

IMF AND EATING QUALITY IN SHEEPMET: A COMPARISON OF AMERICAN, CHINESE AND AUSTRALIAN CONSUMERS

R. O'Reilly^{12*}, L. Pannier¹², G.E. Gardner¹², A.J. Garmyn³, R.H. Jacob⁴, H. Luo⁵, Q. Meng⁵, M.F. Miller³
and D.W. Pethick¹²

¹Australian Cooperative Centre for Sheep Industry Innovation. Armidale, Australia;

²School of Veterinary and Life Sciences, Murdoch University, Murdoch, Australia;

³Texas Tech University, Animal and Food Sciences, Lubbock, USA;

⁴Department of Agriculture & Food Western Australia, South Perth, Australia;

⁵China Agricultural University, College of Animal Science and Technology, Beijing, China.

*Corresponding author email: r.oreilly@murdoch.edu.au

Abstract – The USA and China are Australia's strongest sheepmeat export markets, however insights into consumer perceptions of Australian sheepmeat are limited. IMF and shear force are good indicators of eating quality for Australian consumers however the relationship for American and Chinese consumers is unknown. Eating quality scores (tenderness, juiciness, liking of flavour, and overall liking) were obtained from American, Australian, and Chinese consumers for *Longissimus lumborum* and *semimembranosus* muscles collected from Australian sheep (n=328). Shear force was negatively associated with all sensory traits, consistent for all countries. Whereas, increasing IMF levels had a positive impact on all eating quality scores for all countries, however the most significant change was observed for Australian consumers indicating their higher sensitivity towards IMF differences.

Key Words – Cross-cultural, lamb, sensory.

I. INTRODUCTION

The USA and China are Australia's most valuable export markets for chilled and frozen sheepmeat products [1], yet international consumer perceptions of Australian sheepmeat are poorly understood. Previous work in beef has demonstrated that perceptions of eating quality (EQ) differ between Australian and Korean consumers [2]. This may stem from greater sensitivity to intramuscular fat (IMF) among Australian consumers [3], who's palatability scores for tenderness, juiciness, flavour and overall liking have been shown to be particularly responsive to changes in IMF [3]. Additionally, Japanese consumers, respond negatively to branched chain fatty acids [4], which would off-set the positive relationship between IMF and eating quality traits. Thus extrapolating these Asian results to Chinese consumers we hypothesise that their eating quality scores would be less responsive to changes in IMF, than the eating quality scores of Australian consumers or the similarly Westernised palates of American consumers.

II. MATERIALS AND METHODS

Lambs and yearlings (n=328) were from the Kirby Meat and Livestock Australia genetic resource flock and consisted of maternal, terminal and merino sire types. Animals were slaughtered in two kill groups and the *longissimus lumborum* (loin) and *semimembranosus* (topside) muscles were collected and aged for 10 days prior to frozen transport to the USA, China and within Australia. Untrained consumers, 720 per country divided across 12 tasting sessions, tasted and scored six grilled samples for tenderness, juiciness, liking of flavour, and overall liking on a scale of 1 to 100. Each animal was represented by a loin and topside in two countries at all times and each cut was sampled ten times. IMF and Warner Bratzler shear force (WBSF) were measured on loin samples. EQ data was analysed using linear mixed effects models in SAS with fixed effects of country, muscle type, sire-type within age class, sex within age class, and kill group. Random terms included sire, tasting session within country, and animal identification.

III. RESULTS AND DISCUSSION

Loin IMF had a significant positive association with all sensory traits, across all countries ($P < 0.001$). Between 2.5% and 9% loin IMF, consumer scores for tenderness, juiciness, flavour and overall liking increased by 7.9, 5.8, 7.2, and 6.7 scores in both loin and topside muscles. This highlights IMF as a strong driver of eating quality confirming

previous findings [3]. In agreement with our hypothesis, Australian consumers demonstrated a stronger response to changes in IMF% compared to Chinese consumers, yet contrary to our hypothesis the American consumers were similar to the Chinese. Thus for tenderness, flavour, and overall liking (Fig. 1a), the Australian consumer scores increased by 2.2, 1.8, and 1.8 scores per 1% increase in IMF, contrasting with an increase of 0.8 scores or less for Americans and Chinese consumers across each of these traits ($P < 0.05$). The response among Australian consumers across the sensory traits was about 5% less than that previously reported by Pannier *et al.* [3].

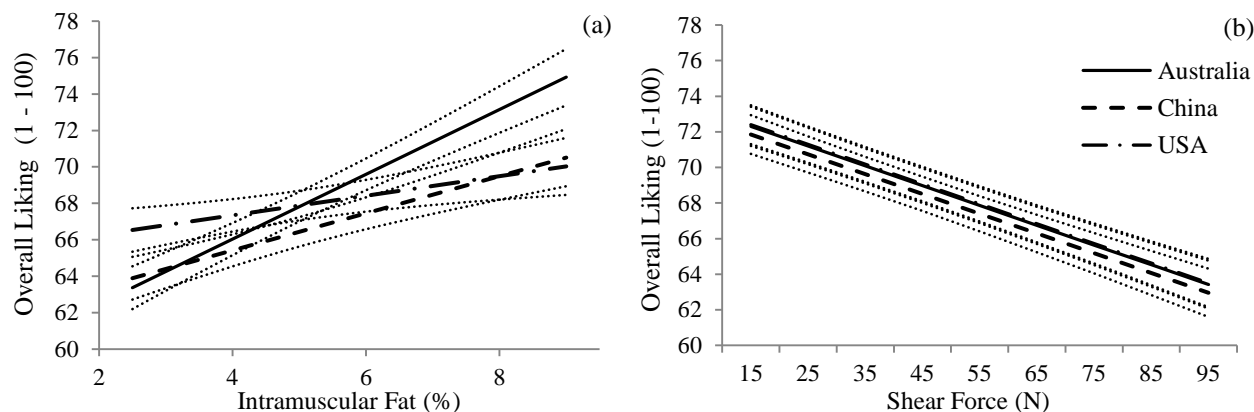


Fig. 1. Association between overall liking scores for American, Chinese, and Australian consumers and Intramuscular Fat % (a), and Warner Bratzler Shear Force in (b). Lines represent predicted means of loin muscle (\pm s.e.).

Increasing WBSF from 15-95 N was associated with decreased tenderness, juiciness, liking of flavour and overall liking of loin samples by 17.6, 8.6, 5.5, and 8.9 eating quality scores ($P < 0.0001$), yet in contrast to IMF this was consistent across all countries (Fig.1b). Given that there was no variation in the response to WBSF between countries, the variation observed for IMF between countries may be a reflection of the inherent correlation between consumer scores with flavour most strongly linked to IMF changes. This would support the assertion that Asian consumers are more sensitive to branched chain fatty acids.

IV. CONCLUSION

Increasing IMF showed a positive impact on all eating quality traits regardless of cultural background, however Australian consumers demonstrated the greatest sensitivity towards IMF changes. Results indicate sheepmeat producers supplying the Australian domestic market would yield the greatest improvements in eating quality by breeding for higher IMF, where other factors along with IMF likely contribute to perceived eating quality for American and Chinese consumers.

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 data collection support.

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