



Correlations between Steer Average Daily Gain, Carcass Measurements, Shear Force, and Descriptive Sensory Characteristics of Steaks

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Objectives

This study explored relationships between indicators of beef eating quality with production and carcass characteristics among commercial beef steers.

Materials and Methods

Average daily gain (ADG) was determined for 970 steers during the feed lot phase. At the harvest facility carcass data was collected including: hot carcass weight (HCW), ribeye area (REA), back fat thickness (BF), and marbling score (MS). From each carcass, loins were collected and aged 14-d postmortem prior to freezing and fabrication into steaks. During fabrication strip loin weight (LW) was collected and steaks of 2.5-cm thickness were produced for Warner-Bratzler shear force (WBSF) and trained descriptive sensory analysis. Panelist ($n = 8$) determined the intensity of 12 attributes including: bitter (BIT), salty (SLT), sour (SOR), umami (UMA), beef flavor ID (ID), bloody/serumy (BLD/SER), brown/roasted (BRW/ROA), fat like (FAT), liver like (LIV), oxidized (OXI), juiciness (JUI), and tenderness (TND).

Results

Average daily gain was positively correlated ($P \leq 0.01$) with TND (0.13) and FAT (0.12), indicating a tendency toward increased tenderness with greater ADG. Furthermore, ADG was negatively correlated (P

≤ 0.01) with the undesirable attribute of OXI (-0.16). Ribeye Area had negative correlations ($P \leq 0.01$) with BRW/ROA (-0.20), SLT (-0.14), UMA (-0.11), TND (-0.14), JUI (-0.14), and ID (-0.10). These results imply lower intensity of some characteristic beef flavor attributes, juiciness, and tenderness in carcasses with greater REA. Meanwhile, carcasses with greater REA possessed greater intensity of OXI and were deemed more tough by WBSF. Back fat was correlated ($P \leq 0.01$) with BRW/ROA (0.18), UMI (0.11), TND (0.14), JUI (0.12), ID (0.08), and SLT (0.11). Additionally, BF was negatively correlated ($P \leq 0.001$) with WBSF (-0.12). Among all correlations the strongest relationships were determined between MS and palatability attributes. Marbling Score had positive correlations ($P \leq 0.001$) with ID (0.21), BRW/ROA (0.12), FAT (0.20), UMI (0.15), TND (0.20), and JUI (0.18). While also being negatively correlated ($P \leq 0.01$) with WBSF (-0.18), SOR (-0.11), and OXI (-0.12).

Conclusion

Overall carcasses which possessed greater ADG, HCW, BF, and MS were related with several positive flavor attributes and tenderness. Meanwhile, carcasses possessing larger REA were related with OXI flavor intensity and decreased tenderness. It may, therefore, be concluded that greater palatability may result from beef steers with both greater feedlot efficiency and increased fat composition making up larger carcasses.