THE EFFECT OF SELECTION FOR MUSCLING ON RATE OF PH DECLINE AND ULTIMATE PH IN LAMB CARCASES POST-MORTEM

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Selection for heavy muscling has been shown to promote the expression of type IIB muscle fibres (fast, glycolytic) in a number of species including pigs and cattle (Wegner *et al*. 2000). Type IIB fibres have greater glycolytic rates than in type I (slow, oxidative) or IIA (fast, oxidative) fibres. Therefore, the recent focus on selection for muscling in Australian meat sheep breeds could potentially impact on rate of pH decline (pHk) or ultimate pH (pHu) in post-mortem (PM) muscle.

A total of 152 four-month old lambs from 5 Breeds, ((Border Leicester x Merino) x Poll Dorset ((BLxM)xPD), Merino x Poll Dorset (selected for muscling; MxPD muscling), Merino x Poll Dorset (MxPD), Merino x Merino (MxM) and Merino x Border Leicester (MxBL)) were slaughtered under commercial killing conditions. All sires were selected for growth except the Poll Dorset sires that were selected for muscling. Lambs were weaned, and transported to the abattoir where they were kept in yards overnight under normal lairage.

After slaughter, pH measurements of the *M. longissimus thoracis et lumborum* (LL) were taken at approximately 0.75, 2, 3, 4.5, 6, 7.5, 9 and 10 h PM until the carcases reached rigor (pH 6.0). At 24 h PM, pHu measurements were taken on the LL and *M. semitendinosus* (ST) muscles. All pH values were adjusted to 25^{o}C using the formula of Briskey and Wismer-Pedersen (1961). The pH was then adjusted to assume glycolysis occurred at a constant temperature of 25^{o}C using the exponential equation described by Bendall (1978). From these functions, the exponential rate constant, pHk, was derived for each carcase based on time in day units.

Both pHk and pHu were analysed in a mixed model that had fixed effects for genotype and operator, and random effects for sire nested within genotype and body nested within (sire*day*operator). Carcasses with pHu > 6.0 were removed from the pHk analysis.

Table 1. Effect of type of animal on muscle pH decline rate (pHk) and ultimate pH (pHu) post mortem (least square means ± s.e.) (see text for details).

	(BLxM)xPD	MxPD muscling	MxPD	MxM	MxBL
M. longissimus thoracis et lumborum (LL)					
PHk	$4.30^{a} \pm 0.22$	$4.54^{a} \pm 0.23$	$4.64^{a} \pm 0.24$	$6.05^{b} \pm 0.25$	$4.99^{a} \pm 0.27$
PHu	$5.59^{a} \pm 0.24$	$5.67^{b} \pm 0.02$	$5.65^{ab} \pm 0.03$	$5.78^{c} \pm 0.03$	$5.72^{bc} \pm 0.03$
%pH > 5.9	0	3.13	3.57	7.69	7.41
M. semitendinosus (ST)					
PHu	$5.79^{a} \pm 0.039$	$5.91^{b} \pm 0.041$	$5.81^{ab} \pm 0.042$	$5.86^{ab} \pm 0.044$	$5.92^{b} \pm 0.043$

Values within rows with different superscripts are significantly different (P<0.05) using Fisher's LSD test

Genotypes with PD sires had lower pHu values than M sired genotypes (P<0.05), and lower pHk (P<0.05), resulting in the later carcases reaching pHu sooner. Second cross lambs ((BLxM)xPD) had the lowest pHu in the ST muscles. The incidence of pHu > 5.9 (LL) was greatest in the M and BL genotypes.

These results suggest that the selection of PD sires based on muscling does not adversely affect carcase pHk or pHu compared with lambs from sires selected for growth. Merino-sired lambs were the only genotype to demonstrate marked differences in the pH variables measured.

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