FINAL REPORT TO DAKOTA COMMODITIES
AND NORTHEAST MISSOURI GRAIN

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Experimental Protocol

A total of 63 Angus and Angus crossbred heifers (initial weight of 516 lbs.) were allotted to three experimental treatments, with 2 pens per treatment. Cattle were sorted into a heavy and light groups for each treatment. At the start of the experiment, heifers received no vaccinations but had previously been vaccinated for IBR/BVD, P13, BRSV, and blackleg. Daily feeding attempted to equalize DM consumption at 2.3% of body weight. Treatments consisted of different sources of supplemental protein: soybean meal vs. distillers dried grains with solubles. Diets consisted of a basal diet of corn silage (27.9% DM), cracked corn, and soyhulls, with the supplement top-dressed and blended when animals were fed at 0900. The treatments were a soybean meal supplement (soybean meal) estimated to provide 12.5% crude protein as a complete diet and a predicted ADG of 1.9 lbs. The distillers dried grains supplements were formulated to provide 11.7% crude protein with projected ADG of 1.9 lbs daily (Low DDGS), and 12.5% crude protein with a projected ADG of 2.02 lbs daily (High DDGS). As shown in table 1, te actual crude protein content of the diets was lower than predicted based on the low crude protein content of corn silage (6.1% on a DM basis). This accounted for lower % crude protein by 1.6% units than formulated to be in the diet. The heifers were adjusted to diets over a 14-day period during the beginning of the 111day growth trial.

Consumption of the diets is found in Table 1. Corn silage and soyhulls were maintained at 92% / 8% ratio, respectively. The amount of corn silage, soyhulls, and corn were adjusted throughout the study based on DM intake. The level of supplement remained fixed at 2 lb / head daily. Diet samples were taken on a weekly basis and analyzed for % DM, % crude protein, % NDF, while digestible intake protein and undegradable intake protein were calculated from reported values for feed ingredients (NRC, 1996).

At 0700 hours, cattle were weighed on two consecutive days at the start and end of the trial in an attempt to minimize error created by fill. Weights were also taken every 28 days to monitor performance throughout the study. The ADG, DM intake, feed to gain ratio, and cost / lb of gain were calculated for the 28 day, 56 day, 84 day, and 111 day period. These data were analyzed as a split plot design using SAS, while the overall ADG, DM intake, feed to gain ratio, and cost / lb of gain were analyzed as a randomized block design.

Results

As shown in table 2, weights were similar among the three treatments. Although the final weights were not statistically different among treatments, the heifers fed the High DDGS treatment weighted an average of 26 lbs per head more as compared to the soybean meal treatment at the end of the 111 day feeding period. This final weight advantage for the High DDGS treatment was attributed to greater numerical (P<.13) ADG for the High DDGS as compared to the soybean meal treatment for the first 28 days (21%), day 57-84 (7%), day 85-111 (9%), and 0-111 days (8.5%). The Low DDGS treatment had similar (P>.13) ADG to that of the Soybean Meal treatment. The DM intake for heifers fed the High DDGS supplement were similar to the other treatments for the 111-day period. Although not significant the High DDGS group consumed 0.60 lbs more DM than the other treatments for the entire period. Likewise, for the 111 days, the feed to gain ratio for each treatment was not different (P>.24). The 0.2 lb per day improvement in ADG for the High DDGS treatment as compared to the Soybean Meal Treatment may be attributed to the higher UIP value for the DDGS protein as compared to that of Soybean meal protein. As shown in table 1, the calculations of UIP for the diets revealed that the High DDGS diet provided 0.122 lb additional UIP as compared to the soybean meal diet. Although the Low DDGS diet had numerically lower % crude protein (10.0% vs. 10.9%, respectively), the ADG for the Low DDGS and the soybean meal treatments were similar (2.65 lb vs. 2.71 lb, respectively), but higher than the predicted ADG (1.9 lb). The greater the ADG of heifers was attributed to higher actual DM intakes than predicted from NRC, 1996 (17.1 vs. 15.9 lbs of DM intake).

As shown in table 2 and 3, the improved feed to gain ratio also accounted for lower (P<.11) cost of gains ($.254 vs. $.28, respectively) for the High DDGS treatment as compared to the Soybean meal treatment. This difference was attributed to the numerically greater ADG for the High DDGS vs. Soybean meal treatments. Table 4 shows the impact of cost of DDGS and soybean meal on the cost of gains for heifers fed soybean meal vs. DDGS diets. The cost of gains for heifers fed the High DDGS diet was lower ($26.44 vs. $26.54 / 100 lb of gain, respectively) than soybean meal, if soybean meal cost $200 or greater and DDGS cost $120 per ton or less.

Implications

The replacement of DDGS for soybean meal in a corn silage based diet lowered the cost of gain of heifers. The DDGS is an economical replacement for soybean meal in a corn silage based diet for heifers.

References

NRC, 1996. Nutrient requirements of beef cattle, 7th revised edition, National Academy Press, Washington, D.C. p. 198.

Table 1. Diet Compositions (expressed as % ration)			
	SBM	Low DDGS	High DDGS
Ingrediets			
Corn Silage	68.5	68.5	64.71
Soyhulls	18.2	18.19	17.2
SBM/DDGS	3.76	3.77	9.12
Limestone	0.42	0.42	0.43
Salt	0.06	0.06	0.05
Urea	0.56	0.56	0.54
Dicalcium Phosphate	0.28	0.28	0.27
Trace Mineral			
Premix [a]	0.02	0.02	0.02
Cracked Corn	8.17	8.17	7.63
Rumensin [b]	0.01	0.01	0.01
Vitamin ADE			
Premix [c]	0.02	0.02	0.02
Chemical			
Dry Matter, %	37.9	38.1	38.2
Crude Protein, %	10.9	10	11.1
DIP, %	68.4	66.3	63.1
UIP, %	31.6	33.7	36.9
NDF, %	46.5	47.9	47.6

[a] Contained 10% Fe min., 10% Mn min., 10% Zn min., 2% Cu min., 500ppm Co, 1000ppm I, 1500ppm Se.

[b] Rumensin included at 180 mg/hd/day.

[c] Contained 4,000,000 IU Vitamin A, 800,000 IU Vitamin D and 1,200 IU Vitamin E per lb.

Table 2. Effect of SBM versus DDGS Supplementation in Developing Heifers					
	SBM	Low DDGS	High DDGS	SE	P<
Initial Wt., lb	515.8	516.7	515.3	41.735	1
Final Wt., lb	821.5	814.7	847.2	48.806	0.89
ADG, lb/d					
0-28 days	2.09	1.98	2.53		
29-56 days	3.2	3	3.23		
57-84 days	2.97	2.95	3.19		
85-111 days	2.58	2.68	2.81		
0-111 days	2.71 [a]	2.65 [a]	2.94 [b]	0.075	0.13

DM Intake, lb					
0-28 days	14.21	14.27	15.02		
29-56 days	16.76	16.92	17.79		
57-84 days	18.32	18.33	18.76		
85-111 days	18.51	18.47	18.76		
0-111 days	16.95	16.99	17.58	0.609	0.74
F/G Ratio, lb/lb					
0-28 days	6.8	7.21	5.94		
29-56 days	5.24	5.64	5.51		
57-84 days	6.17	6.21	5.88		
85-111 days	7.17	6.89	6.68		
0-111 days	6.25	6.41	5.98	0.182	0.24

$_{a,b}$ Means with different superscripts differ at (P<.10)

Table 3. Cost per lb of gain					
	SBM	Low DDGS	High DDGS	SE	P<
0-28 days	0.302	0.3	0.248		
29-56 days	0.233	0.234	0.231		
57-84 days	0.273	0.258	0.248		
85-111 days	0.337	0.3	0.294		
0-111 days	0.281 $_{b}$	0.268 $_{a}$	0.254 $_{a}$	0.006	0.11

$_{a,b}$ Means with different superscripts differ at (P<.10)

Per lb gain costs calculated using the following ingredient costs.*
Corn Silage: $.01/lb
Corn: $.037/lb
Soyhulls: $.035/lb
SBM Supplement: $206.71/T ($252/T SBM)
DDGS Lo Supplement : $156.80/T ($83/T DDGS)
DDGS Hi Supplement : $167.63/T ($83/T DDGS)

*Ingredient costs based on market prices at onset of study.

Table 4. Cost/100lb. Gain for heifers fed soybean meal vs. Distillers Dried Grain (111-day gain)				
SBM Cost/T	S1 Diet	DDG Cost /T	D1 Diet	D2 Diet
$252/T	$28.10	$120/T	$27.26	$26.44
$200/T	$26.54	$83/T	$26.80	$25.40
$160/T	$26.16			