

LOW COST COW/CALF PRODUCTION

The Bulletin For Alumni Of The School

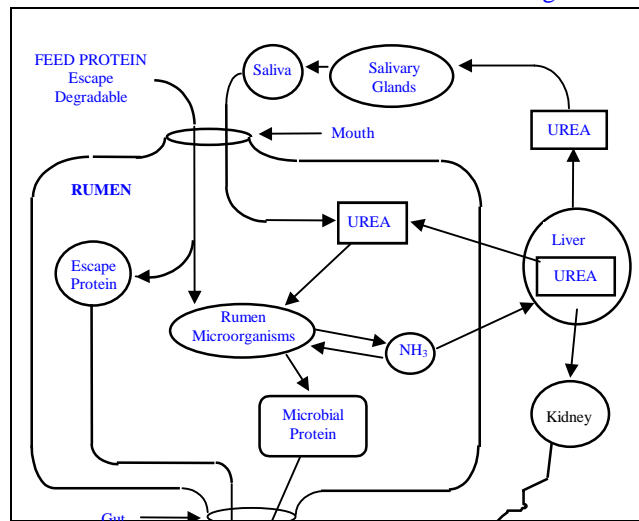
Volume 4

Number 9

More Energy Than NH₃

Not a Two Wheeler

A second neat part of the cycle is that it can go in the opposite direction. When the supply of NH₃ in the rumen is low relative to energy and amino acids cannot be formed, urea is dispensed into the rumen from the liver. Urea then is degraded to NH₃. The salivary glands concentrate urea so some urea enters the rumen via the saliva.



Recall the Urea Cycle? For a refresher, here it is again. Let's review how it works and see how management can put it to good use when supplementing with protein. A portion of feed protein that enters the rumen is degraded to ammonia (NH₃) by the rumen microorganisms. Together with a supply of energy (fatty acids), the microorganisms compound the NH₃ into amino acids. This is followed by the assembly of the amino acids into proteins which become part of the cellular structure and contents of the rumen microorganisms. This is termed Microbial Protein. Eventually, the microbial protein departs the rumen and enters the abomasum and small intestine where it is digested for utilization by the host animal.

So Why The Cycle

Feed protein that can be degraded will be degraded and NH₃ will be formed. NH₃ is toxic. It must not hang around in the free form too long or there will be trouble. There is not a problem as long as there is sufficient energy present in the rumen to form amino acids and subsequently, microbial protein. Should energy not be adequate, there enters one of the really neat parts of the urea cycle. The free NH₃ crosses the rumen wall and enters the liver where it is detoxified by conversion to urea. The urea can circulate harmlessly in the bloodstream throughout the body. It is called blood urea nitrogen (BUN).

The Simple Life

When supplementing with a source rich in degradable protein such as canola and soybean meals, must it be fed every day? Can the urea cycle take over on

Sunday? Researchers¹ at Clay Center, NE took a serious look at this possibility. Six ewes were fitted with indwelling catheters in three veins and one artery. This allowed for the measurement of nutrient flow from the rumen (and other portions of the gut) to the liver and back, and flow into the arterial circulation. All of the ewes were fed bromegrass hay (7.5% CP) ad libitum. One treatment was hay only. In the 2nd, the ewes were fed 162 g (0.357 lb) of SBM daily. The ewes in the 3rd treatment received 486 g (1.07 lb) of SBM every third day (72 hours). The total SBM fed to the latter two groups was the same over a three-day period. The blood analyses indicated that all of the NH₃ diverted from the rumen to the liver was converted to urea. Then, as needed, it was returned to the rumen via the saliva and directly across the wall of the rumen. The fact of the urea cycle and the impact of degradable protein on forage utilization are shown in the following table. Hay consumption was higher for both SBM supplemented groups (not quite as high with the 72-hr treatment but still good). To conclude, feeding the oil meal every 3rd day is good, every other day is better and every day is best.

¹ Krehbiel, C. R., C. L. Ferrell and H. C. Freetly. 1998. Effects of frequency of supplementation on dry matter intake and net portal and hepatic flux of nutrients in mature ewes that consume low-quality forage. J. Anim. Sci. 76:2464.

	Frequency of SBM supplementation				
	Daily or every third day				
	Day 1	Day 2	Day 3	Ave	
Intake g/d	No Supplement				
	Hay	614	616	609	613
	SBM	0	0	0	0
	Total	614	614	614	614
Nitrogen	7.4	7.7	7.5	7.5	
ME Mcal/d	1.49	1.50	1.48	1.49	
	SBM. 24 hour				
	Hay	692	698	679	690
	SBM	162	162	162	162
	Total	854	860	841	852
Nitrogen	21.2	21.4	20.9	21.2	
ME Mcal/d	2.2	2.21	2.16	2.19	
	SBM. 72 hour				
	Hay	597	655	672	641
	SBM	486	0	0	162
	Total	1083	655	672	803
Nitrogen	44.9	8.1	8.2	20.4	
ME Mcal/d	3	1.59	1.63	2.07	

Rumors

"I am going to Roswell tomorrow to pick up my first self-formulated supplement from Alderman Cave." Thank you, Ethan Fuchs, New Mexico.

Schools In 1998 - '99

Edmonton, AB January 18 - 21, '99

Red Deer, AB February 1 - 4, '99

Lethbridge, AB February 16 - 19, '99

Linda Lynch-Staunton

Beefbooster Management Ltd.
#226, 1935-32 Ave NE
Calgary, AB T2E 7C8

(800) 668-1529 or (403) 291-9771

Kirksville, MO March 22 - 25, '99

Tucson, AZ April 5 - 8, '99

Pratt, KS May 18 - 21, '99

Baker City, OR June 7 - 10, '99

Dick Diven

Agri-Concepts, Inc.
12850 N. Bandanna Way
Tucson, AZ 85737-8906

(800) 575-0864 or (520) 544-0864