

Intramuscular fat as a predictor of sheepmeat eating quality (#501)

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Introduction

Sensory perception of sheepmeat is a key factor influencing consumer demand, food choice, repeat purchase behaviour, and willingness to pay (Pethick, Banks, Hales, & Ross, 2006). Many factors affect sheepmeat eating quality, and one of these factors is intramuscular fat percentage (IMF%) (Pannier, Gardner, O'Reilly, & Pethick, 2018). IMF% improves consumer sheepmeat sensory scores (Pannier et al., 2014), and therefore a measure of IMF% is recognised as an important predictor of sheepmeat eating quality in proposed grading systems, such as the Meat Standards Australia (MSA) system. The current MSA sheepmeat pathways system lacks individual objective carcass measurements for traits like IMF% and thus segregation of quality grades between different cuts is not possible. Low to moderate correlations for IMF% ($r^2 = 0.34 - 0.40$) exist between loin and other cuts of the fore and hind sections (Anderson, Pethick, & Gardner, 2015). Hence there is potential to predict eating quality of these cuts based on the IMF% of the loin, however it may be necessary to measure IMF% in individual cuts to describe the variability in eating quality. Therefore, we hypothesised that IMF% of each individual cut will provide a more accurate description of that cut eating quality than using IMF% of only the loin.

Methods

Lambs ($n=918$) from the Meat and Livestock Australia Resource Flock, located at Katanning (WA), were slaughtered at a commercial abattoir and their carcasses subjected to medium voltage electrical stimulation. Loin and topside cuts were collected from 708 carcasses, while the loin, topside, knuckle, outside and rump cuts were collected from the remaining 210 carcasses. In total, 2466 cuts were collected for sensory testing by untrained consumers. Each cut was sliced into 15mm thick steaks prior to grilling according to MSA protocols. Each consumer tasted six test samples on a scale of 0-100 for overall liking. To date, 11 sessions have been conducted including 660 consumers tasting 396 cuts. IMF% was measured on every loin, as well as the topside, outside and rump of the 210 carcasses. Linear mixed effects models in SAS (SAS Version 9.1) were used to analyse consumer scores for overall liking. The models included fixed effects for cut (loin, topside, knuckle, outside and rump), sex (female, male), and birth type (single, twin, triplet), with either IMF% of the loin only or IMF% of all individual cuts (IMF within cut) fitted as a covariate. Animal identification, and consumer within eating quality session were included as random terms.

Results

Both loin IMF% and IMF% of the individual cuts were positively associated with consumer overall liking scores ($P < 0.05$), however this effect varied between the different cuts. Loin IMF% was positively associated ($P < 0.05$) with overall liking in the loin and the topside cuts with scores increasing by 11.1 and 5.9 units respectively over a range of 2.5% - 7% IMF. There was no association ($P > 0.05$) between loin IMF% and overall liking in the knuckle, outside and rump cuts. When IMF% of the individual cuts was included in the overall liking model, increasing IMF% from 2.5% to 7% was associated with an increase in overall liking score of 10.7 units for the loin only, with no effect ($P > 0.05$) in the other cuts.

Conclusion

These preliminary results reject our hypothesis that IMF% of each individual cut will account for more variation when predicting eating quality within that cut compared to using only loin IMF%. Hence there is no advantage in using cut specific IMF% to predict eating quality, and multiple measurements of IMF% in the different muscles might not be needed. The results also indicate that utilising a single site measurement of loin IMF% can describe the eating quality variation of the loin and topside cuts, however further work is required to investigate factors other than IMF% that explain variation in eating quality in the other cuts in sheepmeat. Furthermore, the dataset used was still relatively small (396 of the total 2466 cuts eaten to date) and hence requires further investigation when complete. Correlations between all muscles for IMF% will also be tested.

References

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