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## ACETATE AND GLUCOSE ENTRY RATES IN SHEEP FED A LUPIN SUPPLEMENT

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The high protein content of lupin seed has been suggested (Lindsay, 1976) to be the principal stimulus in dramatic increases in ovulation rate (OR) in ewes fed a lupin supplement of between 250 g/hd/d and 750 g/hd/d for six to seven days. Subsequently studies to describe the pattern of digestion of the lupin protein (Lindsay et al., 1980) and nitrogen balance (Searle and Graham, 1980) in sheep fed a lupin supplement were carried out. Studies in our laboratory (Rowe et al., 1983) suggest that increased metabolisable energy (ME) may be the more important nutritional stimulus in increasing OR. This study was aimed at measuring the entry rates of acetate and glucose in lupin supplemented ewes with the view of using the data to study the effect of intravenous infusion of the two substrates on OR.

Six mature Merino ewes (mean liveweight of 33 kg) were fed a pelleted basal ration 3-hourly to calculated ME requirements. Acetate and glucose biokinetics were determined by continuous intravenous infusion of  $[U-1^4C]$  acetate and  $[U-1^4C]$  glucose on respective days. Arterial blood samples were taken over a 4 h period after 6 h of infusion of each labelled isotope for measurement of concentration and specific radioactivity of acetate and glucose. The above procedure was repeated on the same six ewes after they had been on the basal ration plus 750 g/hd/d of lupin seed for 6 d.

Estimated ME intake (MJ/d) and arterial blood concentrations (mM) and entry rates (mmole/h) of acetate and glucose in ewes fed a basal and basal plus lupin diet

		Basal diet	Basal + lupin
Estimated ME intake		4.57	13.65
Arterial concentrations :	acetate	0.806 <u>+</u> 0.026	0.945 + 0.082
	glucose	$3.46 \pm 0.06$	3.78 + 0.14
Entry rates : acetate		90.1 <u>+</u> 3.3	155.5 + 9.5
glucose		$23.6 \pm 2.1$	$54.2 \pm 5.3$

There were increases in both arterial concentrations and entry rates of the two substrates when lupin supplement was fed. The increases in acetate and glucose entry rates were 73% and 130% respectively. Together these increases account for approximately 38% of the estimated ME value of the lupin supplement. It appears that there is great scope for nutritional manipulation for increasing OR if either or both these substrates are the principal nutritional stimulus in OR.

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