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Relationship between Heifer Carcass Maturity and Beef Palatability

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Objectives

Our objective was to determine the relationship between carcass maturity and beef palatability of strip loin and outside round steaks.

Materials and Methods

Left sides of A ($n = 30$), B ($n = 30$), and C ($n = 30$) maturity heifer carcasses under 30 mo of age by dentition were used. Average skeletal maturities of the groups were A⁶⁷, B⁴⁹, and C⁴⁸. Carcasses were selected to ensure similar marbling scores across maturity groups, and average marbling scores were Sm⁹⁴, Mt⁰², and Mt⁰¹ for A, B, and C maturity carcasses, respectively. Beef strip loins (IMPS 180) and outside (bottom) rounds (IMPS 171B) obtained from these carcasses were purchased from AB Foods (Toppenish, WA) and transported to the University of Idaho Meat Science Laboratory. Following a 14-d aging period, wholesale cuts were removed from vacuum packaging and ischiatic heads were removed from outside rounds to produce trimmed flats. Two 2.54 cm-thick steaks were cut from the trimmed flats and anterior ends of strip loins. Steaks were used to measure Warner-Bratzler shear force (WBSF), cook loss, insoluble and total collagen, and consumer sensory attributes. Steaks used for WBSF were weighed, cooked on open hearth broilers to an internal temperature of 40°C, then turned and cooked to a final internal temperature of 71°C. Cooked steaks were re-weighed to determine cook loss and cooled to 4°C. Six cores (1.27-cm diameter) were then removed from each steak parallel with the muscle fibers and then sheared perpendicular to muscle fiber orientation using a Warner-Bratzler shear machine (GR Manufacturing, Manhattan, KS). Samples from cooked steaks were frozen at -20°C and used to determine insoluble and total collagen. Sensory panel steaks

were frozen at -20°C after aging, and allowed to thaw at 4°C for 24 h prior to the consumer panel. Steaks were cooked as previously described and four 1.27-cm × 1.27-cm × steak thickness cubes were obtained from each steak. Separate sensory panels were conducted for strip loin and outside round steaks. Consumers ($n = 72$ panelists per panel) evaluated cooked samples for overall acceptability, tenderness, juiciness, and flavor using a 9-point scale (9 = like extremely, 1 = dislike extremely). Using an incomplete block design, panelists evaluated 5 samples from the 3 maturity groups. Data were analyzed using the Mixed Model procedure of the Statistical Analysis System (SAS Inst. Inc., Cary, NC). Significance was determined at $P < 0.05$ and data were considered trending at $P < 0.10$.

Results

Heifer carcass maturity did not significantly affect WBSF or cook loss for either outside round or strip loin steaks ($P > 0.23$). Likewise, insoluble and total collagen were not different for either steak type from A, B, or C maturity carcasses ($P > 0.89$). Strip loin steaks from C maturity carcasses tended to have higher overall acceptability ($P = 0.08$) and juiciness ($P = 0.09$) than steaks from B maturity carcasses, but steaks from B and C maturity carcasses did not differ from strip loin steaks obtained from A maturity carcasses ($P > 0.11$). No differences in tenderness or flavor were observed due to maturity ($P > 0.24$). Similarly, maturity had no effect on sensory characteristics of outside round steaks ($P > 0.30$).

Conclusion

In conclusion, advanced skeletal maturity does not decrease palatability of carcasses from cattle under 30 mo of age.