EFFECTS OF FEEDING FORMALDEHYDE TREATED SOYBEAN MEAL SUPPLEMENT ON NITROGEN BALANCE AND PORTAL ABSORPTION OF AMINO NITROGEN AND AMMONIA IN LAMBS

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Improved utilisation of protein supplements by ruminants can be achieved by protection of the proteins against degradation in the rumen. In most studies, the availability of the protected protein is assessed by growth performance data. However an accurate assessment of the availability should include quantitative measurements of the absorption of protein digestion products. In this study, the absorption of free amino nitrogen, ammonia nitrogen and nitrogen balance of lambs fed diets containing soybean meal either untreated or treated with formaldehyde (Bypass Stockfeeds, NSW) were examined.

Six cross-bred ewe lambs (25-30 kg liveweight) were surgically prepared by insertion of indwelling vascular catheters in the portal vein and an external iliac artery and by placement of an ultrasonic perivascular flow probe around the portal vein. After recovery, the lambs were fed a mixture of good quality lucerne, rolled barley and either treated or untreated soybean meal in a 3 x 2 switch-over design. The animals were fed ad libitum and the ratio of lucerne:barley:soybean meal was 60:10:30 (w:w:w). After a four day collection period for nitrogen balance measurements, portal blood flow was monitored continuously and the blood samples were collected at regular intervals for 7 hours post-feeding. The results are summarised in the Table.

Parameter Value	Untreated Soybean Meal	Treated Soybean Meal	SEM	P
Nitrogen balance (g/d)				
Nitrogen intake	67	62	4.6	0.027
Nitrogen lost in faeces	17	16	4.0	0.793
Nitrogen lost in urine	33	25	4.4	0.013
Nitrogen retained	17	21	5.8	0.629
Arterial concentration (mM)				
Alpha-amino nitrogen	4	5	0.3	0.041
Ammonia nitrogen	0.05	0.04	0.003	0.001
Portal absorption (mmol/7 hours)				
Alpha-amino nitrogen	411	357	91.4	0.590
Ammonia nitrogen	74	59	4.5	0.001

Portal absorption and arterial concentration of ammonia nitrogen and urinary excretion of nitrogen were significantly lower in lambs fed treated soybean meal suggesting reduced production of ammonia in the rumen. While a significant increase in the arterial concentration of alpha-amino nitrogen in the treated group suggested increased availability of amino acids, data on portal absorption of alpha-amino nitrogen did not support this conclusion. The results indicate that at least part of the protein in the treated soybean meal is absorbed in a form other than free amino acids.

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