

## THE INFLUENCE OF UREA INFUSIONS ON THE INTAKE OF ROUGHAGES BY SHEEP

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Rumen microbes require an adequate supply of ammonia for optimal activity. In vitro studies (Satter and Slyter 1972) and studies with artificial diets (Miller 1973) indicate that the minimal rumen ammonia concentrations required range from 50-230mg/l. There are no detailed data available however, to indicate whether these concentrations are adequate for ruminants consuming low quality roughage diets.

This paper examines the influence of infusing varying amounts of urea into the rumens of forage fed sheep on voluntary food intake, rumen ammonia concentrations, organic matter digestibility and nitrogen balance.

In each of two separate experiments, urea containing solutions were infused at varying rates into the rumens of five sheep fed chaffed Para grass (experiment A) or oaten chaff (experiment B). Experiment A was conducted using a randomised block design while a latin square design was used for experiment B. The crude protein content in the Para grass and oaten chaff were 27 and 50 g/kg, respectively.

Table 1 Effect of infusing different quantities of urea on DM intake, N-balance, rumen ammonia concentrations and organic matter digestibility in sheep fed diets of Para grass and oaten chaff

Urea infused (g/d)	DM intake (g/d)	NH <sub>3</sub> -N (mg/l)	OMD (%)	N-balance (g/d)
<b>Experiment A</b>				
1	678 <sup>a</sup>	5 <sup>a</sup>	39.6 <sup>a</sup>	-7.6 <sup>a</sup>
1.3	639 <sup>a</sup>	19 <sup>a</sup>	-	-
3.8	652 <sup>a</sup>	45 <sup>b</sup>	-	-
9.5	839 <sup>b</sup>	84 <sup>c</sup>	-	-
11.0	818 <sup>b</sup>	120 <sup>d</sup>	50.6 <sup>b</sup>	-0.15 <sup>b</sup>
<b>Experiment B</b>				
0	778 <sup>a</sup>	39 <sup>cd</sup>	56.1	-0.72 <sup>a</sup>
2	786 <sup>a</sup>	53 <sup>bc</sup>	54.0	-0.62 <sup>a</sup>
4	990 <sup>b</sup>	55 <sup>bc</sup>	59.1	1.21 <sup>b</sup>
6	981 <sup>b</sup>	74 <sup>b</sup>	57.7	0.54 <sup>ab</sup>
8	916 <sup>b</sup>	128 <sup>a</sup>	57.2	1.07 <sup>b</sup>

Values with different superscripts are significantly different (P < 0.05).

With the Para grass diet containing 27 g CP/kg an increase in voluntary food intake (VFI) occurred when the rate of urea infusion was raised from 3.8 to 9.5 g/day; whereas with the oaten chaff diet containing 50g CP/kg, VFI increased when urea infusion rate was increased from 2 to 4 g/d. The increases in VFI were associated with increases of rumen ammonia from 45 to 84 and from 53 to 55 mg/l in experiments A and B respectively. Urea infusion increased N-balance in both experiments but only increased OMD in experiment A.

The results indicate that for optimal rumen microbial activity of sheep fed roughage diets the rumen liquor NH<sub>3</sub>-N concentration needs to be between 50-80mg/l. They also support the results obtained by Elliott et al. (1983) who found that VFI was positively related to rumen ammonia levels up to a concentration of 70 mg/l in sheep fed a range of low quality roughages.

ELLIOTT, R., McMENIMAN, N.P., NORTON, B.W. and CALDERON CORTES, F.J. (1983). *Proc. Anim. Prod. Aust.* 15:000.

MILLER, E.L. (1973). *Proc. Nut. Soc.* 32: 79.

SATTER, L.D. and SLYTER, L.L. (1972) *J. Anim. Sci.* 35:273

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