CARCASS PRODUCTION:

MODIFICATION OF THE MUSCLING REQUIREMENT FOR THE CANADA PRIME/AAA/AA/A BEEF CARCASS QUALITY GRADES

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Recent research conducted at the Lacombe Research Centre and supported by the Canadian Beef Grading Agency provides the scientific justification for the current joint industry-CBGA-CFIA submission to modify the minimum muscling requirement for the Canada Prime/AAA/AA/A beef carcass grades from 'good, with no deficiencies, to excellent' to 'good, with some deficiencies, to excellent'. This research was initiated at the request of Industry/Government Committee on Beef Grading in order to respond to producers' concerns about a perceived undervaluation of the Canada B3 beef carcasses in the Canadian market.

Under the current beef grading regulations, maximum beef carcass value can only be realized when a beef carcass achieves a Canada Prime, AAA, AA or A quality grade. To achieve any of these Canada A quality grades, a beef carcass must be youthful, have good muscling with no deficiencies to excellent muscling, bright red muscle colour, a minimum marbling level of trace, fat which is firm and white or slightly tinged with a reddish or amber colour, and a minimum of 4 mm fat thickness at the grading site. Furthermore, only carcasses qualifying for the Canada A quality grades can be classified into Canada 1, 2 or 3 yield grade. A youthful carcass with all the other requirements but exhibiting deficiencies in muscling will receive a Canada B3 grade. Under the current market conditions, Canada B3 carcasses are severely discounted by the Canadian industry. However, this severe discount is being questioned by the producers' segment of the beef industry, at least for carcasses exhibiting medium to good muscling, since it is believed that, if these carcasses (medium to good muscling) were to have sufficient marbling and fat cover to meet the Canada AA/A quality grade requirements, they would exhibit quality and yield characteristics similar to those of Canada AA/A beef carcasses.

The two key objectives of this research were then:

1. To determine whether a beef carcass exhibiting medium to good muscling but with traces to slight marbling has eating qualities comparable to a carcass with good to excellent muscling which has traces to slight marbling (Canada AA/A).

2. To determine the salable yield of Canada B3 beef carcasses exhibiting medium to good muscling and sufficient marbling and fat cover to meet the Canada AA/A quality grade requirements.

Experimental procedure

Forty-nine Canada B3 steer carcasses exhibiting medium to good muscling, 12 Canada A and 13 Canada AA steer carcasses were selected at a commercial beef packing plant. The carcasses were selected from a single source to avoid differences in palatability attributes which might have arisen from differing pre-slaughter handling and post-mortem chilling regimes.

Palatability: After selection of the carcasses, the left side of the selected carcasses were transported to the Lacombe Research Centre. The rib eye muscle (*longissimus lumborum*, LL) and inside round (*semimembranosus*, SM) were removed, multivaced and held at 1C to provide a total aging period of 14 days. Then LL and SM steaks were cut, multivaced and frozen to -25 C for subsequent assessment of palatability traits by a trained beef tasting panel composed of 6 to 9 panelists (Food Processing Development Centre, Alberta Agriculture, Food and Rural Development, Leduc, AB). All attributes were scored on 15 cm unstructured line scales with each end point tagged with a descriptor.

Sensory Attribute	0 Endpoint	15 Endpoint
Softness	Soft	Hard
Tenderness	No Force (Tender)	Extreme Force (Tough)
Juiciness	Not Juicy	Extremely Juicy
Flavour	No Beef Flavour	Full Beef Flavour
Chewiness	No Force (Tender)	Extreme Force (Chewy)
Rate of Breakdown	Fast	Slow
Amount of Perceptible Connective Tissue	None	Abundant

Salable yield: The 49 Canada B3 carcasses were cut out to obtain the salable lean yield (boneless boxed beef including trimmings-50/75/85%-). Historical data from the project on the CVS for beef carcass grading currently underway at the Lacombe Research Centre were used as control for the salable lean yield comparison.

Results

The average weight of the selected Canada B3 carcasses was 332 kg compared to 307 kg and 286 lbs for Canada AA and A carcasses, respectively. Similarly, average grade fat was 4.6 mm, 6.3 and 6.7 mm; average AMSA marbling score was 483, 354 and 444.

Palatability:

Rib eye Steaks. The eating characteristics of the rib eye steaks from Canada B3 carcasses as determined by a trained panel (softness, initial tenderness, juiciness, flavour intensity, chewiness, rate of breakdown and amount of perceptible connective tissue) were generally superior to the eating characteristics of steaks from Canada AA or Canada A carcasses. Steaks from Canada B3 carcasses were softer, had greater initial tenderness, had a lower degree of chewiness and broke down faster compared to steaks from Canada AA or A carcasses. Additionally, the Canada B3 steaks were perceived to have fuller beef flavor. The two charac-

teristic measured that did not show any significant difference were juiciness and the amount of perceptible connective tissue. No significant differences between rib eye steaks from Canada AA and Canada A carcasses were observed.

Inside round steaks. When observed, the differences in the eating characteristics of inside round steaks from Canada B3 carcasses compared to steaks from Canada AA or Canada A carcasses were not of the same magnitude as was found for the rib eye steaks. Trained panelists did find the Canada B3 steaks softer, more tender and more flavourful. Canada B3 steaks were juicier than Canada A steaks and were as juicy as Canada AA steaks. The degree of chewiness and the rate of breakdown were similar for steaks across all three grades. Similarly, no significant differences were noted for the amount of perceptible connective tissue. As for the rib eye steaks, the eating characteristics of the inside round steaks from Canada AA and A carcasses were similar.

Salable yield:

The salable lean yield (boneless boxed beef including trimmings-50/75/85%-) of Canada B3 carcasses was lower when compared to Canada 1 yield grade carcasses but superior to Canada 2 and 3 yield grade carcasses. Canada B3 carcasses had a higher proportion of front quarter and a lower proportion of hind quarter than Canada 1 yield grade carcasses. However, when compared to Canada 2 or 3 yield grade carcasses there was no difference in the proportions of front and hind quarters. Of importance among the individual cuts was the lower yield of the more valuable cuts such as the rib, loin, inside round and gooseneck cuts and the higher yield of less valuable cuts such as the shoulder cut in Canada B3 carcasses; at least when compared to Canada 1 yield grade carcasses.

Conclusion

The results of this study confirm that, indeed, Canada B3 carcasses (at least those exhibiting medium to good muscling) which, except for muscling, meet the Canada AA/A quality grade requirements have eating qualities, as determined by a trained panel, equal or superior to those of Canada AA or A carcasses.

However, in terms of cutability and yield of the more valuable cuts, Canada B3 carcasses do show a distinct disadvantage, particularly with respect to Canada 1 yield grade carcasses.

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