Table 5. In Vitro VFA Pattern.

Silage	Silage level (%)			
	100 (10 ppm)	75 (44 ppm)	30 (110 ppm)	15 (220 ppm)
	In vitro propionate (% of total VFA's)			
Control	16.0	16.1	18.8	20.7
Ensiled rumensin	17.8	22.2	26.1	28.2
Control and rumensin	21.3	24.2	27.5	29.1

Urea and Feeding Frequency

K. L. Mizwicki, F. N. Owens and B. J. Shockey

Story in Brief

The influence of frequency of feeding urea supplemented concentrate rations was examined using 20 finishing lambs in individual pens. Rations were approximately 80% concentrate with either 1% urea based ration or 3% urea present. The total rations were available free choice either 24 hours per day or in a 1 hour daily meal. Lambs fed the 3% urea diet for only 1 hour daily consumed 46% less feed and gained at less than 30% the rate of lambs fed either 1% urea or lambs with feed available 24 hours daily. Adding urea to the basal diet and feeding it for 24 hours each day, however, increasing intake by 23% and gains by 14% while depressing feed efficiency by 7%.

Introduction

There is an increased demand by livestock producers for an economical and efficient protein supplement for cows on winter range and for steers in the feedlot. Urea and other non-protein nitrogen compounds are usually cost-cutting alternatives. But under many feeding conditions, high urea supplements are fed in a single meal. More uniform intake of urea has been suggested to be beneficial. This study was designed to investigate the effect of frequency of feeding of a high urea ration on performance and supplement consumption of finishing lambs.

Materials and Methods

Twenty growing wether lambs weighing approximately 92 pounds were housed in individual pens and were fed as much as they would consume in a 1 hour meal or free choice over 24 hours every day for 41 days. The lambs were fed the basal 12% protein diet (Table 1) or this diet with 2% urea added. Weight gains and feed intakes were monitored.

Results and Discussion

Lambs meal fed the urea supplemented ration for only 1 hour daily had lower feed intakes (2.1 vs 3.4, 3.5, 4.3 lb.) than lambs on the other treatments (Table 2). Lambs fed this same ration but offered free access to it for 24 hours every day, rather than meal fed, ate the most feed of all groups. This indicates that frequency of feeding definitely influences the value of urea as a supplement. The depression in intake can be attributed to the bitter taste of urea as well as to physiological effects noted by other reports when a large dose of urea was fed or infused into the rumen.

Lamb gains paralleled feed intakes, being severely depressed with the meal fed urea supplemented ration. Feed efficiency displayed a similar trend as average daily gain.

One can calculate the amount of feed needed for maintenance and subtract this from the total feed consumed by the lambs. Then, the expected gain for a given level of intake can be calculated (Table 2). Comparing observed gain to expected gain suggests that reduced intake can explain the depressed gain and feed efficiency with the meal fed urea ration. But at both feeding frequencies, the urea supplemented ration produced slower than expected rates of gain and the basal ration gave faster than anticipated gains. No explanation for this decrease in ef-

Table 1. Ration Composition.

Ingredient	Amount, %
Corn, cracked	62.75
Alfalfa pellets	6.00
Cottonseed hulls	14.00
Soybean meal, 44%	10.00
Cane molasses, liquid	5.00
Salt, trace mineralized	0.5
Ground limestone	0.5
Ammonium chloride	0.5
Urea[1]	1.0
Dical phosphate	0.5
Aurofac—10	0.1

[1] The high urea diet contained 3% urea.

Table 2. Lamb Performance.

Ration	Low Urea		High Urea	
Feeding time	24 hr.	1 hr.	24 hr.	1 hr.
Starting weight, lb.	86.8	95.6	92.4	94.4
Daily gain, lb.	0.52[1]	0.61[1]	0.59[1]	0.17[2]
Daily feed, lb.	3.53[1]	3.39[1]	4.34[1]	2.13[2]
Feed/gain	6.82[1]	5.55[1]	7.35[1]	12.82[2]
Expected gain, lb.	0.51	0.48	0.68	0.22

[1,2] Means in a row with different superscripts differ statistically ($P<.05$).

ficiency of net energy use with urea supplementation is apparent.

In summary, higher urea rations fed once daily in a meal inhibited total feed and energy intake. Whether urea based range supplements similarly inhibit intake of dry winter range grass later in the day is uncertain. Increasing the frequency of intake of urea supplements should improve the overall energy balance of animals under feedlot or range conditions.

Niacin for Growing Sheep and Steers

F. N. Owens, K. L. Mizwicki and B. J. Shockey

Story in Brief

Niacin was added to high concentrate rations in three feeding studies. First, 63 growing lambs were fed a urea-supplemented 12% protein ration with 0, 250, 500 or 1000 parts per million (ppm) supplemental niacin. Daily gain and feed efficiency were improved slightly by supplementation. In a second trial, 72 steers were fed an 11% protein soybean meal supplemented ration with 0, 250 or 500 ppm supplemental niacin. Average daily gain and feed efficiency for the 117 day trial were 3.89, 5.32; 3.77, 5.32; 3.77, 5.30; and 3.72, 5.47 for the three levels of niacin.

Feed intake was depressed about 4% with added niacin with most marked depression during the first half of the trial. No significant effects on performance, carcass characteristics or rumen fluid composition were evident. In the third trial, 40 steers and heifers were fed a urea-supplemented 11.2% protein ration with 0 or 250 ppm supplemental