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Sensory Descriptive Attributes of Grass and Grain-Fed Australian Beef *Longissimus Lumborum* after Extended Wet-Aging Periods

D. Evers[1]*, A. J. Garmyn[1], J. F. Legako[1], D. R. Woerner[1], and M. F. Miller[1]

[1]Animal & Food Sciences, Texas Tech University, Lubbock, TX, USA
*Corresponding author. Email: danielle.evers@ttu.edu (D. Evers)

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Objectives

The objective of this study was to evaluate the effects of extended wet-aging on the beef flavor profile of grass and grain-fed Australian strip loins.

Materials and Methods

Strip loins (HAM 2140) were collected from grass and grain finished cattle (n = 50) at a commercial abattoir near Brisbane, Australia. Subprimals were portioned into sections and assigned randomly to 1 of 3 postmortem aging periods (45, 70, or 135 d). Portions were individually vacuum packaged and shipped refrigerated (0–4°C) to Texas Tech University in Lubbock, TX. Upon arrival, the strip loin sections were sorted into respective aging groups of 45D, 70D, and 135D and stored at 1–2°C. On each respective day, sections were fabricated into 2.54-cm steaks, vacuum packaged and frozen (–21°C). Electric clamshell grills were used to cook thawed (held at 2–4°C for 24 h) steaks to a medium degree of doneness (71°C); cooked temperatures were recorded. Steaks were cut into cubes and evaluated by trained panelists (n = 6) for descriptive sensory attributes using a 100-mm anchored line scales (0 = slight, 50 = moderate and 100 = strong).

Results

The sour flavor was the only trait where an interaction between diet and postmortem aging was detected ($P < 0.01$). Samples aged 135 d from both grass and grain were similarly ($P > 0.05$) scored with a stronger ($P < 0.05$) sour flavor than all other treatment combinations, which did not differ ($P > 0.05$). Aging impacted ($P \leq 0.01$) beef flavor ID, liver-like, metallic, rancid, green-hay, umami, and bitter flavors, as well as overall juiciness and overall tenderness. For beef flavor ID, 45D aging resulted in the greatest intensity ($P < 0.05$), while 70D samples were intermediate, and 135D samples were the least intense. For liver-like, metallic, rancid, green-hay, and bitter flavors, 135D samples had the strongest flavor, while 70D samples were intermediate, and 45D samples had the weakest flavor intensity ($P < 0.05$). For umami, 45D samples had stronger ($P < 0.05$) umami flavor than 135D samples, but 70D samples did not differ from either 45D or 135D ($P > 0.05$). Panelists rated 70D and 135D samples juicier ($P < 0.01$) than 45D samples, but 70D and 135D did not differ ($P > 0.05$). For overall tenderness, panelists rated 135D samples more tender ($P < 0.05$) than 45D and 70D, which were similar ($P > 0.05$). Diet impacted ($P < 0.05$) bloody/serumy, liver-like, green-hay, and bitter flavors. For bloody/serumy and liver-like, the grain fed treatments resulted in greater ($P < 0.05$) flavor intensity than grass fed treatments. However, grass fed samples had stronger ($P < 0.05$) green-hay and bitter flavors compared to grain fed samples. Diet and aging had no effect ($P > 0.05$) on fat-like or sweet flavors.

Conclusion

Extending postmortem aging of Australian beef strip loins from 45 to 135 d resulted in decreased beef and umami flavors, along with concurrent increased detection of off-flavors, such as liver-like, rancid, and sour. Diet influenced fewer flavor traits than postmortem aging, but grass-fed samples still had stronger green-hay flavor, as would be expected. Based on these results, aging beef strip loins 135 d is not recommended based on reduced beef flavor and increased off-flavor detection.