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Trained Sensory Panel Evaluation of 9 Beef Cuts from 3 USDA Quality Grades

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Objectives

To determine the palatability characteristics of 9 beef cuts from 3 USDA quality grades.

Materials and Methods

Beef strip loins (IMPS #180), inside rounds (IMPS #169), bottom rounds (IMPS #171), shoulder clods (IMPS #114), and chuck rolls (IMPS #116A) were selected from 3 quality grades (Prime, Choice and Select), vacuum packaged, and aged for 21 d at 4°C. The sub-primals were fabricated into 9 beef cuts (Delmonico, Flat Iron, Denver, Ranch, Shoulder Petite Tender, San Antonio, Western Griller, Tucson and Strip). Cuts were fabricated to 2.54 cm steaks and frozen at -20°C prior to analysis. Steaks were cooked on an electric clamshell grill (Cuisiart Griddler Deluxe model GR-150) to 71°C. The temperature was measured using a thermocouple connected to a Doric Mini-trend Data Logger 205 B-1-c OFT (Doric Scientific). Each steak was cut into 1 cm×1 cm×steak thickness samples and immediately served to trained sensory panelists. Each panelist was trained per the American Meat Science Association guidelines for Sensory Evaluation (2016). The samples presented to the panelists were evaluated for initial juiciness, sustained juiciness, myofibrillar tenderness, connective tissue amount, beef flavor intensity, off flavor intensity, and overall tenderness on continuous line scales with verbal anchors at end (0 = extremely dry/tough/none/bland, 100 = extremely juicy/tender/abundant/intense) and midpoints.

Results

For all traits evaluated other than overall tenderness, there was no quality grade × cut interaction ($P > 0.05$). Initial juiciness, myofibrillar tenderness, and beef flavor

intensity rated higher ($P < 0.05$) for Prime than Choice and Select, which were rated similar ($P > 0.05$). Select steaks had a greater ($P < 0.05$) amount of connective tissue than both Choice and Prime steaks. Panelists rated Delmonico, Flat Iron and Denver steaks highest ($P < 0.05$) for initial and sustained juiciness, while the San Antonio and Tucson cuts rated lowest ($P < 0.05$). For myofibrillar tenderness, the Delmonico and Flat Iron cuts rated highest ($P < 0.05$), followed by Strip Loin and Denver steaks. The Tucson cut was the toughest ($P < 0.05$) myofibrillary. Western Griller steaks had the greatest ($P < 0.05$) amount of connective tissue, followed by the Tucson cut, which had a greater ($P < 0.05$) amount of connective tissue than all other cuts. For beef flavor intensity, the Denver cut rated the highest ($P < 0.05$), with the Delmonico and Flat Iron steaks rating higher ($P < 0.05$) than all other cuts.

There was an interaction ($P < 0.05$) between quality grade and cut for overall tenderness. Within Prime, Delmonico steaks were rated most ($P < 0.05$) tender, and no difference ($P > 0.05$) was found among Strip Loin, Flat Iron, Denver, and Shoulder Petite Tender steaks. Whereas within Choice and Select, Delmonico steaks were similar ($P > 0.05$) to Flat Iron and Shoulder Petite Tender steaks for overall tenderness. Additionally, within Prime, no difference in overall tenderness was found among Western Griller, San Antonio, and Tucson steaks. However, San Antonio steaks were more tender ($P < 0.05$) than both Western Griller and Tucson steaks in both Choice and Select.

Conclusion

The results, from the trained panel, indicate that for all traits other than overall tenderness, quality grade had a similar impact on the palatability traits of the evaluated muscles. Also, these results show the Delmonico, Flat Iron, and Denver steaks were favored over strip loin steaks.