AMPC/Sheep CRC/MLA Case Study

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Author:	AMPC, Sheep CRC, MLA
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Fact sheet – Lamb Eating Quality

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Consumers demand premium quality and value for money when purchasing lamb. They are willing to pay more for a higher quality product, especially when the quality can be guaranteed. Previous research has shown that if the price of 'good every day' Meat Standards Australia (MSA) quality lamb (3 star) is set to 100%*, then consumers are prepared to pay differing prices for other grades of product (Table 1).

Table 1: Consumer willingness to pay

Quality	MSA Grade	Willingness to pay*
Premium	5 Star	200%
Better than every day	4 Star	147%
Good every day	3 Star	100%
Ungraded	2 Star	49%

Measuring lamb sensory scores

The Sheep CRC Information Nucleus flock (INF) has provided an opportunity to understand the range of genetic and non-genetic factors that significantly affect consumer sensory scores for eating quality. Untrained consumers were recruited to test grilled samples of the *longissimus lumborum* (loin) and *semimembranosus* (topside) muscle from 1,471 lambs for tenderness, juiciness, flavour, odour and overall liking score using a 1–100 scoring system.

Effect of carcase fat on lamb eating quality

Short loin fat weight, calculated as the fat from a denuded short loin, is a good indicator of total carcase fatness. Adjusted to the same hot carcase weight, the sensory scores of both loin and topside cuts showed a small increase as short loin fat weight increased.

The mean shortloin fat weight from the INF lambs tested for eating quality was 249g (range 40–880g). Up to a 450g short loin fat weight, sensory scores increased by 3 (tenderness) and 2 (overall liking) consumer scores, however, after this there is no further improvement.

Effect of muscle on lamb eating quality

Short loin and topside muscle weights are good indicators of whole carcase muscle weight. Muscling measured by short loin and topside muscle weight has a negative relationship with consumer sensory scores.

The mean short loin muscle weight measurement from the INF lambs tested for eating quality was 367g (range 170–635g) and the mean topside muscle weight was 617g (range 350–1010g). Adjusted to the same hot carcase weight, increased muscling decreases the sensory scores. This effect ranged from 3–7 consumer scores for the loin (between 200–560g) and 4–9 for the topside (between 400–880g), with the highest impact on tenderness, followed by overall liking, juiciness and flavour.

Effect of production and management factors on lamb eating quality

Factors such as location (research station), year of birth, gender, dam breed and age at slaughter have a small but significant impact on the consumer sensory scores. This indicates that the MSA system is an effective grading system to deliver good eating quality and minimises the impact these production effects have on eating quality.

Grilled loin samples (mean overall liking score = 72) were more acceptable for consumers than grilled topside samples (mean overall liking score = 52), indicating that integration of the different cuts is a vital factor in optimising sheepmeat eating quality.

Effect of intramuscular fat percentage (IMF%) on lamb eating quality

Intramuscular fat contributes to the juiciness, flavour and tenderness of cooked meat. Animals with higher IMF% levels will produce meat that is more acceptable for consumers. The measured IMF% range in INF lambs was 2–7%, with a mean value of 4.2%. The preferred range in lamb is between 4 and 6%.

IMF% is a strong driver of consumer sensory scores, increasing all sensory traits (Figure 1). The highest impact was on juiciness resulting in an increase of 11 consumer scores across the IMF% range. The increase for overall liking was 10 consumer scores, 9 scores for flavour and 6 scores for tenderness.

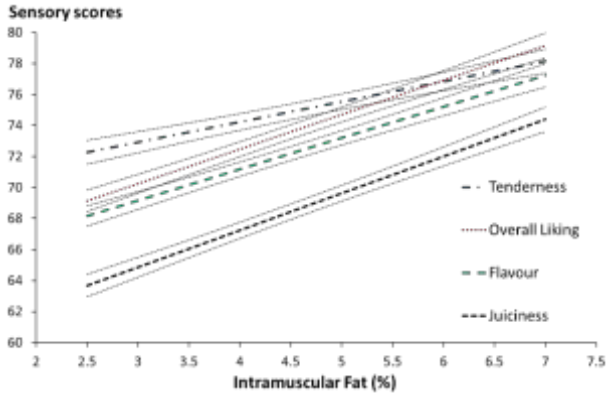

Figure 1: IMF% impact of the loin on consumer sensory scores.

Effect of sires on lamb eating quality

Sire had a significant effect on sensory score with a range of four consumer scores for flavour to 10 consumer scores for tenderness for both the loin and topside samples (Figure 2). These differences are sufficient to change the final consumer rating of the steaks and shows that genetic effects need to be considered in the development of an updated MSA lamb grading model.

Meat from terminal-sired lambs had the lowest sensory scores compared to maternal- and merino-sired lambs, reflecting the more intense selection pressure for more muscle and therefore higher lean meat yield. Terminal sired lambs have been shown to have less IMF%, which in part may be associated with the lower sensory scores.

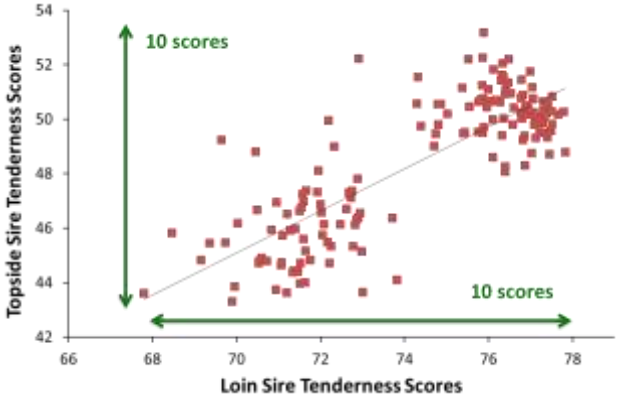

Figure 2: Sire variation on consumer tenderness scores for loin and topside. Each point represents the mean of all progeny from a sire.

Selection for more muscular and leaner animals using sire Australian Sheep Breeding Values has been shown to reduce the consumer sensory scores. This confirms the growing concerns that selecting for higher lean meat yield would reduce consumer eating quality and highlights the need for careful monitoring of selection programs to maintain high lamb eating quality.

Summary

Sensory scores increase with higher IMF%, higher fatness and lower muscling. These associations, together with the sire information, should be incorporated in the development of an enhanced MSA lamb grading model to better predict the lamb eating quality.

Further information

For further information please refer to the Intramuscular Fat fact sheet and the Sheep CRC Information Nucleus www.sheepcrc.org.au/genetic/summary-of-progress-in-genomics-and-genetics/information-nucleus.php

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