EFFECT OF DIET ON AMINO ACID COMPOSITION OF RUMEN BACTERIA

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Bacteria usually supply most of the amino acids (AA) available for absorption by ruminants. The N and AA composition of rumen bacteria has been reported to vary little with diet (Bergen et al. 1968; Storm and Orskov 1983). We have reassessed this finding in sheep eating a wider range of forages.

Rumen bacteria were isolated from sheep in two separate trials. In Trial 1, sheep were given, once daily, 900g oaten chaff with (OCU) or without (OC) 12g urea, or 700g lucerne chaff (LC). Sheep in Trial 2 were offered, ad libitum, a continuous supply of OC (different from Trial 1, OC2), LC, chopped meadow hay (MH) or chopped wheaten straw (WS). Bacteria were isolated from whole rumen contents by combining fluid with washings from solid particles, followed by differential centrifugation. The final bacterial pellet was resuspended in water and microscopic examination revealed only minimal contamination with feed. Amino acid analyses were performed in duplicate after hydrolysis with 6N HCl. AA concentrations were expressed as g/16g hydrolysed N. The table shows treatment means (s.e. below) for proportion of essential AA in total AA (EAA/Total) and total bacterial N. (All percentages refer to % in bacterial DM. EAA-N% was calculated assuming 80% of total bacterial N was AA-N).

	Trial 1:			Trial 2:			
Diet:	OCU	OC	LC	OC2	LC	MH	WS
EAA/Total	0.432	0.390	0.407	0.500	0.511	0.510	0.501
	0.008	0.007	0.014	0.004	0.006	0.007	0.014
Total N(%)	7.75	7.73	8.40	5.46	7.79	9.07	5.45
	0.189	0.310	0.556	0.180	1.064	1.628	0.395
EAA-N(%)	4.18	3.77	4.27	3.41	4.98	5.79	3.40
	0.132	0.149	0.239	0.074	0.545	0.879	0.106
n	4	4	4	3	3	3	2

n, number of individual sheep isolates

In Trial 1, urea supplementation of OC increased EAA/Total without changing total bacterial N. In Trial 2, EAA/Total was unaffected by diet but there was a non-significant trend for the lower N diets (OC2 and WS) to have lower total bacterial N. Relative to OCU, LC and MH, the EAA-N content of bacteria was reduced ($P<0.05$) by 24% on diets with N contents less than that needed to meet rumen N requirements (OC, OC2 and WS).

These results indicate that AA composition of rumen bacteria can be significantly influenced by diet, and that the quality of bacterial AA can be reduced in sheep eating low N forages.

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