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The Relationship between Quality Measurement Techniques of Pork Loins and Chops

L. W. Lucherk[1]*, S. D. Shackelford[2], T. L. Wheeler[2], D. A. King[2], and M. F. Miller[1]

[1]Animal and Food Sciences, Texas Tech University, Lubbock, TX, USA;
[2]USDA-ARS, U.S. Meat Animal Research Center, Clay Center, NE, USA

Objectives

Assessment of boneless pork loin quality under industrial conditions is used in plants for segregation of product into programs and for export as well as for routine quality control and research. This assessment is usually made on the exposed longissimus on the ventral side of the muscle. However, lighting and bloom time may not be ideal on-line at time of subjective evaluation. It is therefore the objective of this study to evaluate the relationship between objective and subjective measurements of pork loins on-line and quality of pork loin chops under ideal conditions.

Materials and Methods

Packing plants ($n = 5$) were identified that represent variation in factors that are known to impact meat quality. Trained personnel selected boneless loins ($n = 200$/plant) during routine loin boning at 1 d postmortem (dpm). Subjective color (C1), firmness (F1), and marbling (M1); and objective color (Hunter Lab D65/10°; 2 readings/loin) and pH at 2 locations (1/3 and 2/3 length of loin) were evaluated on each loin. Loins were vacuum-packaged, boxed and transported under refrigeration. Immediately on arrival, loins were unboxed, sorted, and aged (fat-side down) in a single layer on solid-shelf carts. At 14 dpm, boneless loins were unpackaged and allowed to drip dry before weighing to assess purge loss (PL). Anatomical location of chops was standardized across loins to ensure even slicing. Immediately after chops were cut and tagged, chops were weighed (initial weight for cooking loss determination). After 3 h bloom, subjective color (C14), marbling (M14), and firmness scores (F14), objective color (Hunter Lab D65/10°; 2 readings/chop) and pH were determined for both chops 3 and 10 and averaged for a composite value for each loin. Chops 5 and 6, which cor-

respond approximately to the 11th rib region of the loin, were used for determination of slice shear force (SSF). The following day (15 dpm), chops were cooked, weighed to determine cooking loss (CL), and SSF determined. Data were analyzed using the PROC CORR procedure of SAS (SAS Inst. Inc., Cary, NC).

Results

Generally, measurements taken on anterior and posterior ends of the loin were highly correlated to each other. Correlation analyses were used to identify and quantify relationships among C1, M1, and F1 and C14, M14 and F14, respectively. Of quality measures evaluated, the strongest correlation ($P < 0.001$) with chop quality occurred between M1 and M14 ($r = 0.55$). Also, C1 and F1 were positively correlated ($P < 0.001$) with C14 ($r = 0.49$) and F14 ($r = 0.34$), respectively. Additionally, a stronger correlation ($P < 0.001$) occurred between C14 and L* ($r = -0.75$) at 14 dpm than C1 and L* ($r = -0.56$) at 1 dpm. At 1 dpm, loin L*, a* and b* were positively correlated ($P < 0.001$) with chop L* ($r = 0.84$), a* ($r = 0.74$), and b* ($r = 0.53$) at 14 dpm, respectively. Also, L* at 1 dpm was positively correlated ($P < 0.001$) with C14 ($r = 0.65$). The strongest correlation ($P < 0.001$) with tenderness ratings occurred between CL and SSF ($r = 0.28$). Moreover, CL was positively correlated ($P < 0.001$) with PL ($r = 0.48$) and negatively correlated with pH at 1 dpm ($r = -0.69$).

Conclusion

Results of this study indicate the difficulty in visual assessment of pork loin quality under industrial conditions; however, objective color evaluation of loins under industrial conditions were highly correlated with objective color evaluation of chops. This project was funded, in part, by The Pork Checkoff.

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