

TRANSFER OF UREA FROM THE BLOOD TO THE GUT OF CATTLE

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Estimates of the rate of transfer of urea from the blood to the rumen and post-ruminal tract of sheep, achieved by use of ^{15}N - and ^{14}C -urea tracers, have been reported recently (Nolan and Leng, 1972; Norton *et al.* 1978). Similar estimates for cattle are not available and accordingly the following study was conducted.

Three Hereford steers, weighing approximately 200 kg, and prepared surgically with rumen and abomasal fistulae, received 125 g/h of chaffed pasture hay containing 1.4%N. The animals received no urea, or 11.6 - 14.1 g urea-N/d infused into the rumen or abomasum over three periods of 14 days, in a Latin square design. A similar group of three steers received urea into the abomasum plus 500 g/d of refined sucrose infused (15 l/d) into the rumen. Measurements of urea movements were made using ^{14}C - urea and $\text{NaH}^{14}\text{CO}_3$ over the final four days of each treatment using the methods of Norton *et al.* (1978).

TABLE 1. Urea movements (g N/d) and concentration (mg N/l) of plasma urea and rumen ammonia in Hereford steers

Treatment	Flux of plasma urea	Degradation of plasma urea		Concentration of	
		In rumen	In post ruminal tract	Plasma urea	Rumen ammonia
1. Control	34.0 ^a	11.3 ^a	8.7 ^a	118 ^a	60 ^a
2. Urea/rumen	47.1 ^b	8.6 ^b	16.7 ^a	173 ^b	127 ^b
3. Urea/abomasum	55.0 ^{bc}	14.1 ^{ac}	18.7 ^{ac}	179 ^{bc}	81 ^{ac}
4. Sucrose/rumen urea/abomasum	45.9 ^c	25.9 ^d	10.0 ^c	90 ^d	45 ^d

Means in columns not containing the same superscript are significantly different ($P < 0.05$); superscripts a, b refer to comparisons within treatments 1, 2 and 3; superscripts c and d refer to comparisons between treatments 3 and 4.

The table shows that the rate of transfer of plasma urea into the rumen was affected by the concentration of rumen ammonia and plasma urea, and by the amount of organic matter digested in the rumen. Transfer of urea to the post-ruminal tract was largely determined by the concentration of plasma urea.

The results suggest that the transfer of endogenous urea to the rumen of cattle is regulated to provide a concentration of rumen ammonia sufficient for microbial growth.

NOLAN, J.V. and LENG, R.A. (1972) *Br. J. Nutr.* 27 : 177

NORTON, B.W., MURRAY, R.M., ENTWISTLE, K.W., NOLAN, J.V., BALL, F.M., and LENG, R.A. (1978) *Aust. J. agric. Res.* (in press)

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