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## Correlation of Beef Longissimus Thoracis Quality and Composition with Semimembranosus Quality and Composition

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### Objectives

Previous research has investigated the quality of individual muscles and separate cuts within a beef carcass. However, few studies have examined the relationship between the quality of different beef muscles. Understanding this relationship could determine the necessity of certain meat quality analyses to assess the value of beef carcasses. Thus, the objective of this study was to examine the correlation between the quality and composition of beef *semimembranosus* (SM) and *longissimus thoracis* (LT) muscles.

### Materials and Methods

At 4 d post-mortem, beef inside round (IMPS #168) and rib (IMPS#107) cuts from the right side of steer carcasses ( $n = 63$ ) were collected from a commercial processing facility and delivered to the University of Guelph Meat Science Laboratory. At 5 d post-mortem, pH and objective color ( $L^*$ ,  $a^*$ ,  $b^*$ , chroma, hue; measured with a Minolta CR-400) were collected for the SM muscle within the round section. At 6 d post-mortem, pH and objective color were collected for the LT muscle. Duplicate 5 to 6 g homogeneous samples from each the SM and LT samples were analyzed for moisture content by forced-air convection oven drying at 100°C for at least 24 h (Method 950.46, AOAC, 2000). Lipid content of the dried duplicate samples were determined by soxhlet extraction with petroleum ether, followed by at least 24 h of oven drying at 100°C. PROC CORR of SAS 9.4 was used to calculate the Pearson correlation coefficients for all parameters. Correlation coefficients were regarded as weak at  $r < |0.35|$ , moderate at  $|0.36| \leq r \leq |0.67|$ , and strong at  $r \geq |0.68|$ . PROC REG of

SAS was used to create linear regression models between parameters that had meaningful relationships. PROC GPLOT of SAS (SAS Inst. Inc., Cary, NC) was used to create scatter plots to allow better visualization of the correlations between meaningful parameters.

### Results

There was a weak and statistically insignificant correlation between LT and SM pH values ( $r = 0.20$ ,  $P = 0.11$ ); as well as, a weak correlation between LT and SM hue ( $r = 0.24$ ,  $P = 0.06$ ). There was a slightly stronger, positive linear correlation between LT and SM  $L^*$  (lightness) values ( $r = 0.34$ ,  $P = 0.01$ ). Moisture content of LT and SM had a significant, moderately correlated linear relationship ( $r = 0.66$ ,  $P < 0.0001$ ). Similar to moisture, the correlation between LT and SM lipid content was moderately correlated ( $r = 0.67$ ,  $P < 0.0001$ ). All other LT and SM quality parameters were very weakly correlated ( $r = -0.06$  to  $0.01$ ), thus no further statistical analyses were performed.

### Conclusion

Results from this study showed that in general meat quality attributes from beef *longissimus thoracis* and *semimembranosus* muscles were weakly correlated with one another, and composition was only moderately correlated. Thus, analyses measuring individual beef muscle quality are required to achieve more accurate results and more meaningful assumptions of eating experience. Future studies could examine the relationship of the remaining beef primal cuts.