

DEVELOPMENT OF RUMINAL THIAMINASE TYPE 1 ACTIVITY IN GRAIN FED SHEEP

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A previous report has shown high levels of thiaminase type 1 activity in rumen liquor from polioencephalomalacia (PEM) affected sheep in W.A. (Steele and Lambe 1979). Field outbreaks of PEM are commonly associated with supplementary grain feeding (McKenzie and Steele 1980). These findings led to the current investigation of the production of the enzyme in the rumen of grain fed sheep.

Merino ewe weaner sheep were fed oaten grain ad libitum without supplementary roughage. The sheep consumed an average of 1 kg of grain daily and had a weight gain of 31.5% during the 11 weeks of the experiment. Rumen liquor samples were taken from 56 sheep and thiaminase type 1 activity was monitored by a radiochemical assay (Edwin and Jackman 1974). Control sheep grazing a neighbouring cereal stubble paddock were also sampled. Thiaminase activity is dependent on a basic cosubstrate and the enzyme was assayed with and without exogenous cosubstrate to measure potential and actual enzyme activity in vivo.

Prior to grain feeding, the mean rumen liquor thiaminase activity was 75 mIU/l. After 1 week of grain feeding, a significant increase in mean thiaminase activity (1850 mIU/l) was found in 75% of the sheep. Actual thiaminase activity was 94% of potential, indicating that endogenous cosubstrate was available for the catalysis of thiamin in the rumen. Insignificant levels of thiaminase were found in the stubble grazing sheep.

It is concluded that thiaminase type 1 activity increases in the rumen of sheep during grain feeding, and this may be important in some PEM outbreaks in feedlot systems of fattening sheep.

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