

The effectiveness of aging and electrical stimulation on tenderness in lamb loins

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Previous work (1) suggests that aging of lamb loins for 3 days produces satisfactory consumer tenderness regardless of the post slaughter chill regime. Given this, technologies such as electrical stimulation of lamb carcasses post slaughter, a procedure which improves tenderness by preventing cold shortening and causing accelerated postmortem tenderisation, have not been widely utilised in the Australian Lamb Industry. The aim of this study was to test the effectiveness of aging meat and electrical stimulation on tenderness in lamb loins.

Ninety-six animals were used to determine the effectiveness of varying levels of electrical stimulation and aging on the tenderness of lamb carcasses. Three carcass treatments were used: (control (no stimulation); low voltage stimulation; and high voltage stimulation) and two aging treatments (two days; and four days). The loins of each animal were divided in two, one half was evaluated using the trained sensory panel at Curtin University, and the other half was evaluated using Warner-Bratzler shear force tests.

	Control		High voltage stimulation		Significance of effect (P)	
	Days aging		Days aging		Stimulation	Days aging
	2	4	2	4		
Warner-Bratzler shear force (kg)	6.92 ± 0.47	5.66 ± 0.47	3.44 ± 0.39	3.03 ± 0.50	<0.0001	0.033
Taste panel tenderness	5.03 ± 0.30	5.40 ± 0.41	6.89 ± 0.33	6.78 ± 0.42	0.0005	Not significant

The comparison of the sensory panel's results to the shear force value taken on the same sample showed a significant ($P < 0.01$) negative correlation, such that as shear force increase the panel rating of tenderness decreases. High voltage stimulation halved the shear force measurements so that they fell within the accepted range for tender meat (shear force less than 5 Kg). The mean taste panel tenderness scores (1 = very tough to 10 = very tender) were increased significantly ($P < 0.01$) by high voltage electrical stimulation. Aging for 4 days showed a small but significant ($P < 0.05$) impact on shear force and no impact on taste panel tenderness.

The results indicate that high voltage stimulation is clearly superior to aging alone as a means for producing lamb with acceptable tenderness. Stimulation acts to prevent cold shortening and accelerate aging (1). The results may also be indicative of an increase in the rates of chill in commercial plants over the years resulting in increased incidence of cold shortening.

1. Shorthose WR, Powell VH, Harris PV. Influence of electrical stimulation, cooling rates and aging on the shear force values of chilled lamb. *Journal of Food Science* 1986;51:889-892.