EFFECT OF POULTRY LITTER ON WINTER WEIGHT GAIN OF BEEF COWS

K. C. Barnes[2] S. C. Smith[2], J. G. Britton[3] and D. M. Miller[4]

Story in Brief

Forty-nine commercial beef cows of mixed breeding were used to study the effect of poultry litter as a supplement to grass hay during the winter. Cows were fed supplements of corn only, corn plus cottonseed meal or poultry litter, or were fed no supplement. The trial was conducted for 53 days from January 2, 1997. Treatment groups were maintained in a common pasture containing very short dormant warm season grasses. Cows were fed supplements daily in portable feeders equipped with stanchions to facilitate individual feeding while consuming the same hay source. The control groups were maintained in an adjacent trap on the same hay as cows on other treatments. Gains for control group 1, control group 2, corn only, corn plus poultry litter, and corn plus cottonseed meal were 22, 36, 33, 34, and 61 lb/hd, respectively.

(Key Words: Poultry Litter, Beef Cows.)

Introduction

The commercial poultry industry in eastern Oklahoma produces significant amounts of poultry litter. This litter consists of manure, bedding and spilled feed. Environmental concerns and high feed prices prompt cattlemen to consider poultry litter as a supplement for wintering beef cows. Laboratory analyses show litter to generally average within the ranges of 20-25% crude protein, 55-60% TDN, 20-25% ash with significant levels of calcium, phosphorus and other macro and trace minerals. A sample survey by Ruffin and McCaskey (1990) demonstrated large variations around averages of nutrient contents in 106 poultry litter samples. Smith et al. (1993) found no benefit to feeding a supplement of poultry litter and corn to stocker cattle wintered on hay compared with supplements of corn only or corn and cottonseed meal. Ruffin and McCaskey recommend poultry litter supplements of 25% corn and 75% litter for dry beef cows and 1/3:2/3 corn:poultry litter for lactating cows. The objective of this research was to determine the value of poultry litter as a supplement ingredient for cows wintered on medium quality hay.

Materials and Methods

Eighty nonlactating, pregnant beef cows of mixed breeding were offered corn in a portable feeder equipped with self-catching stanchions. After a three week training period 39 cows allowed themselves to be caught eating from the feeders. Ten cows were randomly selected from those that would not eat from the feeders (control group 1) to compare animal performance with those previously allowing themselves to be caught and that would eat grain (contol group2). Cows weighing an average 1,112 lb were individually identified with number eartags, weighed, dewormed with Synanthic (22.5%)[a] (1 ml/4.54 lb BW), and randomly assigned to treatment. Cows were fed supplements of corn only, corn plus cottonseed meal or poultry litter, or were fed no supplement (control and negative control groups). The trial was conducted for 53 days beginning January 2, 1997. Feed treatment groups were maintained in a common area with only

short dormant forage available. Control groups were maintained in a similar pasture Cows were fed supplements daily in the portable feeders. Feed samples were collected and analyzed by Livestock Nutrition Laboratory Services, Columbia, MO (Table 1). The daily amounts of supplements and nutrients fed is shown in Table 2.

Cows were baited into feeders with one-half pound of corn and then fed an additional 1-1/2 lb corn, 1-1/2 lb corn plus 1 lb CSM or 1-1/2 lb corn plus 2 lb poultry litter six times per wk. All cows consumed the same hay source. The hay was analyzed and contained 5.6 to 9.1% crude protein, dry matter basis.

Results and Discussion

Although the metal feeders with stanchions allowed individually feeding of supplements and a common hay source, consistent supplement consumption was difficult to achieve. There was noticeable variation in the way that cows of all treatments would eat from the feeders. Some cows were very eager and consumed their supplements consistently throughout the trial. Others would consume their daily feed offerings for several days and then refuse feed for one or more days. Refusal to eat poultry litter preempted the complete randomization of cows to treatments. Four cows did not complete the trial due to calving.

Gains for control group 1, control group 2, corn only, corn plus poultry litter, corn plus cottonseed meal and were 22, 36, 33, 34 and 62 lb/hd, respectively (Table 3). The cows fed corn and CSM gained significantly ($P<.05$) more than negative control and cows fed corn only. They also gained more weight ($P<.10$) than control and cows fed corn and poultry litter.

The conversion of corn or other high starch feeds to gain for cattle grazing low to medium quality forage is generally 10 or more lb of feed to one lb of gain. Cattle receiving corn only supplementation in this trial followed this pattern. Cattle receiving a high protein supplement when consuming low to medium quality forages typically convert at more efficient levels of 2.5-3 lb of feed to one lb of gain. The improved conversion results from a positive associative effect of supplemented dietary protein on forage intake and digestibility. Of the nitrogen contained in poultry litter, approximately 45% is the form of true protein, 30% form uric acid, 13% ammonia, and the remaining nitrogen from other non-protein sources (Bhattacharya and Fontenot, 1965). Cows fed poulty litter may have failed to demonstrate a protein effect because nitrogen content of poutry litter was insufficient in protein quality to enhance rumen microbial digestion of the lower quality summer forages.

Literature Cited

Bhattacharya, A.N. and J.P. Fontenot. 1965. J. Anim. Sci. 24:1174.

Ruffin, B. G., and T. A. McCaskey. 1990. Feedstuffs 62 (15):13.

Smith, S. C. et al. 1993. Okla. Agr. Exp. Sta. Res. Rep. P-933:160.

-

Table 1. Analysis of feed supplements.[a] (Dry matter basis)

Item	Corn only	CSM/ corn	Litter/ corn
Moisture, %	13.19	12.40	14.29
Crude protein, %	8.96	27.63	18.70
ADF, %	3.46	9.59	13.84
TDN, %	91.16	74.27	73.62
NEm, mcal/lb	1.08	.74	.73
NEg, mcal/lb	.69	.48	.47
Nitrogen, %	1.43	4.42	2.99
Calcium, %	.02	.14	1.82
Phosphorus, %	.24	.67	1.03
Magnesium, %	.15	.37	.43
Potassium, %	.89	1.26	1.77
Sodium, %	.01	.06	.18
Sulphur, %	.30	.22	.35
Iron, ppm	63.05	111.85	784.04
Copper, ppm	5.78	14.86	38.44
Manganese, ppm	9.25	20.33	355.32
Zinc, ppm	28.34	47.45	184.07

aLivestock Nutrition Laboratory Services, Columbia, MO.

Table 2. Daily amounts of supplements and nutrients fed.

Item	Corn only	CSM/ corn	Litter/ corn
Daily feed, lb	2.0	3.0	4.0
Crude protein, lb	.16	.72	.64
TDN, lb	1.6	1.9	2.5
Calcium, g	1.6	1.7	28.3
Phosphorus, g	1.9	8.0	16.0

Table 3. Effect of poultry litter on gain.

	Number	Initial weight, lb	Gain, lbs
Neg. control	10	1082	22[a]
Control	9	1148	36[a]
Corn only	10	1129	33[a]
Litter corn	10	1114	34[a]
CSM/corn	10	1094	61[b]

a,b Values with differing superscripts differ at the P <.10 level.

1997 Research Report