

Tenderness of Meat from Extensively Raised Goats

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The fact that goats have the ability to survive and reproduce under adverse environmental conditions (Schönfeldt *et al* 1993) makes goat production extremely attractive to Australian farmers who operate grazing enterprises in rangeland areas. However consumer demand for tender meat is often not satisfactorily met by goat meat (Schönfeldt *et al* 1993) with goat meat being tougher than sheep meat (Webb *et al* 2005). Given this fact and a desire to target the higher value table meat market, the Australian goat industry is investigating methods to enhance the eating quality of goat meat. One strategy to improve tenderness is to age the meat for a period of time with key enzymatic changes leading to degradation of myofibrillar proteins and improvements in tenderness (Hopkins and Geesink 2009). There is a paucity of work on the gains from extended ageing of meat from Australian rangelands goats, but work in the US by King *et al* (2004) showed that ageing goat meat for 14 days was required before tenderness levels even approached acceptable levels. The aim of this study was to examine whether ageing could be used to produce goat meat with acceptable tenderness levels, when the goats represent those produced under rangeland conditions.

In total 64 female goats from two different consignments (32 from each) of varying backgrounds and ages were killed over two days at a commercial abattoir with one consignment killed on each kill day. These kill days were two weeks apart. Both consignments of goats had been run under rangeland conditions and were not intensively farmed. The entire *m. longissimus thoracis et lumborum* (LL) (Anonymous 1998; HAM No. 5109) from both sides of the carcass were removed and sub-sampled at 24 h post-mortem. In kill one, samples were taken, vacuum packed and aged at 4°C for 2, 4 or 21 days, and where possible in kill two aged for 1, 2, 4 or 21 days. Samples (~65 g) were then frozen at -20°C until tested for shear force.

Table 1. Mean and standard deviation (SD) for shear force in Newtons according to ageing period

		Ageing period (days)	
1 day*	2 day	4 day	21 day
86.3 (15.1)	74.5 (18.9)	68.5 (18.7)	49.2 (17.2)

*animals from consignment 2 only.

In the current study the absolute values for shear force were very high and indicate that this goat meat would not on average approach being acceptable as a table meat unless aged for 21 days. In sheep meat Hopkins *et al* (2006) reported that to achieve a failure rate of 10% or less with consumers, shear force should be around 30 N or less. However in the present study even after 21 days of ageing the goat meat tenderness was less than ideal. This is not an isolated result for goat meat as Webb *et al* (2005) showed that it is tougher than sheep meat and in the study of King *et al* (2004) after 14 days of ageing the shear force averaged across all treatments was still 58 N. In the study of McKeith *et al* (1979) even the best combination of electrical stimulation and ageing (7 days) only reduced the shear force to 46 N. Clearly these results suggest that for the Australian goat industry to produce a high quality product from rangeland goats, a shift in management at both the production and processing level is required.

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