



Variability of U.S. Pork Primal Quality

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Objectives

It is possible variation in pork quality contributes to reduced customer confidence in the predictability of finished product quality, and therefore, may lead to pork products being less competitive for U.S. consumer dollars. The objective of this study was to quantify the amount of variability attributable to pork primal quality by sex, season, marketing group (MG), production focus (PF), and random variation (pig).

Materials and Methods

Pigs ($N = 8,042$) were raised in 8 different barns (central U.S.) representing 2 seasons (hot and cold) and 2 production focuses (lean and quality). Pigs were marketed in 3 groups from each barn. Data were collected on a total of 7,684 pigs. Variance of each pork quality trait was calculated using the MEANS procedure. The `mivque0` option of the VARCOMP procedure (SAS v. 9.4) was used to evaluate the proportion of variability that sex, season of production, PF, and MG, contributed to total variance. Variance remaining was referred to as pig and includes biological variation between pigs as well as other factors not accounted for in this study.

Results

Variances for carcass composition traits were: HCW ($s^2 = 88.13$ kg), backfat thickness (15.96 mm), loin depth (72.62 mm), percent lean (7.63%), and iodine value (13.17g/100g Fatty Acid Methyl Esters). Pig contributed 93.5% of the variation in HCW, and MG, sex, season, and PF accounted for 4.1, 1.4, 0.8, and 0.3%, respectively. Variability that was present in percent lean could be attributed to pig (39.4%), PF (36.4%), sex (15.8%), and season (10.2%). Pig contrib-

uted 71.9% of the variability in iodine value; remaining variation was accounted for by PF (14.0%), sex (13.2%), and MG (0.9%). Variances for loin traits were: boneless weight ($s^2 = 0.24$ kg), L* (6.21), a* (1.32), b* (1.08), ultimate pH (0.02), slice shear force (30.24 kg), and marbling score (0.85). Loin weight variability was attributed to 68.7% by pig, 21.4% by PF, 5.4% by sex, 2.7% by season, and 1.8% by MG. Pig accounted for 70.5% of the variability in loin L*, season 17.2%, PF 9.1%, and sex 3.3%. Ultimate pH variability was accounted for by pig (88.5%), season (6.2%), PF (2.4%), MG (2.2%), and sex (0.7%). Pig accounted for 62.7% of the variability in slice shear force, with remaining variability accounted for by season (23.4%), PF (11.2%), and sex (2.8%). Variability in marbling score was impacted by pig (48.9%), PF (39.0%), and sex (12.0%). Variances for belly traits were: weight ($s^2 = 1.32$ kg), length (18.59 cm), width (5.98 cm), average depth (0.18 cm), and flop (0.70). Belly weight variability was due to 88.9% pig, 4.1% sex, 3.8% MG, 3.0% PF, and 0.1% season. Variability in belly flop was attributed to pig (74.6%), PF (13.6%), sex (11.3%), and MG (0.5%). Variances for ham traits were: weight ($s^2 = 1.20$ kg), semimembranosus (SM) pH (0.08), SM L* (9.83), SM a* (3.47), and SM b* (2.42). Ham weight variability was accounted for by pig (93.9%), MG (2.8%), PF (2.2%), and season (1.1%). Variability of SM L* was due to pig (95.3%), season (3.0%), MG (0.8%), sex (0.6%), and PF (0.3%).

Conclusion

Although variability of carcass composition and quality traits can be accounted for by sex, season, PF, and MG, the greatest portion of variability cannot be attributed to those factors. Therefore, other factors, including inherent variation of pigs, contribute to variability in pork quality and carcass characteristics. This project was funded, in part, by The Pork Checkoff.