LOW COST COW/CALF PROGRAM

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Consumption & Protein

Considerable time in the School is devoted to the necessity of dietary degradable protein in order to fully utilize forage (the land). The percentage of land that would not be utilized, due to a known deficiency of degradable protein, was calculated. The rumen microorganisms require degradable protein - not the cow. If the protein is degradable, it will be degraded. The primary end product of this degradation is ammonia (NH_3). When there is an excess of NH_3, relative to fermentable energy, it crosses the rumen wall and is detoxified in the liver by conversion to urea. Surpluses are excreted through the kidney. While in the rumen, NH_3 is used by the microorganisms to form amino acids and microbial protein. We suggest that the requirement for degradable protein should be 0.1 times energy consumed (Mcal of NEm).

Sources

Canola and soybean (SBM) meals are excellent sources of degradable protein. About 65% of the total protein contained in these meals is degradable. Conversely, cottonseed meal is not a good source of degradable protein. Researchers at Kansas State University[1] used soybean meal in a forage consumption study with steers and a body condition study with cows. In the consumption study, ruminally fistulated steers were offered ground tallgrass-prairie hay (CP=5.3) ad libitum. The forage was supplemented with one of five levels of SBM (0, .08, .16, .33 or .5% body weight). The results are shown in the following table. The actual lb amount of SBM fed daily is given in the first row. The third row indicates the quantity of degradable protein consumed daily from both forage and SBM. Forage intake is in the last row. The values indicate that as SBM was increased from 0 to 1.3 lb/d, daily intake of forage increased. Higher levels of SBM did not result in increased forage consumption. The requirement for degradable

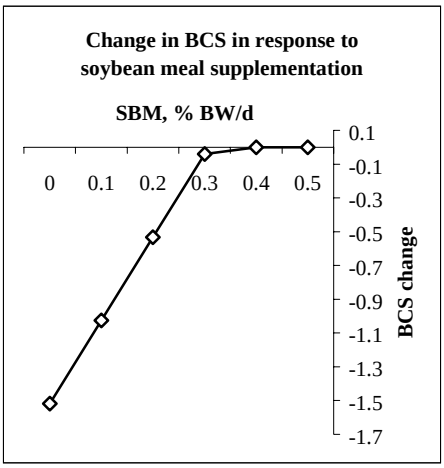
Effect of increasing amount of soybean meal on forage intake

SBM lb/d	0.00	0.67	1.30	2.71	3.95
Body wt	805	836	811	820	789
		Daily Intake			
Degradable	0.39	0.76	1.04	1.48	1.94
Forage	13.9	18.5	20.4	18.8	20.0

protein is about 1.04 lb/d. A reasonable estimate of NEm for this quality of prairie hay is 0.47 Mcal/lb. The steers that consumed 20.4 lb of hay received 9.6 Mcal of NEm. When degradable protein consumed (1.04) is divided by energy, the quotient is 0.108 (or 0.108 times energy consumed equals lb degradable protein required).

The Cows & BCS

Pregnant cows grazing dormant forage (deficient in degradable protein) would have less slippage in BCS if degradable protein were provided. That is exactly what occurred in this study. Pregnant cows (average initial weight of 1142 lb) with an average BCS of 5.3 on Dec 2 were fed one of eight levels of SBM, ranging from 0.08 to 0.48% of body weight until the first day of calving season (69 days by Feb 10). Increasing levels of supplemental SBM reduced cumulative cow BCS losses from day 0 through day 69. See the following chart. A single-slope, broken-line



model revealed that change in BCS plateaued in response to supplemental SBM at about 0.3% body weight (~3.43 lb). In contrast to the hay the steers received, the standing forage the cows grazed would have changed in nutrient composition throughout the study. If, however, it is assumed that the energy content was the same as the hay (0.47 Mcal of NEm), energy consumption can be estimated.

$$NEm = (0.65 \times EMBW)^{.75}$$

$$(0.144598 \times NEm + 0.206865 \times NEm^2 - 0.036915)$$

Assuming a frame score of 4 (Angus X Hereford), daily NEm consumption would be 10.7 Mcal. SBM consumption of 3.43 lb would provide 1.1 lb of degradable protein or 0.103 lb of degradable protein per Mcal of NEm consumed.

Rumors

"We really appreciate the management tools you have given us for our ranch." Thank you, Ted Sailer, North Dakota.

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[1] Mathis, C.P., R.C. Cochran, G.L. Stokka, J.S. Heldt, B.C. Woods and K.C. Olson. 1999. Impacts of increasing amounts of supplemental soybean meal on intake and digestion by beef steers and performance by beef cows consuming low-quality tallgrass-prairie forage. J. Anim. Sci. 77:3156.