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Tenderness and Sensory Attributes of Eleven Muscles from Carcasses within the Canadian Cull Cow Grades

J. Roberts¹, A. Rodas², M. Juárez^{1*}, O. Lopez-Campos¹, I. Larsen¹, and J. Aalhus¹¹Agriculture and Agri-Food Canada, Lacombe, Canada; ²University of Manitoba, Winnipeg, Canada

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Objectives

The objective of this research was to benchmark palatability attributes for muscles from carcasses assigned grades within the Canadian grading standards for cows compared to youthful carcasses.

Materials and Methods

Eleven muscles (psoas major, infraspinatus, longissimus thoracis, longissimus lumborum, triceps brachii, rectus femoris, gluteus medius, semitendinosus, semimembranosus, biceps femoris and teres major) were obtained from mature graded carcasses with > 50% ossification (D1, D2, D3 and D4; $n = 84$) and youthful carcasses with < 50% ossification A/AA grades youthful carcasses (over [OTM]; $n = 18$, and under [UTM] 30 mo of age; $n = 18$, based on dentition but < 50% ossification); these muscles were aged 14 d prior to sensory and shear force evaluation. Steaks were thawed and grilled to an endpoint temperature of 71°C. Peak shear force was determined on each core perpendicular to the fiber grain using a texture analyzer equipped with a Warner-Bratzler cell (crosshead speed of 200 mm.min⁻¹). For the sensory evaluation, each sample was evaluated by a 6-member trained panel for initial tenderness, overall tenderness, amount of perceptible connective tissue, juiciness, and beef flavor intensity using an 8-point descriptive scale.

Results

The results suggest that while most meat from cow graded carcasses becomes less tender, within these carcasses, some muscles did not become tougher. For ex-

ample, the PM from mature graded carcasses remains tender and had higher juiciness, suggesting this muscle is still valuable from the perspective of eating quality; similar results were observed in tenderness comparisons made between USDA select and grain-finished beef cull cows. Additionally, several muscles received lower scores for overall tenderness, but did not have a significantly higher shear force. This may indicate the extent of toughening for these muscles was not large. While overall tenderness for most muscles across the mature grades decreases, other sensory attributes were often similar to those of youthful carcasses. In some instances, juiciness or beef flavor intensity were higher in the mature carcasses than in the youthful carcasses. As such, many cuts from mature carcasses would likely have acceptable eating quality with tenderness interventions such as blade tenderization or brine injection applied.

Differences in meat quality exist between the mature quality grades. The largest decreases in tenderness occurred in the D3 carcasses, which are graded as such due to poor muscling. The present results appear to be consistent with tenderness measures obtained from non-finished beef cows. Quality differences between mature grades suggest that classification of mature carcasses based on muscling and fat depth does serve to partially differentiate carcasses in a manner that relates to meat quality.

Conclusion

The changes to eating quality attributes differed between the mature grades; as such, processors could potentially use the information presented here as a guide for utilizing cuts which retain high eating quality and separating those which may require tenderness intervention to reach consumer acceptability.