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Summary only

FACTORS INFLUENCING NITROGEN FLOW FROM THE RUMEN

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The passage of non-ammonia nitrogen (NAN) from the rumen of sheep has been examined from unpublished and published data obtained in this laboratory and elsewhere. Information from these studies showed:

(1) A range of feeds containing more than about 13% crude protein (CP) could be divided into two categories: a high soluble N group (fresh perennial ryegrass, white clover, a *Lotus corniculatus* variety (Empire) of low condensed tannin (CT) content and a casein containing feed), and a low soluble N group (dried forage hays, a fresh *L. corniculatus* variety (Maitland) of high CT content, barley-based feeds and formalin-treated casein containing feed). Within each group the daily NAN flow (% N intake) [ $Y$ ] was linearly related to the apparent fractional outflow rate of the rumen OM pool ( $FOR = \text{duodenal OM flow rate} - \text{rumen OM pool size, d}^{-1}$ ) [ $X$ ]. The relationships for the high soluble N group,  $Y = 7.5 + 48.6X$ , and the low soluble N group,  $Y = 36.5 + 39.1X$ , showed similar values for the slope but different intercept values.

(2) That the lower NAN flow usually associated with the high protein solubility of fresh herbage can be overcome by the presence of CT in the feed. Thus, in sheep fed fresh *L. corniculatus* (Maitland) the higher level of CT (1.46 vs. 0.26% DM) resulted in decreased protein solubility and consequently a decreased rumen  $NH_3$  pool size; decreased protein degradation in the stomach; and an increase in the proportion of N consumed that was retained by the animal.

(3) Assessment of available evidence indicates that the increased NAN flow with higher FOR values is a consequence of the increased flow of undegraded dietary N and the increased yield of microbial N per unit OM apparently digested in the rumen.

(4) Dry feeds containing low "available" N (*i.e.*, less than about 13% CP or a major proportion of CP as HCHO-treated protein) exhibited greater NAN flows than would be predicted by the above relationship. This is interpreted as being due to influence of N recycling on these diets.