

FORMALDEHYDE TREATMENT OF LUPIN SEED

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Sweet lupin seed is a valuable, high protein supplement for ruminants, but much of its protein (c. 65%) is degraded in the rumen (Hume 1974). Furthermore it is low in sulphur-containing amino acids (SAA). In this study whole lupin seed (*L. angustifolius* cv Uniwhite) was treated with formaldehyde in an attempt to reduce the extent of protein degradation and increase the availability of SAA for wool growth.

Preliminary in vitro studies using a range of concentrations of formaldehyde, showed the optimum treatment to be 60 ml of 39% (W/V) formaldehyde in 2 l of water per kg of whole lupin seed. The lupins were soaked for 18 hours before drying at 50°C.

Eight Merino wethers, with rumen and duodenal cannulae, were fed approximately 400 g DM/day of a diet containing either treated or untreated lupin seed and oats day (1:2) for 26 days. Rate of wool growth was measured over the last 14 days. During the last seven days we measured nitrogen (N) balance, and flow of N through the duodenum using the inert marker Cr-EDTA.

TABLE 1 Utilization of dietary nitrogen and rate of wool growth by sheep fed on diets containing formaldehyde-treated (FT) or untreated lupin seed (means \pm SE)

	FT	UT
N intake (g/d)	9.54	8.11
Flow of N through duodenum (g/d)	14.03 \pm 0.93	7.54 \pm 0.68
Faecal N (g/d)	2.66 \pm 0.16	1.94 \pm 0.04
Apparent digestibility of N (%)	72.1 \pm 1.7	76.1 \pm 0.50
Urinary N (g/d)	4.99 \pm 0.29	6.15 \pm 0.50
N retention (g/d)	1.88 \pm 0.39	0.02 \pm 0.49
Wool growth (mg/cm ² /14 days)	5.38 \pm 0.53	6.00 \pm 0.29

Although there was a difference in intakes of nitrogen because of an error in formulating the diets, it is apparent that formaldehyde treatment greatly increased the flow of N from the stomach without impairing overall digestion. However, in these animals most of the extra N was apparently recycled to the rumen for in both groups there was limited utilization of the N apparently absorbed.

Formaldehyde treatment of lupin seed did not affect the rate of wool growth ($P > 0.05$). Supplementary methionine (1.5 g/d) given duodenally to sheep on the same diet containing untreated lupins increased wool growth by 22% (Hopkinson and Mackintosh unpublished results). However, formaldehyde treatment may not increase the availability of SAA, particularly when the content of these in protein is low (Barry 1976).

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