Factors influencing consumer assessment of wet and dry aged Merino cull ewe meat eating quality

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Introduction: Increasing Australian consumer demand for mutton will improve returns for producers and industry sustainability. Dry ageing mutton purportedly enhances its eating quality and consumer appeal. However, the optimal dry ageing process has not been defined in terms of consumer acceptability. Therefore, an investigation into the effect of AM (ageing method, dry vs wet), and AP (ageing period,14-56 days) on the eating quality of two muscles (LTL (longissimus thoracis et lumborum) and SM (semimembranosus)) was conducted.

Materials and methods: The mutton processing conditions are described in Hastie et al. (2021). Merino cull ewe carcases (n=81) were characterised for IC (insoluble collagen content), IMF (intramuscular fat content), fat score (subcutaneous fat depth),TM (total moisture) and ASBVs (Australian sheep breeding values). Leg and loin primals were wet or dry-aged for 14, 28, 42 or 56 days. After ageing, the LTL and SM were excised; each muscle provided 10 samples for consumer assessment. Consumers (n=540) assessed 3240 grilled samples for EQ (eating quality; tenderness, juiciness, liking of flavour and overall liking) on a 0-100 scale using Meat Standards Australia protocols (Hwang et al., 2008; Polkinghorne et al., 2008; Thompson et al., 2005). Consumer EQ data was analysed by AHC (agglomerative hierarchical clustering). For each EQ attribute, a parsimonious mixed model was fitted for the experimental factors and further models were developed for the LTL and SM incorporating the experimental factors, consumer clusters, carcase characteristics and ASBVs influencing EQ ($P<0.05$).

Results: Experimental factor modelling found LTL rated higher than SM for all EQ parameters ($P<0.001$). LTL achieved >70 for all EQ attributes. AP affected tenderness only ($P = 0.002$), and AM was not significant for any EQ attribute.

Three consumer clusters were identified by AHC; cluster 1 (n=220) = dry aged mutton preferers, cluster 2 (n=240) = no preference for AM, and cluster 3 (n=80) = wet aged mutton preferers. Inclusion of the consumer clusters in the LTL and SM models affected all EQ assessments ($P<0.001$ for all). The interaction of cluster with AM also affected all EQ attributes ($P<0.001$ for all).

Tenderness scores of LTL and SM were negatively affected by IC ($P<0.001$ for LTL, $P=0.003$ for SM). LTL tenderness increased with IMF and SM tenderness increased with post weaning eye muscle depth. Optimum tenderness liking was achieved for LTL at 56 days and for SM at 42 days. Juiciness liking improved in LTL with increasing IMF and fat score and decreased for SM with increasing TM. LTL liking of flavour and overall liking increased with IMF and decreased with higher IC. For SM, AP influenced liking of flavour and tended to affect overall liking.

Conclusions: Mutton LTL regardless of AM had good EQ. However, AHC indicated dry ageing is a polarising treatment, increasing mutton's appeal for some consumers, and decreasing its appeal for others. Modelling the EQ drivers for SM and LTL highlighted the attributes driving consumer response for LTL and SM, e.g. flavour and overall likings were driven by AP for SM, and by IC and IMF for LTL.

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