



Effects of Extended Aging on the Flavor Characteristics of Grass and Grain Fed Australian Beef *Longissimus Thoracis*

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Objectives

The objective of this study was to investigate the effects of extended wet ageing on the flavor characteristics, of grass and grain fed Australian beef *lumborum thoracis*.

Materials and Methods

Cube rolls (HAM #2244) were collected from grass and grain fed cattle ($n = 30$) at a commercial abattoir near Brisbane, Australia. Cube rolls were vacuum packaged and shipped under refrigeration ($0-2^{\circ}\text{C}$) to Texas Tech University. Each cube roll was cut into 2.5-cm steaks and labeled according to position from posterior to anterior end. Steaks were vacuumed packaged, stored through the appropriate postmortem ageing period (35, 45, 55, or 65 d postmortem), and then frozen until further analysis. One steak from each cube roll was used for trained descriptive flavor analysis with 8 trained panelists comprised of mostly graduate students from Texas Tech University. Flavor attributes of cooked steaks were scored using 100-point anchored line scales (0 = none, 50 = moderate, and 100 = strong).

Data were analyzed using PROC GLIMMIX of SAS with diet, postmortem ageing, and their interaction as fixed effects and panelist as a random effect. Final temperature was tested as a covariate for all the flavor attributes.

Results

An interaction was detected only for the bitter flavor and overall juiciness ($P \leq 0.03$). Beef flavor ID, fat-like,

metallic, umami, and sweet were not influenced by diet or postmortem ageing ($P > 0.05$). Ageing influenced bloody seromy flavor ($P > 0.05$) with 45 d samples having greater flavor than 55 d samples, but not differing ($P > 0.05$) from any other ageing period. Diet and ageing influenced rancid flavor ($P > 0.05$), with grass fed samples having a stronger rancid flavor than grain fed samples. Samples aged 65 d had a stronger rancid flavor than 45 or 55-d samples, and 35-d samples had the lowest rancid flavor. Diet and ageing influenced grassy flavor ($P > 0.05$), again being stronger in grass than grain fed samples. Samples aged 35 d had a weaker ($P > 0.05$) grassy flavor than any other ageing period, which did not differ ($P > 0.05$). Diet and ageing had an effect on liver-like flavor ($P < 0.05$) with stronger flavors in grain than grass fed samples and liver-like flavor increasing with postmortem ageing time. Sour flavor was affected by diet only ($P < 0.05$) with grass fed samples having stronger sour flavor than grain fed samples. Ageing had an effect on overall tenderness ($P < 0.05$); samples aged 35 d were least tender, and samples aged 45 d were more tender than 55 d samples but did not differ from 65 d samples.

Conclusion

The results suggest that beef flavor as measured by beef flavor ID and umami were not impacted by extended ageing; however, some off-flavors grew stronger as ageing time extended. Flavor attributes such as rancid, grassy, sour were stronger in grass than grain fed samples, but grain fed has a stronger liver-like flavor. Ageing influenced both overall tenderness and juiciness, but typically not in a linear fashion.