THE SHORT-TERM RESPONSE IN NITROGEN BALANCE OF SHEEP FED A LUPIN SUPPLEMENT

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Lindsay (1976) reported that ewes supplemented with lupin grain showed a rapid increase in ovulation rate - 30% after six days of supplementation. As this response may be associated with increased protein intake, the initial effect of lupin feeding on nitrogen balance was investigated.

Four thin adult wether sheep were removed from pasture, individually housed in metabolism cages and fed 750 g/day low quality wheaten chaff (5.2% crude protein) for three weeks. They were then supplemented with 400 g/day whole lupin seed (34% crude protein) for two weeks. Daily nitrogen intake and losses in faeces and urine were measured over the last week on the forage and during the period of supplementation.

Nitrogen losses in faeces and urine increased steadily for seven days after the start of supplementation and then declined to a relatively constant level (Fig. 1). The effect of this variation was to produce a change from a large apparent nitrogen balance of 15 g on the first day to a negative balance of 2 g on day seven, followed by a positive balance of 2 g from day ten onwards.

Apparent nitrogen balance must be accounted for by changes in body tissues and gut contents. As there was no large shift in faecal nitrogen in the two weeks of supplementation, the high initial balance must have been due to tissue retention rather than to an accumulation in the digesta. When milk was infused into the abomasum of adult sheep it took two or three days for urinary nitrogen excretion to reach a plateau (N.McC. Graham, unpublished). Furthermore, changing the protein intake of rats from low to high caused an increase in plasma amino acids on the first few days and then an increase in urinary nitrogen excretion (Harper 1968). It seems likely that an abrupt increase in protein supply induces a temporary high tissue retention of nitrogen pending the synthesis of degradative enzymes in the liver as suggested by Harper (1968). The unanswered question is whether the metabolic consequences of this series of events could affect the maturation of ovarian follicles.


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