Towards improving carcass classification for the canadian dark-cutting beef: consumer sensory evaluation

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Introduction: The Canadian beef industry is currently taking a financial loss on dark-cutting (B4 grade) carcasses as they are downgraded in classification and considered inferior by retail and consumers. In contrast, the USA grading system downgrades dark-cutting carcasses by one quality grade based on the marbling score.

Objective: This study evaluated if different colour intensities of Canadian dark-cutting (B4) carcasses (Moderate-MD/Dark-DK) could be considered equivalent in quality to normal (N) carcasses of a lower quality grade/marbling score (high to low: AAA, AA, A) based on consumer sensory evaluations of raw and cooked steaks.

Material and methods: Two hundred left beef carcass sides (100 N and 100 B4) were selected during 6 collection days from a commercial slaughter plant in Alberta (Canada) following colour assessment (CBGA, 2010) of the ribeye between the 12th–13th vertebrae at 48 h post mortem by certified beef graders. Within colour grouping (N, MD, DK), marbling was assessed subjectively using beef marbling pictorial standards as reference points (USDA, 2016) to select 25 A, AA and AAA carcasses from both N and B4 grades. Subsequently, ribeyes were removed from the carcasses, tagged, vacuum packaged and transported under refrigerated conditions to the Lacombe Research and Development Centre (AB, Canada). After 14 d ageing, steaks were cut and frozen until consumer testing at the Consumer Product Testing Centre (AB, Canada). Consumers evaluated visual (marbling, colour) characteristics of raw steaks and basic palatability (appearance, tenderness, juiciness, flavour, and overall acceptability) and intent to purchase of cooked steaks, using 5 and 9-point hedonic scales.

Results: When rated on raw appearance, B4(MD/DK)AAA and B4(MD/DK)AA were perceived as having similar ($P>0.05$) marbling acceptability and colour uniformity as NAA and NA steaks, respectively. Colour acceptability was also similar for B4MDAAA and B4(MD/DK)AA compared to N steaks of a lower quality grade/marbling score, but lower ($P<0.01$) in B4DKAAA than NAA. Indeed, fewer panellists (28%) indicated they would purchase raw B4DKAAA steaks compared to B4MDAAA (47%) and NAA (43%). In contrast, no differences in the willingness to purchase were observed between B4(DK/MD)AA and NA (34/36 vs. 39%). The B4MDAAA and B4(MD/DK) AA were comparable ($P>0.1$) to NAA and NA cooked steaks, respectively, for appearance, tenderness, juiciness, flavour and overall acceptability. The B4DKAAA were also similar ($P>0.1$) in cooked appearance, flavour and overall acceptability but higher in juiciness and tenderness ($P<0.01$) than NAA cooked steaks, probably due to higher marbling, pH and water holding capacity.

Conclusion: The B4MDAAA and B4(MD/DK)AA carcasses could potentially receive similar grades as NAA and NA carcasses, respectively, based on these consumer ratings. Despite equivalent (or better) eating quality of B4DKAAA compared to NAA steaks, raw appearance would negatively impact consumer purchase, suggesting merit for continuing a segregated grade. Consumer education could increase awareness of these results and help to increase acceptance and purchase intent of B4DKAAA meat.

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