

# VALUE OF FEATHER MEAL FOR REPLACING SOYBEAN MEAL IN SUMMER PROTEIN SUPPLEMENTS

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## Story in Brief

Hydrolyzed feather meal at a rate of 12% was used to replace 22% soybean meal in a supplement for heifers grazing summer native range from late June to October. Over the summer grazing period, unsupplemented heifers gained 1.33 lb/day compared to 1.55 for soybean meal and 1.57 lb/day for the feather meal-soybean meal treatment. In another trial, weaned fall-born calves grazing native range were offered the same supplements from May to mid-July. Unsupplemented calves gained 1.16 lb/day while calves fed the soybean meal and soybean meal/feather meal supplements gained 1.51 and 1.31 lb/day, respectively. With prices existing at the time of the study, including feather meal at a 12% rate in a soybean meal-based supplement would reduce supplement costs by \$10.60 per ton.

(Key Words: Beef Cattle, Feather Meal, Protein.)

## Introduction

It is common to feed protein supplements to stocker calves grazing native grass or bermudagrass pastures from mid to late summer. Because of volatile prices for soybean meal and cottonseed meal, interest has grown in finding alternative sources of natural protein. Large quantities of hydrolyzed feather meal are available in Oklahoma because of the close proximity of several major poultry processors. Hydrolyzed feather meal, typically priced slightly higher per ton than cottonseed meal or soybean meal but with twice the crude protein content, would be an attractive product if two questions could be resolved. The first is the relative nutritive value of hydrolyzed feather meal in supplements compared to cottonseed meal and soybean meal, and the second is palatability of feather meal in supplements. The objective of this study was to compare performance of yearling heifers and weaned fall-born calves grazing summer native range when hydrolyzed feather meal was used to replace about 22% of the soybean meal in a protein supplement.

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## Materials and Methods

The first trial was conducted on native tallgrass prairie at the Range Cow Research Center 12 miles west of Stillwater. Thirty-two spring-born and fifteen fall-born Hereford and Hereford x Angus heifers were allotted by breed, age and weight to three treatment groups. Treatments were Control, no supplement; Soybean meal (1.0 lb/day) or Feather meal-Soybean meal (1.0 lb/day) in which hydrolyzed feather meal was included at a rate of 12%. Supplement compositions and feeding rates are shown in Table 1. A level of 12% feather meal was chosen because it should be palatable and still provide an economically significant substitution for soybean meal. Supplement amounts were prorated for 3 days per week feeding on Monday, Wednesday and Friday. Supplements were individually fed in covered stalls and all heifers grazed the same pasture. The trial period was June 23 to October 17 with intermediate weights taken at 28- or 35-day intervals. All weights were taken after overnight withdrawal from feed and water.

In a second trial, fall-born steers were weaned in late April and transported to the Pawhuska Research Station on May 10. The cattle were allotted to treatments (Table 1) and placed on a common pasture on May 16. The supplements and feeding rates were the same as mentioned above (Table 1). Supplement amounts were prorated for 3 days per week feeding on Monday, Wednesday, and Friday. On feeding days, the calves were

Table 1. Composition (% as-fed) of supplements and feeding rates.

	Control	Soybean meal	12% Feather meal
<b>Ingredients</b>			
Soybean meal	---	98	72
Feather meal		--	12
Sorghum grain		--	13.73
Dicalcium phosphate		1.86	2.09
Vit A (30,000 IU/gm)		.18	.18
<b>Nutrient content</b>			
Crude protein		40	40
Phosphorus		1.0	1.0
<b>Feeding rates, lb</b>			
Per day	0	1.0	1.0
Per feeding (3 days/week)	0	2.3	2.3

gathered and separated into respective treatment groups. Supplements were group-fed in community troughs. The trial ended on July 18. All weights were recorded after overnight withdrawal from feed and water.

## Results and Discussion

Heifer gains are shown in Table 2. Heifers weighed about 780 lb at the start of the study and were in good body condition. Some difficulty was encountered during the first two weeks of the study in getting heifers to consume supplements. Excellent forage availability and introduction to the individual feeding facility were likely causes. Two heifers from the soybean meal group and one from the feather meal group were removed from the study after they consistently refused to eat supplements for two weeks. All other heifers readily consumed supplements after the first few days. Although there are numerous reports of palatability problems with feather meal, the fact that two heifers refused to eat soybean meal precluded any conclusions about effects of feather meal on supplement palatability.

**Table 2. Effects of feather meal on summer gains of heifers grazing native range.**

	Control	Soybean meal	12% Feather meal
No. of heifers <sup>a</sup>	16	13	15
Weights, lb			
Initial, 6/23	785	771	782
Daily gains, intermediate, lb/d			
6/23 - 7/25, 35 days	1.75	1.59	1.68
7/25 - 8/22, 28 days	1.04 <sup>b</sup>	1.43 <sup>c</sup>	1.14 <sup>b</sup>
8/22 - 9/19, 28 days	.84 <sup>b</sup>	1.01 <sup>b</sup>	1.28 <sup>c</sup>
9/19 - 10/17, 28 days	1.60 <sup>b</sup>	2.16 <sup>c</sup>	2.13 <sup>c</sup>
Entire study, 119 days, lb/d	1.33 <sup>b</sup>	1.55 <sup>c</sup>	1.57 <sup>c</sup>

- <sup>a</sup> Two heifers from the soybean meal group and one from the 12% feather meal group were removed for failure to eat supplements.  
<sup>b,c</sup> Means in a row with different superscripts differ ( $P < .05$ ).

Similar gains for all control and supplemented heifers (Table 3) during the first 35 days in June and July suggest that protein was adequate in the forage during this period. During the second and third 28-day periods from July 22 to August 22, supplemented heifers tended ( $P < .1$ ) to gain faster than controls. The advantage for soybean meal during the second period and for feather meal-soybean meal during the third period probably reflects fill differences frequently encountered with short term weights. During the fourth period, gains from both supplemented groups were similar and both were significantly greater than for controls. For the entire 119 days of the study, both supplemented groups gained faster ( $P < .01$ ) than control heifers (1.55 and 1.57 vs 1.33 lb/day).

Fall-born heifers held over the previous winter on dry winter grass were lighter (756 vs 792 lb) and thinner than the spring-born heifers wintered on wheat pasture. It is interesting to note that no interaction was detected between heifer age and response to supplementation. This means that supplementation increased daily gains of the older, thinner heifers to the same extent as for younger, fatter heifers.

In conclusion, results suggest that hydrolyzed feather meal can be used at a rate of 12% to replace 22% soybean meal in protein supplements with no effect on summer weight gains. Assuming ingredient costs (\$/cwt) of: sorghum grain, \$4.50; feather meal, \$12.00; soybean meal, \$10.00; dicalcium phosphate, \$13.50, the supplement containing 12% feather meal cost \$9.53/cwt while the soybean meal supplement cost \$10.06. With these prices, including feather meal at a rate of 12% reduced supplement cost by \$10.60 per ton.

**Table 3. Effects of feather meal on weight gains of calves grazing native range.**

	Control	Soybean meal	12% Feather meal
No. of heifers	14	14	14
Weights, lb			
Initial, 5/16	392	394	399
Total gain, lb, 63 days	76	96	86
Daily gain, lb/d			
5/16 - 7/18	1.16 <sup>a</sup>	1.51 <sup>b</sup>	1.31 <sup>ab</sup>

<sup>a,b</sup> Means in a row with different superscripts differ ( $P < .05$ ).

In the second trial, the soybean meal supplement increased daily gain .35 lb/day ( $P < .05$ ) compared to controls. Performance of the cattle consuming the feather meal-soybean meal supplement was intermediate to controls and soybean meal. The inferior response to feather meal-soybean meal cannot be readily explained in light of the results in Trial 1. Response to the soybean meal treatment is similar to responses noted in previous trials utilizing weaned calves grazing in May and June (Scott et al., 1987; McCollum and Lusby, 1989). Because the supplements were not individually fed, we cannot determine if gains were depressed due to reluctance of some cattle to consume the feather meal supplement. Cattle were observed during feeding but there were no apparent nonconsumers. Other possible causes for the apparent poorer response to the 12% feather meal supplement may be the short duration of the study and younger age of the cattle in Trial 2.

### Literature Cited

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