

**Title:** Determination of the correlation of loin quality parameters with fresh belly characteristics and fresh and processed ham quality, **NPB #14-221**

**Investigator:** Dustin Boler

**Institution:** University of Illinois

**Date Submitted:** 1 February, 2016

**Scientific Abstract:**

The primary objective of this research was to characterize variability of the U.S. pork supply. To achieve the primary objective we had three primary goals: 1) correlate fresh loin quality with fresh belly characteristics and fresh and processed ham quality, 2) evaluate differences in loin, ham, and fresh belly quality from pigs marketed in cold and hot seasons, and 3) characterize variation in carcass characteristics of pigs selected to either maximize lean growth potential or maximize meat quality and marketed in three groups (cuts). Nearly 8,000 carcasses were evaluated in this study. Pigs were either raised with a production focus on lean growth or on exceptional meat quality and raised either during cold or hot seasons. Pigs from 8 total barns (2 from each production focus and season combination) in the Midwestern US were sold independently in 3 marketing groups from each barn based on visual appraisal of body weight with a target body weight based on each supplier's program specifications. All pigs were slaughtered under the supervision of FSIS in a single Midwestern plant. Pigs were immobilized using CO<sub>2</sub> stunning and slaughtered via exsanguination. Hot carcass weight was correlated with loin weight ( $r = 0.723$ ;  $P < 0.05$ ), belly weight ( $r = 0.862$ ;  $P < 0.05$ ), and ham weight ( $r = 0.890$ ;  $P < 0.05$ ). Loin weight was correlated with belly weight ( $r = 0.476$ ;  $P < 0.05$ ) and ham weight ( $r = 0.706$ ;  $P < 0.05$ ). Belly weight was correlated with ham weight ( $r = 0.685$ ;  $P < 0.05$ ). Even though carcass weights and primal weights were related, quality parameters from one primal often did not correlate ( $P > 0.05$ ) with quality parameters of other primal pieces. Tenderness was weakly correlated ( $r = -0.263$ ;  $P < 0.05$ ) with loin ultimate pH. Cured ham color was weakly correlated with objective loin color ( $r = 0.247$ ) and loin ultimate pH ( $r = -0.220$ ). Overall, fresh loin quality is statistically but not meaningfully related to belly characteristics, fresh ham characteristics, or processed ham quality. Therefore, drawing conclusions about meat quality of the ham or belly using the quality indicators of the loin can be misleading. Comparisons of fresh and processed meat quality, as well as carcass composition, between pigs raised during the hot and cold seasons were made. Several statistical ( $P < 0.05$ ) differences were detected, **however, season was not replicated and an additional replication would add credibility to the data.** Pigs raised during the cold season were 0.94 kg heavier ( $P < 0.0001$ ), 1.08 mm leaner ( $P < 0.0001$ ), had 4.68 mm larger loins ( $P < 0.0001$ ), and had 1.22 percentage units greater ( $P < 0.0001$ ) estimated lean values than pigs raised in the hot season. Ultimate pH of loins from pigs raised during the hot season were 0.05 units greater ( $P < 0.0001$ ) than ultimate loin pH of pigs raised in the cold season. However, subjective color was not different ( $P = 0.37$ ) and objective color was only 1.62 L\*

---

These research results were submitted in fulfillment of checkoff-funded research projects. This report is published directly as submitted by the project's principal investigator. This report has not been peer-reviewed.

---

For more information contact:

National Pork Board • PO Box 9114 • Des Moines, IA 50306 USA • 800-456-7675 • Fax: 515-223-2646 • pork.org

---

units greater ( $P < 0.0001$ ) in pigs raised during the hot season compared with pigs raised during the cold season. Slice shear force values of pigs raised during the hot season were 4.17 kg more tender ( $P < 0.0001$ ) than pigs raised during the cold season. Overall, differences in meat quality were detected between pigs raised during the cold season and pigs raised during the hot season, but **an additional replication is necessary before final conclusions can be made**. Contributions to total variance of carcass characteristics were determined for marketing group, sex, season, and production focus. The random effect of pig contributed the greatest proportion of total variance to carcass traits (93.5% of HCW, 51.2% of fat depth, 60.5% of loin depth, and 39.4% of percent lean). Marketing group contributed 4.1% and sex contributed 1.4% of the variation of HCW. Production focus contributed 26.7%, sex contributed to 17.6%, and season contributed 4.5% of the variation in fat depth. The remaining variation in loin depth was attributed to production focus (20.0%), season (16.1%), marketing group (2.0%), and sex (1.4%). Production focus (34.6%), sex (15.8%), and season (10.2%) were large contributors to total variation in percent lean. No difference in variability between sexes existed for HCW ( $P = 0.09$ ) or loin depth ( $P = 0.60$ ); barrows had greater variation than gilts for fat depth and percent lean ( $P \leq 0.01$ ). Variability was greater in the hot season for HCW, but was less for fat depth and percent lean compared with the variability of HCW in pigs from the cold season ( $P \leq 0.01$ ). The quality production focus had a greater variance than the lean focus for HCW, fat depth, and loin depth ( $P \leq 0.03$ ). No difference in variability of marketing groups existed for loin depth ( $P = 0.20$ ). A difference in variability among marketing groups exists for HCW, fat depth, and percent lean ( $P \leq 0.01$ ).