

DIGESTIBILITY OF RUMINAL MICRO-ORGANISMS

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The ruminant animal derives its essential amino acid requirements by digesting microbial protein and undegraded dietary protein that enters the small intestine from the forestomachs. Estimates of digestibility of bacterial N in the intestines of sheep and cattle are variable (see Salter and Smith 1977; Hagemeister et al. 1980) and this variation may have a marked effect on N utilisation and retention by the ruminant.

In the present study, estimates of apparent digestibility and retention of microbial monomers were made using ^{35}S (Expts 1 and 2) and ^{15}N (Expt 3) in sheep given a ration (g/d) of 300 oaten chaff and 327 sucrose in hourly feeds. Bacteria (in the fluid phase or attached to particulate matter) in the rumen of a sheep were labelled by continuous intra-ruminal infusion of $\text{Na}_2^{35}\text{SO}_4$ (1 $\mu\text{Ci/ml}$; 0.22 ml/min) or $^{15}\text{NH}_4\text{Cl}$ (0.02 mmole $^{15}\text{N/ml}$; 0.15 ml/min). A sample of rumen digesta was taken from this sheep and bacteria were isolated, washed and then injected into the rumens of other sheep on the same diet. Faeces and urine were collected for 7 d and apparent digestibility and retention of ^{15}N - and ^{35}S -labelled materials within the animals were calculated. The results are given in the Table.

The apparent digestibility and retention in sheep of ^{15}N - and ^{35}S -labelled materials in rumen micro-organisms

	^{35}S (Expt 1)		^{35}S (Expt 2)		^{15}N (Expt 3)	
	Digestibility	Retention	Digestibility	Retention	Digestibility	Retention
Bacteria ¹	74	59	83	69	86	66
Bacteria ²	69	57	74	57	87	76
Protozoa	95	75	79	62	89	74

¹Bacteria isolated from ruminal fluid by differential centrifugation.

²Bacteria isolated from ruminal particulate digesta, by differential centrifugation, after incubation for 20 min at 37° in a buffer solution containing a detergent [Tween 80].

The apparent digestibility coefficients take account of N and S secreted by ruminal micro-organisms or released after lysis in the rumen, as well as during digestion in the small intestine or fermentation in the large intestine. It should be noted that some ^{35}S and ^{15}N may have been absorbed from the forestomachs and some recycled ^{15}N and ^{35}S may have been present in the faeces.

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