

**Clearance of an intra-venous dose of cysteine by Merino sheep
selected for higher clean fleece weight**

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Sheep with higher capacity for wool growth have been reported to maintain lower plasma cystine levels and to clear an i/v dose of cysteine more rapidly than lower capacity sheep (1).

We have examined these parameters in 2-year old Merino ewes, 6 each from an Armidale selection line (SA), a Cunnamulla line (SC) and a control line (US). They were given once daily 1 kg of lucerne hay (LH; 852 g DM) or mixed (3/2) wheaten and lucerne hays (WL; 835 g DM) in a crossover design. The diets contained (g/kg DM), respectively: OM 914, 921; DOM 637, 586; crude protein 165, 132. Blood was taken into heparin by jugular venipuncture at intervals throughout one day. Next day, one hour after feeding, each sheep was given an i/v injection of L-cysteine HCl; blood samples were taken before and at intervals for 3 hours after the dose. Plasma was separated, total cyst(e)ine was determined (2) and the increment in concentration due to the dose was calculated. Dose clearance was expressed both as the % decline of the increment per minute and as the volume of plasma cleared per minute, calculated as (dose / area under the increment v. time curve).

	Selection line			Diet		RSD	Significance (P)	
	SA	SC	US	LH	WL		Line	Diet
Live weight (kg)	43.7	40.9	37.6	40.8	40.6			
Plasma 'half-cystine' (µM)	93.5	87.8	93.5	93.7	89.4	10.72	NS	NS
Dose clearance (%.min ⁻¹)	4.3	4.2	3.7	3.7	4.4	0.42	< 0.05	< 0.01
(ml.min ⁻¹ .kg ^{-3/4})	45.1	46.3	38.6	41.8	44.8	6.42	< 0.05	< 0.10

By contrast with (1), plasma cystine levels did not differ between lines, nor were they affected by diet. Dose clearance provides an index of the capacity of the sheep to use extra cysteine; it should be greater in genetically superior sheep for any particular diet and when poorer quality diets are given. The results show both of these effects and are consistent with (1). Variation was quite high, RSD being 10-15% of the overall mean, probably because the measurements were made during the 4 hours following the daily meal rather than under steady-state conditions.

1. Williams AJ, Thornberry KJ. The clearance of cystine from plasma of sheep genetically different in wool production. Proc Nutr Soc Aust 1991; 16:214.
2. Williams AJ, Murison RD, Cross CC. Reactions of cyst(e)ine concentration in plasma of Merino sheep from two genetic groups to fasting and ACTH injection. Aust J Agric Res 1986; 37:657-663.