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US Consumer Assessment of New Zealand Lamb

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Objectives

The objective of this study was to establish consumer eating quality benchmarks of New Zealand lamb by selecting various cuts from a controlled livestock range and across multiple locations and seasons.

Materials and Methods

Lamb carcasses ($n = 325$) were selected to fit within 3 GR (fat thickness) score ranges (< 6, 6 to 9, and > 9) within 3 carcass weight brackets [Light (13 to 17 kg), Medium (17.1 to 21 kg), and Heavy ($\geq$ 21.1 kg)]. Four genders were represented: ram, wether, ewe and cryptorchid. Carcasses were selected in February and April from 2 abattoirs in New Zealand in the north and south island. Paired muscles/muscle groups [*longissimus dorsi* (LD), *semimembranosus* (SM), rump (*gluteus medius* and *biceps femoris*), and knuckle (*vastus intermedius, vastus lateralis, vastus medialis,* and *rectus femoris*)] were collected from each carcass, denuded and fabricated into 15-mm slices, aged 1–28 d postmortem, and frozen prior to shipment to the US for sensory evaluation. Consumers ($n = 1440$) were fed in 5 states across the US and each tested 7 cooked samples by rating tenderness (TEN), juiciness (JUC), flavor liking (FLAV) and overall liking (OL) using 100-mm lines scales. Data was analyzed using PROC GLIMMIX in SAS examining fixed effects of abattoir, kill month, sex, weight bracket, GR bracket, muscle, postmortem aging and consumer feeding location at a significance level of $\alpha = 0.05$.

Results

Carcass weight influenced ($P < 0.01$) JUC, but had no effect ($P > 0.05$) on TEN, FLAV and OL. Heavy carcasses were juicier than middle or light weight carcasses.

GR score had no effect on any palatability traits ($P > 0.05$). Gender impacted TEN and FLAV ($P \leq 0.03$), but not JUC or OL ($P > 0.05$). Ewes were more tender than rams or cryptorchids, but were similar to wethers. Consumers liked the flavor of ewes more ($P < 0.05$) than wethers or cryptorchids, but had similar FLAV as rams ($P > 0.05$). Also, south island lambs were favored ($P \leq 0.01$) in JUC, FLAV and OL, but there was no difference for TEN. Lambs harvested in February ranked higher ($P \leq 0.02$) in all palatability characteristics than April. Rumps were more tender ($P < 0.05$) than all other muscles, knuckle and LD were intermediate, while SM was least tender. There was no difference ($P > 0.05$) in JUC for knuckle and rump, but both were juicier ($P < 0.01$) than LD. Rumps and LD had greater FLAV and OL than knuckles, which were intermediate, and SM were scored lowest for FLAV and OL. Postmortem aging influenced TEN ($P < 0.01$), as 28 d cuts were scored greater than all other days except 24 d. There was a general trend for increasing TEN as postmortem aging increased, but adjacent periods often had similar TEN scores. The case was the same with JUC, except that 14, 24, and 28 d were similar ($P > 0.05$). There were no differences ($P > 0.05$) for FLAV between 7, 14, 24, and 28 d, but 24 and 14 d ranked higher ($P < 0.01$) than 1 or 2 d. Plus, there was no difference ($P > 0.05$) between 7, 14, 24, and 28 d for OL, yet 14, 24, and 28 ranked higher ($P < 0.01$) than 1 and 2 d postmortem age. Lastly, state influenced TEN, JUC, FLAV and OL ($P < 0.01$). CA had lower TEN and JUC ($P < 0.01$) than all other states. CO and CA had greater FLAV and OL than all other states ($P < 0.05$), except TX had similar OL. OH scored FLAV and OL lower than all other states ($P < 0.05$).

Conclusion

Overall, region, season, cut and postmortem aging had the most profound effects on lamb consumer eating quality.