

MEAN RETENTION TIME OF PARTICLE MARKERS IN THE RUMEN OF SHEEP

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Interpretation of the behaviour of markers that associate with particulate matter in the rumen is complicated by factors such as their exchange amongst particles and the size distribution of particles initially marked (Faichney 1986). We have compared the mean retention times (MRT) of two external markers, bound to a specified particle fraction by methods intended to prevent exchange amongst particles, with that of the internal marker indigestible acid-detergent lignin (IADL).

Three Texel wethers (45-60 kg liveweight), cannulated at the rumen and duodenum, were given 863 gDM/d of a diet prepared from rye-grass hay by hammer-milling followed by screening to remove dust; it was presented in equal meals at 3 h intervals. Rumen particles passing a 0.8 mm but retained on a 0.4 mm screen (fraction 3) in a wet-sieving procedure were labelled with ^{169}Yb (Ellis and Beever 1984, modified) or ^{51}Cr (Uden et al. 1980) and were given as a single rumen dose in periods 1 and 2 respectively; digesta samples were taken for assay at intervals for 96 hours. Rumen MRT was calculated from the marker concentration-time data by a numerical integration procedure. In period 3 MRT's of unabsorbed solutes, ^{169}Yb (infused as YbCl_3), IADL and fraction 3 IADL were determined as described by Faichney (1986). The results are shown in the Table:

Sheep	Rumen MRT (hours)					
	Solutes	^{169}Yb	IADL	IADL-fr3	^{169}Yb -fr3	^{51}Cr -fr3
A	11.2	12.6	26.4	16.3	15.0	14.3
B	14.6	18.9	39.6	24.3	28.4	26.6
C	11.5	12.2	29.9	18.1	19.7	21.2
Mean	12.4	14.6	32.0	19.6	21.0	20.7

The three markers of fraction 3 particles gave similar values. The MRT of infused ^{169}Yb , which exchanges readily amongst particles, was considerably less than the net value for all particles (IADL) and was less than the value for fraction 3. The binding methods used appear to have prevented marker exchange allowing the markers used to provide reasonable estimates of the MRT of particles entering a specified fraction in the rumen.

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