Evaluation of Feather Meal for Calves Grazing Cornstalks

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Calves grazing cornstalks can be expected to perform similarly on either a traditional soybean meal or a sunflower/feather meal supplement. The sunflower/feather meal supplement resulted in a saving of $0.05/hd/day.

Summary

Three years of cornstalk grazing trials were conducted from 1995-97 to determine the feeding value of a sunflower, feather and blood meal supplement compared to a traditional soybean meal supplement. Analysis revealed no year x treatment interaction in years 1 and 2, so data were pooled. Gains of calves receiving soybean meal (0.97 lb/day) were not significantly different from those consuming sunflower/ feather meal (0.83 lb/day). In year 3, protein sources were evaluated for undegradable intake protein before formulation. Gains were similar between soybean meal (0.19 lb/day) and sunflower/feather meal (0.16 lb/day). A supplement containing sunflower/ feather meal is an acceptable alternative to a soybean meal supplement while saving approximately $50-64/ton.

Introduction

Cornstalks are an excellent source of winter feed for growing calves. However, some type of protein supplementation is required, especially toward the end of the grazing period when corn grain becomes limited. Feather meal (FM), a byproduct of the poultry industry, has gained significant use by cattle producers in the past few years. Feather meal is an excellent source of undegradable intake protein (UIP) allowing for maximum winter gains based on forage availability and quality. In addition, FM is high in CP, allowing producers to deliver more total protein in a smaller package. While UIP is critical for growing calves, degradable intake protein (DIP) is equally important to maintain forage digestion by the rumen microbial population. Sunflower meal (SM), a source of DIP, lends itself as a carrier in the supplement and helps mask any possible palatability problems associated with FM. Blood meal (BM), another supplement high in CP and UIP, adds an excellent complementary amino acid profile which has been shown to be beneficial for young growing calves. A mixed supplement containing sunflower, feather and blood meals should result in calf gains equal to those of the more traditional, and expensive, supplement containing soybean meal (SBM).

The objective of this trial was to evaluate the feeding value of a sunflower/feather meal supplement when compared to soybean meal for weaned calves grazing winter corn residue.

Procedure

Three consecutive years of winter cornstalk grazing trials were conducted in 1994-95, 1995-96 and 1996-97 utilizing 279 crossbred weaned calves. In year 1, 99 calves were assigned to one of four dryland cornstalk fields in a randomized complete block design. Two fields assigned the SBM treatment included 29 and 18 head, while the two SM/FM fields contained 34 and 18 head. Head counts in each field were based on acreage and a previously determined dryland stocking rate of 1 animal/acre. In year 2, 90 calves were assigned to one of four dryland stalk fields in a randomized complete block design. Fields contained 23 and 24 head (SBM) and 28 and 15 head (SM/FM). Head counts were determined as described above. In year 3, 90 calves were assigned randomly to one of eight irrigated stalk fields. Soybean meal fields contained 8, 11, 11 and 16 head while SM/FM fields contained 8, 11, 11 and 15 head. Head counts in each field were based on acreage and an irrigated stocking rate of 1.2 animals/acre. Each year, half of the fields in the study received 1.5 lb/hd (as-is, Table 1) of SBM supplement; the other half received 1.5 lb/hd (as-is, Table 1) of SM/FM supplement.

In year 3, residual corn estimations were made in each field prior to grazing by measuring 250 x 2.5 ft strips in four random locations. Whole and partial ears were collected and ears were shelled and the corn weighed to determine amount of residual corn in each field in bushels/acre.

In year 1, supplements were formulated to contain equal amounts of CP and UIP. The same supplement formulations were used in year 2; however, based on calf gains in both years, CP and *in situ* analyses were conducted following grazing in year 2 to evaluate supplement formulations compared to actual lab values. Based on this information, the SM/FM supplement was reformulated prior to grazing in year 3. The new formulation included 44.5% CP, 26% of which was UIP (DM basis), to more closely equalize supplements based on actual lab values. Prior to reformulation, both CP and *in situ* analyses were conducted on the protein sources of each supplement. These actual values for CP and UIP were used in the new formulation. Crude protein and *in situ* analyses were again performed on the mixed supplements following grazing.

For *in situ* analysis, ingredients and supplements were incubated in quadruplicate dacron bags, utilizing one steer maintained on a grass hay diet. All samples were incubated 16 hours. After incubation, bags were washed with warm rinse water until water ran clear, then dried for 48 hr at 140°F, and weighed. Residue was analyzed for N using a nitrogen analyzer. Crude protein values were determined by grinding ingredients and supplements and analyzing for N.

Animal performance was measured in terms of ADG. Both initial and final weights were based on the average of two consecutive day weights following three days of limit feeding at 2% of body weight. Calves were removed from fields when, based on visual appraisal, quantity of forage became limiting.

Results

Because analysis showed no year x treatment interaction between years 1 and 2 (1994-95 and 1995-96), data were pooled across years. Gains for calves receiving SBM were not different than calves receiving SM/FM. Calves supplemented with SBM gained 0.97 lb/d, while calves consuming SM/FM gained 0.83 lb/d (Table 2). Following the analysis of supplements after grazing in year 2, the SBM was found to be 44% CP (DM basis), 42% of which was UIP. The SM/FM was 41% CP (DM basis), 33% of which was UIP. These results may explain why SBM calves gained numerically faster. Young calves require substantial UIP for maximum growth. The microbial population in calves is unable to supply adequate protein to the animal, even when maximum growth is not desired. Therefore, supplying calves with increased UIP should result in improved gains. As indicated by the above UIP values for each supplement, the SBM was supplying calves with slightly more UIP than the SM/FM, which likely resulted in the observed gains. While DIP values for SM/FM would have been higher, metabolizable protein supplied to the animal from microbial protein would likely be limited by energy from the corn residue. Assuming energy intake was equal in all fields, microbial CP supplied to calves would have been roughly equal in both treatments; however, based on UIP values, metabolizable protein would have been slightly greater for calves receiving SBM.

While the energy and protein interaction is important to animal performance, energy alone can have a large impact on gains. An important source of energy for cattle on corn residue is residual corn. Previous cornstalk grazing research at the University of Nebraska has shown residual corn can have a large impact on calf performance, with residual corn exhibiting a strong positive correlation with ADG. It is possible calves receiving SBM were grazing in fields containing more residual corn; however, no residual corn estimations were determined prior to grazing in years 1 and 2.

In year 3, efforts were made to resolve supplemental protein and residual corn questions. Formulation of

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Table 1. Supplement compositions.

Ingredient	Supplement, % DM 1994-96 SBM[a]	1994-96 SM/FM[a]	1996-97 SBM[a]	1996-97 SM/FM[a]
SBM[a]	91.4	——	91.4	——
FM[a]	——	11.2	——	18.9
SM[a]	——	81.2	——	69.1
BM[a]	——	2.1	——	2.6
Urea	——	——	——	3.1
Dical	3.3	1.6	3.3	2.4
Vit. premix	.08	.08	.08	.08
Trace min. premix	.26	.26	.26	.25
Selenium	.18	.18	.18	.18
Salt	3.27	3.27	3.27	3.27
Rumensin 80	.14	.14	.14	.14
Pellet binder	1.36	——	1.36	——

[a]SBM = soybean meal; FM = feather meal; SM = sunflower meal; BM = blood meal.

Table 2. Average daily gain of calves and residual corn estimates by year and treatment.

Year	ADG, lb/hd/day Soybean meal	ADG, lb/hd/day Sunflower/ Feather meal
1994-1995	.59	.46
1995-1996	1.34	1.20
Average, 1994-1996	.97	.83
1996-1997	.19 (.63)[a]	.16 (.52)[a]

[a]Residual corn estimations (bu/acre, as-is).

the SM/FM supplement was revised to more closely match the SBM supplement and residual corn was measured after harvest, but prior to animal placement in fields. Calf gains in year 3 were similar for SBM (0.19 lb/d) and SM/FM (0.16 lb/d; Table 2). Likewise, residual corn estimates were similar with 0.63 bu/acre remaining in SBM fields while 0.52 bu/acre remained in SM/FM fields.

Economic analysis of both supplements from year 3 revealed that the SM/FM supplement was $64.40 less per ton than SBM. This resulted in a difference of $0.05/hd/d and a total savings of $3.87/hd over 80 days of grazing. However, due to the recently inflated price of SBM, these differences may be larger than normal. Utilizing prices from May 1996, an economic comparison for years 1 and 2 demonstrates a price difference of $50/ton, which may be more representative of SBM costs typically observed.

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