CHINESE CONSUMER ASSESSMENT OF SHEEP MEAT IN TRADITIONAL HOTPOT: THE ROLE OF MUSCULARITY AND INTRAMUSCULAR FAT %

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I. INTRODUCTION

China is one of Australia's primary sheep meat export destinations [1], hence it is important to understand the palatability of Australian sheep meat using popular Chinese cooking methods such as hotpot. Hotpot is one of the top three cooking methods for sheep meat in China [2]. Previous work using grilled lamb showed that lower carcass muscularity, reflected through *longissimus lumborum* (loin) weight adjusted for carcass weight, and increased intramuscular fat (IMF) had a positive influence on overall liking scores of sheep meat for Australian [3] and Chinese consumers [4]. Similarly, for Korean consumers, increasing IMF levels improved eating quality (EQ) in multiple beef cuts cooked by grill and thin slice traditional BBQ (Park et al. 2008). Thus it seems plausible that these animal factors are still likely to be evident using a hotpot cooking method. Therefore, we hypothesised that decreasing loin weight and increasing IMF would improve overall liking scores in untrained Chinese consumers using a hotpot cooking technique on Australian sheep cuts.

II. MATERIALS AND METHODS

Lambs and yearlings (n=214) were sourced from the Katanning and Kirby Meat and Livestock Australia genetic resource flocks, and were progeny of merino, maternal, and terminal sire types. Entire boneless shoulder (HAM No. 5055) and leg (HAM No. 5070) cuts were collected and aged for 10 days prior to frozen export to China. Each cut was trimmed to the same 50 x 50 x 100 mm block, and ten 1.6 mm slices were prepared from each block for testing. Slices were cooked in unseasoned boiling water for two minutes. A total of 4,320 slices were served to 720 untrained Chinese consumers, who scored six slices each for overall liking on a scale of 1 to 100. Muscle weight and IMF was measured on all loin muscles and hot carcass weight recorded for each animal. Overall liking scores were analysed using linear mixed effects models in SAS with fixed effects of muscle type, sire type within age class, sex within age class, and site. Random terms included animal identification within sire, and consumer identification within grill session. Loin muscle weight corrected for hot carcass weight was used as an indicator of muscularity and along with IMF were tested separately as covariates in this model

III. RESULTS AND DISCUSSION

Overall liking was 3.7 units greater in shoulder cuts (66.7) than leg cuts (63) for the hotpot cooking method ($P<0.01$). Shoulder cuts had much greater overall liking in hotpot cooking, than scores previously reported by Australians consuming roasted forequarter (60 or less) [5]. Alternatively, for leg cuts tested in hotpot, the overall liking scores were similar to those reported for roasted legs bone-in (63.6) tested by Australian consumers [5].

In agreement with our hypothesis, increased muscularity had a negative impact on overall liking ($P<0.05$) scores of both shoulder and leg cuts which decreased by 5.9 points across a 400 g increase in loin weight (Table 1). Loin IMF percentage demonstrated a positive relationship with EQ ($P<0.05$; Table 1), with overall liking of shoulder and leg cuts increasing by 5.6 scores from 2.5 to 7 percent IMF. These results were similar to previous reports of decreased EQ with greater muscularity for Australian consumers testing grilled samples [3], despite the different consumers groups, cooking style and muscle types utilised in each study. Similarly, the positive impact of higher IMF levels on EQ, corresponds to previous research in Chinese consumers testing grilled loin and topside samples [4]. Therefore, the thin slicing of meat and hotpot cooking method did not eliminate intrinsic quality attributes associated with muscularity and IMF, a finding consistent for both cuts.

Table 1. Association between average overall liking scores (± s.e.) of the shoulder and leg cuts with loin weight adjusted for hot carcass weight, and intramuscular fat %.

Loin weight (g) adjusted for HCWT	Overall liking score		Intramuscular fat %	Overall liking score	
	Shoulder	Leg		Shoulder	Leg
240	71.4 ± 2.4	68.3 ± 2.4	2.5	62.3 ± 1.6	58.6 ± 1.6
340	68.4 ± 1.2	65.5 ± 1.1	3	63.5 ± 1.2	59.8 ± 1.2
440	66.3 ± 0.7	63.7 ± 0.7	4	65.4 ± 0.8	61.8 ± 0.8
540	65.2 ± 1.5	62.8 ± 1.5	5	66.8 ± 0.7	63.2 ± 0.7
640	65.0 ± 2.6	62.9 ± 2.6	6	67.6 ± 0.7	64.0 ± 0.7
			7	67.9 ± 0.8	64.2 ± 0.8

IV. CONCLUSION

These findings demonstrate that the shoulder cut performs well when cooked using a traditional Chinese hotpot method, providing a potential opportunity for new product placement in the hotpot restaurant and retail sectors. In addition, for producers supplying the Chinese market, these results emphasise the importance of balanced selection for carcass attributes such as muscularity and IMF to maintain eating quality and consequently ensure continued consumer satisfaction.

ACKNOWLEDGEMENTS

The authors would like to thank the Cooperative Research Centre for Sheep Industry Innovation, Meat and Livestock Australia and associated organisations for funding, and technical support.

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