

THE EFFECT OF PHYSICAL FORM OF LUCERNE HAY
ON THE PASSAGE OF MARKERS THROUGH THE RUMEN OF SHEEP

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The grinding and pelleting of forages at any given intake results in a decrease in the extent of digestion in the rumen and an increase in the flow of protein to the duodenum (Thomson and Beaver 1980). On the basis of an interpretation of faecal marker excretion curves (Blaxter et al. 1956), these effects have been attributed, in part at least, to a reduction in mean retention time (MRT) of feed residues in the rumen (Thomson and Beaver 1980). However, direct measurements of rumen MRT's have revealed increases when forages are ground (Balch 1950 ; Weston and Hogan 1967).

Six Corriedale wethers (initial mean liveweight $43 \pm SE$ 1 kg), fitted with rumen and abomasal cannulae, were given chopped lucerne hay (ad libitum intake 75 ± 3 g DM/(d.kg^{3/4})) or the same hay ground and pelleted (ad libitum intake 98 ± 3 g DM/(d.kg^{3/4})) at rates ranging from 0.2 to 0.9 ad libitum. Rumen MRT's for a solute marker (⁵¹Cr-EDTA) and a particle-associated marker (¹⁰³Ru-phen) were calculated from the decline in their concentration in the rumen during the 2 d following termination of a continuous infusion.

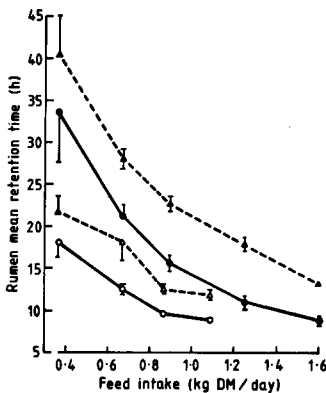


Fig. 1.

The effects of intake and grinding of lucerne hay on rumen MRT. Chopped O Δ; ground ● ▲; ⁵¹Cr-EDTA O-●; ¹⁰³Ru-phen Δ--▲. Vertical bars give standard errors.

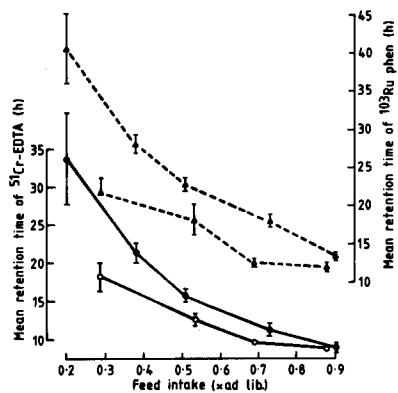


Fig. 2.

As expected, MRT's decreased as intake increased but, for both markers, MRT was less for the chopped hay at any given intake (Fig. 1). As intake approached ad libitum, the MRT's appeared to approach a common value for each marker independent of physical form (Fig. 2). These results confirm and extend earlier findings (Balch 1950; Weston and Hogan 1967). As the extent of digestion in the rumen usually decreases when forages are ground (Thomson and Beaver 1980), these results suggest that the rate of digestion declines when forages are ground, perhaps as a result of changes in the structure of the rumen microbial population associated with the decrease in MRT.

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