* muscle and then allowed to bloom for 2 h. The chops were identified by the distance of their anterior surfaces to the anterior surface of the loins from which they were cut. Color of the *longissimus* muscle ( $L^*$ ,  $a^*$ ,  $b^*$ , and reflectance spectra) was measured by a Hunter Lab MiniScan 4500L spectrophotometer (Hunter Associates Inc, Reston, VA) with illuminant A, 10° observer angle, and 25-mm aperture size on the anterior surface of the pork chops. Hue angle, chroma, and percentages of deoxymyoglobin, oxymyoglobin, and metmyoglobin were also calculated. Differences in color at 19 locations, Pearson's correlation coefficients among color measurement, and prediction models for color parameters by location (cm) were determined by

the MIXED procedure of SAS 9.4 (SAS Institute, Cary, NC) using the linear mixed model with distance or location being the fixed effect and loin being the random effect. The coefficients of determination were estimated by the covariance parameters and the F values for fixed effects, which are the ratios of fixed effect variance to the residual variance.

### Results

Location had a great effect on the lightness, redness, and percentages of deoxymyoglobin and oxymyoglobin in *longissimus* muscle ( $P \leq 0.028$ ). Lightness from location 0 to 9 followed a quadratic relationship with distance (lightness =  $54.75 + 1.26 \times \text{distance} - 0.05 \times \text{distance}^2$ ;  $R^2 = 0.97$ ;  $P < 0.001$ ) and had a positive correlation with hue angle ( $r = 0.83$ ;  $P < 0.001$ ). Redness from location 0 to 18 followed a quadratic relationship with distance (redness =  $22.19 - 0.24 \times \text{distance} + 0.005 \times \text{distance}^2$ ;  $R^2 = 0.99$ ;  $P < 0.001$ ) and had a positive correlation with oxymyoglobin percentage ( $r = 0.52$ ;  $P < 0.001$ ) and chroma ( $r = 0.93$ ;  $P < 0.001$ ). The oxymyoglobin percentage was greatest at the anterior (1– 5; 69 to 73%) and least at midpoint of the loin (10– 13; 63 to 65%;  $P < 0.001$ ); whereas the percentage of deoxymyoglobin was opposite ( $P < 0.001$ ). No location effect was found for metmyoglobin percentage ( $P = 0.137$ ).

### Conclusion

Anatomical location has a great impact on the color of the *longissimus* muscle, which is important for the evaluation of pork quality.