An Exploratory Observational Study of Variability Within Rib, Loin, and Brisket Subprimals

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Objectives

Inconsistencies within the boxed beef supply have historically led to increased cost and variability for end users of beef products. Our objective was to quantify adherence to Institutional Meat Purchase Specification (IMPS) guidelines and differences in quality and yield parameters including pH, marbling score (MARB), retail yield (RY, %), and Warner-Bratzler shear force (WBSF, kg).

Materials and Methods

Five boxes of USDA Choice subprimals (SUB) were utilized including IMPS 112A Rib Ribeye Roll Lip-On, 120 Brisket Deckle-Off Boneless, 180 Loin Strip Loin Boneless, and 184 Loin Top Sirloin Butt Boneless. Each SUB was cut into 2.54-cm thick steaks and photographed against a 6.90×6.65cm standard for analysis of *longissimus* muscle area (LMA, cm^2), *gluteus medius* muscle area (GMMA, cm^2), *pectoralis profundus* muscle area (PPMA, cm^2), and percentage lean (PL,%).

Results

Ribeyes were out of specification for excessive tail length, excessive intercostal meat, knife scoring, and bones at a rate of 100, 92, 72, and 64%, respectively. Additionally, ranges for pH, MARB, RY, and WBSF were 5.36 to 5.88, Sl^{60} to SM^{80}, 81.8 to 92.5%, and 2.55 to 6.15kg, respectively. Coefficient of variation (CV) for LMA was compared between steaks, SUB, and boxes with values ranging from 12.6 to 17.5, 16.5 to 33.5, and 25.9 to 31.4%, respectively. Moreover, CV of PL ranged from 8.3 to 13.9, 3.6 to 12.1, and 8.5 to 13.0%, between steaks, SUB, and boxes, respec-

tively. Brisket defects included knife scoring, presence of the deckle, and absence of the natural seam exposing the lean surface of the *pectoralis profundis* at a rate of 71, 22, and 13%, respectively. Ranges for pH, MARB, RY, and WBSF were 5.38 to 5.97, TR10 to SM20, 85.6 to 97.1%, and 4.73 to 8.67 kg, respectively. The CV for PPMA between steaks, SUB, and boxes ranged from 16.0 to 83.8, 12.4 to 53.1, and 29.9 to 53.7%, respectively. Additionally, CV of PL ranged from 11.7 to 34.1, 5.9 to 23.3, and 14.2 to 23.4%, between steaks, SUB, and boxes, respectively. Strip loin defects included excessive fat cover, bones, excessive tail length, and knife scoring at a rate of 87, 87, 80, and 36%, respectively. Ranges for pH, MARB, RY, and WBSF were 5.35 to 5.67, Sl70 to SM50, 69.5 to 87.5%, and 2.14 to 4.59 kg, respectively. Between steaks, SUB, and boxes, CV of LMA ranged from 13.9 to 22.4, 2.5 to 17.0, and 14.1 to 19.0%, respectively. The CV for PL ranged from 5.2 to 9.5, 3.8 to 8.6, and 6.2 to 7.9%, between steaks, SUB, and boxes, respectively. Top sirloin butt defects included non-square cuts at the cranial or caudal end, knife scoring, and bones at a prevalence of 60, 24, and 4%, respectively. Ranges for pH, MARB, RY, and WBSF were 5.48 to 5.74, TR60 to SM30, 45.7 to 65.0%, and 2.76 to 6.12 kg, respectively. The CV for GMMA between steaks, SUB, and boxes with ranges of 13.8 to 30.4, 7.4 to 44.5, and 23.7 to 28.5%, respectively. The CV for PL ranged from 7.6 to 27.1, 5.3 to 36.3, and 16.2 to 21.3% between steaks, SUB, and boxes, respectively.

Conclusion

These results indicate low rates of IMPS adherence due to workmanship. Furthermore, additional variability occurs due to differences in muscling, level of finish, and postmortem metabolism.