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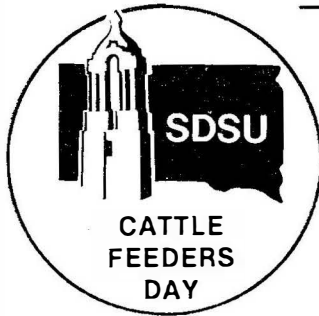
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FEEDLOT PERFORMANCE OF GROWING STEER CALVES ON A
HIGH ROUGHAGE RATION SUPPLEMENTED WITH A HIGH
"BYPASS" OR AN ALL NATURAL PROTEIN SUPPLEMENT^{1,2}

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Summary

Seventy-two crossbred steer calves were utilized in a 105-day feedlot trial to evaluate two types of protein supplements fed with a low-energy, high-roughage ration. Animals were fed either 1 lb/head/day of a high "by-pass" protein supplement or 1.5 lb/head/day of an all natural protein supplement. All animals received 2 lb of whole corn per day and ad libitum corn silage. Results of the trial indicated no significant differences for average daily gain or feed efficiency. However, an economic benefit was realized with \$.05 reduction in the cost per pound of gain utilizing the urea-containing "by-pass" protein supplement.

Introduction

In recent years much of nutrition research has been conducted in the area of "by-pass" proteins. Scientists at the University of Nebraska and Iowa State University have developed a means of measuring the degree of "by-pass" in natural ingredients. The naturally occurring proteins which do not undergo degradation in the rumen pass into the lower digestive system, thus the term "by-pass." The protein is then more efficiently utilized by the ruminant animal as compared to proteins being degraded by the microorganisms. To aid in "by-pass" a form of nitrogen such as urea generally accompanies the "by-pass" proteins which is readily converted into ammonia for the rumen microorganisms. This form of nitrogen serves to insure adequate health of microbes. The physical effect of heat is most commonly used to insure some protein "by-pass." Thus, due to manufacturing techniques, some products such as blood meal, meat and bone meal, corn gluten meal, dehydrated alfalfa meal and dried distillers grains have protein "by-pass" capabilities.

This study was undertaken to compare a urea-based protein supplement containing meat and bone meal and dehydrated alfalfa as the primary "by-pass" protein source to a protein supplement containing soybean meal and sunflower meal as the protein sources.

¹Trial conducted at the James Valley Research Farm, Redfield, S.D.

²Appreciation is expressed to Farmland Industries for providing and manufacturing the protein supplements.

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Procedures

Seventy-two steers with an average initial weight of 577 lb were allotted on the basis of previous treatment (Ralgro implant study) and body weight into six pens with 12 animals per pen and three pens per treatment. Upon arrival at the feedlot, all animals were vaccinated, wormed and implanted with Ralgro. All animals were fed silage free choice, 2 lb of corn per head per day and either 1.5 lb per head per day of a 35% all natural protein supplement containing 200 mg of rumensin or 1 lb per head per day of a 55% high "by-pass" protein supplement which contained 25% protein equivalent from urea and 300 mg of rumensin per pound. This will be referred to as "by-pass 55-25." Table 1 contains the nutrient composition of each concentrate. Animals were taken off feed and water the evening prior to initial and final weights. Animals were weighed every 28 days. Average daily gains, cost/lb of gain and feed efficiency were subjected to an analysis of variance.

TABLE 1. SUPPLEMENT NUTRIENT LEVELS

Item	By-pass 55-25	All natural 35
Crude protein, %	55.00	35.00
NPN, %	25.00	0
Fiber	11.27	9.30
Ca	3.0	2.50
P	1.41	.75

Results

Table 2 shows the performance of steers fed either 1.5 lb/head/day of the 35% natural protein supplement or 1 lb of the 55-25 "by-pass" protein supplement. The steers consuming the "by-pass" supplement gained somewhat better than the steers consuming the 35% all natural supplement (2.22 vs. 2.14 lb/head/day). This difference was not significant ($P = .27$). Total consumption of feed by both groups was similar. Feed conversion favored the 55-25 "by-pass" protein supplement (6.94 vs. 7.39 lb feed/lb gain), but the differences were not significant ($P > .05$). The cost of putting on a lb of gain was \$.05 less for animals consuming the urea-containing "by-pass" protein. This difference was highly significant ($P = .01$).

The percent rumen degradable protein (RDP) and percent rumen undegradable protein (RUDP) are shown for the two diets in table 2. On a diet basis similar amounts of RUDP and RDP were fed. Based on these values, similar performance of the two groups would have been expected and indeed was received. Cost per lb of gain was less for the "by-pass" protein supplement fed group due to the lower cost of a urea-containing concentrate and the apparent but nonsignificant improvement in feed conversion by the "by-pass" fed group. This economic advantage of replacing part of the natural protein with urea in ruminant rations has been well documented. Thus, the feeder can obtain similar gains with low-energy, high-roughage growing rations, with a considerable cost savings on feed, utilizing a urea-containing "by-pass" protein supplement.

TABLE 2. THE PERFORMANCE OF STEERS FED EITHER "BY-PASS"
55-25 OR 35% ALL NATURAL PROTEIN SUPPLEMENT

	By-pass 55-25	All natural 35
No. of days on trial	105	105
No. of animals	36	36
Initial wt, lb	577	577
Final wt, lb	810	802
Average daily gain, lb	2.22	2.14
Average daily ration, lb ^a		
Corn	1.8	1.8
Concentrate	.9	1.35
Silage	12.73	12.69
Total	15.43	15.84
RDP, %	7.12	6.85
RUDP, %	2.03	2.17
Feed/gain, lb ^a	6.94	7.39 ^b
Cost, lb of gain, \$ ^a	0.33 ^c	0.33 ^b

^aDry matter basis.
^{b, c}Significantly different (P < .01).