A CUT BY COOK EVALUATION OF MUTTON EATING QUALITY

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I. INTRODUCTION

Mutton, a sheep with at least 2 permanent incisors in wear, is typically viewed as a low quality product due to the negative impact animal age has on tenderness from increasing collagen crosslinks and insolubility [1]. Mutton eating quality assessment is often limited to one or two cuts and one cooking method [2,3]. However, it is well known that the impact of age affects cuts differently, and that cooking method influences eating quality [4,5]. This cut by cook interaction has not been well described in mutton across a variety of cuts. Pethick *et al.* [6] evaluated the variation in consumer scores for multiple commercial cuts in mutton cooked by the roast method and found that consumers did find mutton cuts acceptable but that scores varied for each cut. This study aimed to further explore consumer eating quality scores of various mutton cuts for different cooking methods.

II. MATERIALS AND METHODS

Merino 6-year-old ewes (n=110) were processed according to AUSMEAT standards. Mean carcase weight, GR tissue depth, intramuscular fat %, and ultimate loin pH was 19.2kg, 6.6mm, 6.0%, and 5.8 respectively. Carcases were boned out 7 days post-slaughter into 8 different commercial cuts including loin, knuckle, rump, topside, outside, rack and shoulder. After preparation the cuts were vacuum packed, aged for a further 3 days and then frozen (10 days aging in total). Some cuts (loin, knuckle rump, topside, outside) were cooked using a Western grill method, which were sliced into 15mm thickness steaks prior to grilling on a Silex grill. Remaining cuts (topside, shoulder, rack cutlet) were roasted using an Electrolux oven and sliced into 4mm slices after cooking [7]. The exception to this was the rack cutlet cut, which was roasted but served on the bone approximately 25mm thick. Untrained consumers evaluated meat samples for tenderness, juiciness, liking of flavour, and overall liking on a scale line of 0 (worst) to 100 (best). Each cut received 10 consumer scores for each eating quality trait and a rating of 2 star (unsatisfactory), 3 star (good everyday), 4 star (better than everyday), or 5 star (premium). Eating quality scores were analysed in linear mixed models with cut included as fixed effect, consumer ID and animal ID included as random terms.

III. RESULTS AND DISCUSSION

As expected, there is a significant difference in eating quality traits between cuts. Grilled loin, knuckle and rump consistently rank higher for all traits compared to the topside and outside, while roast rack cutlets outperformed the shoulder and topside roast cuts (Table 1). Consumer scores for grilled loin, knuckle, and rump were higher on average than scores for grilled topside and outside. The topside cut roasted had 2.4 overall liking and 7.5 tenderness scores higher than grilled. Majority of consumers deemed all the cuts acceptable, with the percent of consumers scoring 3 star or higher ranging from 68% (topside) to 92% (loin). The loin, knuckle and rump cuts are deemed as high-quality cuts, consistently scoring well with consumers in meat from lamb, yearling and mutton when grilled [5,8]. They also rank higher than other cuts when roasted [6,8]. Similarly in this study, rack cuts in mutton scored higher than other cuts when roasted. This was also seen in Pethick *et al.* [6] where the rack roast scored the highest of all roast cuts. Eating quality scores in this study were higher than those seen in other studies, particularly the roast topside, which received an average overall liking score of

31.6 in Pethick *et al.* [6], compared to 54.4 in this study. Factors such as intramuscular fat %, ageing time, or consumer demographics may explain the higher scores in this study.

Table 1 The least square means and standard errors for the eating quality traits, and percentage of consumers that rated a 3 star or higher of the commercial cuts cooked by grill or roast from mutton Merino ewes.

Cut	AUS-MEAT Code	Cook	Tenderness	Juiciness	Liking of flavour	Overall liking	% star ratings >3
Loin	5150	Grill	66.1[1]	64.2[1]	66.5[1]	67.1[1]	92%
Knuckle	5072	Grill	66.2[1]	66.3[2]	64.9[1]	66.1[1]	90%
Rump	5074	Grill	53.9[2]	59.1[3]	60.8[2]	59.2[2]	83%
Topside	5077	Grill	45.1[3]	53.7[4]	54.9[3]	52.0[3]	68%
Outside	5075	Grill	49.6[4]	59.7[3]	56.7[4]	55.4[4]	76%
Rack Cutlet	4764	Roast	57.4[5]	57.7[3]	60.7[2]	58.8[2]	81%
Topside	5077	Roast	52.6[2,6]	51.9[4]	55.3[3,4]	54.4[4]	75%
Shoulder	5050	Roast	51.3[4,6]	47.1[5]	55.6[3,4]	53.8[3,4]	74%
SEM			0.98	0.90	0.83	0.88	

Cuts with different superscript numbers within eating quality trait are significantly different (P<0.05)

IV. CONCLUSION

Mutton eating quality is cut dependent and can be influenced by cooking method, as observed for the topside cut in this study. All mutton cuts tested were well acceptable for consumers as majority of the conusmers considered the cuts as ‘good every day’, ‘better than every day’ or ‘premium’ quality. Variation in cuts is expected and as such the new MSA sheepmeat model is geared on predicting the eating quality of each cut by different cooking methods for all ageclasses.

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