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The Impact of Marbling Texture on Trained Sensory Panel Ratings of Beef Strip Loin Steaks

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Objectives

Analyze effects of 3 marbling textures (fine, medium, and coarse) on trained sensory panel ratings of beef steaks from 3 quality grades.

Materials and Methods

Beef strip loins (IMPS #180) from 3 quality grades: Top Choice (Modest^{00}–Moderate^{100} marbling), Low Choice (Small marbling), and Select (n = 117;39/quality grade) were visually sorted at the 12th 13th rib interface into 3 texture groups: fine, medium, and coarse using the USDA Marbling Texture reference card (USDA-AMS-LS-SB-02). Within each ribeye, 75% of the marbling had to meet the standard to qualify. After transport to Kansas State University Meat Lab, strip loins were fabricated into 2.5 cm steaks, and vacuum packaged. Steaks were aged for 21 d postmortem at 2 to 4°C before freezing at –20°C. Twenty-four h prior to each sensory panel session, steaks were thawed at 2 to 4°C. After thawing, steaks were cooked on clamshell grills (Cuisinart Griddler Deluxe, East Windsor, NJ) to 71°C. After cooking, each steak was sliced into 2.54 cm×1 cm×1 cm cubes. Eight sensory panelists, trained per AMSA guidelines, were served 2 cubes of each steak and asked to evaluate initial and sustained juiciness, myofibrillar tenderness, amount of connective tissue, overall tenderness, beef flavor intensity, and off-flavor intensity on continuous line scales on electronic tablets (Toshiba Encore 2, Toshiba, Tokyo, Japan) using a digital survey (Qualtrics, Provo, UT). Each line scale was anchored at both ends with descriptive terms (0 = extremely dry/tough/none/unbeef-like/bland, 100 = extremely juicy/tender/abundant/beef-like/intense) and mid-points with descriptive terms (50 = neither dry/tough/none/unbeef-like/bland or juicy/tender/abundant/beef-like/intense). Data were analyzed as a 3 × 3 factorial, with marbling texture, quality grade, and their interaction serving as fixed effects.

Results

There were no marbling texture group × quality grade interactions ($P > 0.05$) for all traits evaluated. Coarse steaks were rated higher than medium steaks ($P < 0.05$) for initial juiciness, but similar to fine steaks ($P > 0.05$) for the same trait. Coarse steaks were also rated higher ($P < 0.05$) for sustained juiciness and beef flavor intensity than fine or medium marbled steaks. No differences ($P > 0.05$) were found between fine and medium steaks for sustained juiciness and beef flavor intensity. All marbling texture treatments were rated similar ($P < 0.05$) for connective tissue amount, myofibrillar tenderness, overall tenderness, and off-flavor intensity. Top Choice steaks were rated higher for both initial and sustained juiciness ($P < 0.05$) than Select steaks, but were similar to Low Choice steaks ($P > 0.05$) for both traits. All quality grades were similar ($P > 0.05$) for myofibrillar tenderness, amount of connective tissue, overall tenderness, and off-flavor intensity. Top Choice and Low Choice steaks were similar ($P > 0.05$) and greater ($P < 0.05$) in beef flavor intensity than the Select steaks, respectively.

Conclusion

These results indicate steaks with coarse textured marbling were more flavorful and were juicier when compared to steaks with fine and medium textured marbling when evaluated by trained sensory panelists. This research indicates beef with coarse marbling should not discriminated against at marketing, as trained panelists reported better ratings compared to fine and medium marbling textures for 2 attributes important to establishing steak palatability.

