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Influence of dry versus wet ageing of sheepmeat on eating quality (#483)

Melindee Hastie[1], Robin Jacob[2], Steve Bonney[3], Long Huynh[4], Rod Polkinghorne[5], Hollis Ashman[1], Damir Torrico[1], Minh Ha[1], Robyn Warner[1]

[1] the University of Melbourne, Faculty of Veterinary and Agricultural science, Melbourne, Australia; [2] Western Australian Governement, Department of Primary Industries and Regional Development, Perth, Australia; [3] Norlane Trading ltd., Melbourne, Australia; [4] Meat and Livestock Australia, Sydney, Australia; [5] Birkenwood International Pty. Ltd, Melbourne, Australia; [6] the University of Melbourne, Faculty of Veterinary and Agricultural science, Melbourne, Australia; [7] the university of Melbourne, Faculty of Veterinary and Agricultural science, Melbourne, Australia; [8] the university of Melbourne, Faculty of Veterinary and Agricultural science, Melbourne, Australia; [9] the university of Melbourne, Faculty of Veterinary and Agricultural science, Melbourne, Australia

Introduction

Dry ageing has been successfully utilised by the beef industry to produce premium beef products that can demand premium prices. Potentially sheepmeat could also benefit from the application of dry ageing technology there is, however, little information available on the eating quality of dry aged sheepmeat or optimum ageing period in terms of consumer liking. Therefore, an investigation into the influence of ageing method and ageing time on the consumer response to dry and wet aged grilled *semimembranosus* (SM) and *longissimus thoracis et lumborum* (LTL) was conducted.

Methods

96 multipurpose merino cull ewes, with known ASBV (Australian sheep breeding values), ranging from 3-8 years of age, were slaughtered. Hot carcase weight (HCWT) and fat score were recorded the day after slaughter. The loins and legs from both sides were subsequently removed and processed into primals (loins, HAM number 4840 and legs, HAM number 4810), as described by Ausmeat (2005). Legs and loins were assigned either to dry or wet (bone-in for both) ageing treatments and to ageing periods of 2, 4, 6 or 8 weeks. Dry ageing was conducted at 0 -1.0oC, RH of 80-85%, airspeed 0.12 – 3.0 m/sec. Wet aged primals were vacuum packed into cryovac bags and aged in a cold room at 0.5 - 2.0oC. At completion of designated ageing periods the SM and LTL were separated from the primals, vacuum packed and stored at -20oC until sensory testing. 540 consumers were recruited for 9 sensory testing sessions. Demographic data was collected from all participants before commencing tasting using the methods described by Hwang et al. (2008). Briefly, samples were thawed, cut into 1.5 cm steaks, and allocated to sensory sessions using an incomplete Latin Square. Grilled LTL and SM samples were presented to consumers prepared using the cooking and sensory evaluation protocols described by Thompson et al. (2005) and Watson et al. (2008) respectively. For each sample, consumers rated eating quality on a 1-100 scale for tenderness, juiciness, liking of flavour and overall liking. Upon completion of the tasting assessment, consumers were asked to grade the quality of the sample as "unsatisfactory", "good everyday quality", "better than everyday quality" or "premium", by checking a box. Questions about "Willingness to pay" for each of the quality grades were included at the end of the tasting sessions as described by [RW1] Bonny et al. (2017), where consumers were asked to mark on a scale the AUD / Kg they would be prepared to pay for each of the quality grades. All statistical analyses were performed using REML in GENSTAT (16th Edition).

Results

For all consumer eating quality traits (tenderness, juiciness, liking of flavour and overall liking), there was no difference between dry and wet ageing treatments (P>0.05; results not presented). However, muscle (LTL or SM) influenced all sensory attributes significantly (P <0.001) with LTL consistently scoring higher than SM. Ageing period influenced tenderness (P = 0.040), and there was a trend for ageing period and muscle to interact (P = 0.091). Extending the ageing period from 2 to 8 weeks produced higher scores for tenderness of LTL but not SM. There was also a tendency for flavour liking to increase with ageing period (P =0.057). For the quality grading questions, on average, consumers rated LTL "better than good everyday quality "and SM as "good everyday quality". For the willingness to pay questions, consumers indicated (on average), they were willing to pay 1.4 times more for "better than everyday" meat when compared to "good everyday" quality meat. This indicates there may be a potential price uplift for "premium" mutton cuts such as loin.

Conclusion

Whilst the untrained consumer panel was not able to differentiate dry from wet aged sheepmeat using the eating quality assessment methods described, there were a number of consumers within the panel who demonstrated a clear preference for dry aged mutton. Further investigation of the consumer flavour descriptors for dry vs wet aged mutton is warranted.

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Notes

Batch	Formulation*	Day	Cooking method	Hardness (N)	Cooking yield (%)
1	2.7%SF-18.2% water	1	Grill	-	73.8
	2.7%SF-18.2% water	4	Grill	-	82.1
	2.4%SF-28.0% water	1	Grill	-	70.0
	2.4%SF-28.0% water	4	Grill	-	69.8
2	1.4%SF-18.4% water	0	Oven	25.5	79.8
	1.7%SF-0.0% water	0	Oven	29.4	74.9
	1.5%SF-10.2% water	0	Oven	20.5	70.8
	2.5%PS-25.0% water	0	Grill	8.7	83.5
	2.5%PS-25.0% water	0	Oven	16.0	72.5
	1.4%PS-14.5% water	0	Oven	15.8	76.6
	1%PS-14.5% water	0	Oven	11.0	68.0
	1.8%SF-1.4% PS-18.1% water	0	Oven	20.4	82.5
	1.4%SF-1.4%PS-18.2% water	0	Oven	16.8	81.2
	1.3%SF-2.7% PS-17.9% water	0	Oven	7.8	81.2

*SF= sugarcane flour, PS= potato starch

Table 1.
Hardness and cooking yield of beef patties formulated with sugarcane f
lour, potato starch or combination of both.

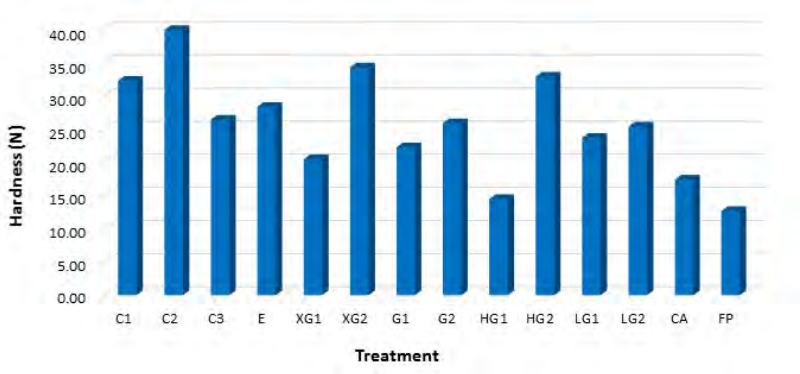

Figure 1.
Hardness of beef patties influenced by various formulations and cooking methods (grilled, G vs oven-cooked, O). C1=10% water-G; C2=10% water-O; C3=0% water-O; E=10% egg- 0% water-O; XG1=0.005% xanthan gum, 15% water-G; XG2=0.005% xanthan gum,15% water-O; G1=0.05% gelatine,15% water-G; G2=0.05% gelatine,15% water-O; HG1=0.10% High Acyl gellan gum, 19% water-G; HG2=0.10% High Acyl gellan gum, 19% water-O; LG1=0.10% Low Acyl gellan gum, 19% water-G; LG2=0.10% Low Acyl gellan gum, 19% water-O; CA=0.10% carrageenan, 19% water-G; FP=Functional Patty,4% Davidson´s plum powder, 1.3% SF, 18% water-O.

Notes

Muscle	Ageing period (AP)				SED	F-value		
	2 weeks	4 weeks	6 weeks	8 weeks		AP	Muscle	AP* Muscle
Tenderness								
LTL	71.88	73.50	75.30	77.66	1.909	**0.040**	**<0.001**	0.091
SM	51.63	56.65	55.31	54.66				
Flavour liking								
LTL	71.91	73.97	73.35	73.49	1.719	0.057	**<0.001**	0.151
SM	59.16	60.10	59.84	56.68				
Overall liking								
LTL	72.28	74.56	74.18	75.12	1.752	0.237	**<0.001**	0.175
SM	57.72	60.07	58.67	57.04				
Juicy								
LTL	71.04	72.01	71.39	72.68	1.825	0.508	**<0.001**	0.373
SM	59.75	62.92	61.54	60.65				

Table 1
Table 1: Effect of ageing period (AP; 2, 4, 6, 8, weeks) and muscle (LTL, *longissimus thoracis et lumborum*; SM, *semimembranosus*) and their interactions on predicted means for consumer sensory scores. The SED given is for the interaction.

Notes