

# Liquid Protein Supplement vs. Dry Natural-Protein Supplement For Wintering Heifer Calves

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## Story in Brief

A liquid supplement (self-fed) was compared to a dry natural-protein supplement (self-fed, with added salt as the intake-limiting ingredient) for heifer calves wintered on dry native grass. Calves consuming liquid supplement lost 77 lb. during the wintering period while those fed the natural-protein supplement lost 54 lb. On the basis of prices used, the liquid supplement had an advantage of \$0.91 in winter supplement cost, but a disadvantage of \$8.05 in value of winter weight change.

## Introduction

The use of liquid supplements to provide additional energy, protein and other nutrients has increased in recent years. Perhaps the major advantage of liquid supplements has been the saving in labor to the cattleman. They are self-fed, plus in most cases they are delivered directly to the pasture. Most liquid supplements contain a molasses base with urea added to supply the major portion of the nitrogen or crude protein equivalent. Previous research at Oklahoma State University has suggested a low utilization of urea with low quality roughage; it is questionable if enough urea is being utilized to meet the protein requirements through synthesis of microbial protein.

Previous research has also shown that additional energy supplied by molasses has very little if any benefit if the animal is in a protein deficient state. In view of these and other problems associated with the feeding of liquid supplements with low quality forages, their actual value should be fully determined.

The purpose of this trial was to compare a liquid protein supplement with a self-fed dry natural-protein supplement for heifer calves grazing low quality roughage during the winter.

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## Procedure

The experiment was conducted at the Lake Carl Blackwell Range located 10 miles west of Stillwater. The predominant forage is of tall-grass prairie type with climax species consisting of little blue stem, Indian and switch grasses. Since these grasses were dormant during the winter trial, the major portion of the diet consisted of dry weathered grass. Prairie hay was fed only on a few occasions when snow covered the range forage.

The experimental cattle consisted of 44 crossbred Charolais x Angus and Charolais x Hereford heifers 8-10 months of age. They were randomly allotted to two groups. These calves had been weaned 9-22-71. The experiment was initiated 11-18-71 and terminated 3-29-72, a 132-day period. Two pastures were used and the cattle were rotated at the time they were weighed which was at approximately 28-day intervals.

The liquid supplement was a commercial mix that contained 35 percent crude protein and was self-fed. The natural-protein supplement contained 30 percent crude protein. The ingredient makeup of the natural-protein supplement was as follows:

Ingredient	Percent of Formula
Milo	23.80
Soybean meal (44%)	57.43
Dehydrated alfalfa meal	5.00
Molasses, blackstrap	5.00
Wheat middlings	5.00
Monosodium phosphate	2.36
Dicalcium phosphate	.73
Sodium sulfate	.63
Trace minerals	.05
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	100.00

Vitamin A to provide 10,000 IU/lb. of supplement.

Salt was used to limit the intake of the natural-protein supplement. The salt level to limit the intake varied from 17 to 27 percent and the average salt level for the entire period was 23 percent. It was not possible to maintain comparable intake of the two supplements at all times during the trial. Consumption of the natural-protein supplement was relatively high early in the trial so its subsequent intake had to be restricted by increasing the level of salt. However, the amount of crude protein consumed per head for the entire feeding period was equal for the two supplements.

The calves were scored for condition at the start and finish of the trial.



## Results and Discussion

The summary of the performance of the calves can be seen in Table 1. The heifers consuming the liquid supplement lost 77 pounds while those on the natural-protein supplement lost 54 pounds, a 23 pound difference (statistically significant,  $P < .005$ ), during the 123-day treatment period. After 57 days on trial the weight loss of the two groups of heifers was approximately equal and it was only during the last 75 days that the difference in weight loss occurred. The reason is not clear because the consumption of liquid supplement was higher than natural-protein supplement during the last 75 days. This is in contrast to the earlier part of the trial when the consumption of the natural-protein supplement was at a higher level than that of the liquid supplement.

The condition of the cattle as measured by condition score was not influenced by kind of supplement.

The consumption of the liquid and dry natural-protein supplements was approximately 1.0 and 1.15 lb. per head daily, respectively. Crude protein intake was 0.35 per head daily for both groups. In addition, 0.34 lb of salt per head daily was consumed by the calves fed the natural-protein supplement.

An economic analysis is shown in Table 2. On the basis of price assumptions which were used, the total winter cost of liquid protein supplement was \$0.91 less than for the dry natural-protein supplement. However, the heifers fed natural protein had a 23 lb. advantage in winter weight change which was worth \$8.05 at \$0.35 per pound; the natural-protein supplement had a net financial advantage of \$7.14. Prices

Table 1. Weight, Condition Score and Supplement Intake (Winter 1971-72, 132 Days)

Item	Supplement and % Crude Protein	
	Natural 30	Liquid 35
Number heifers	22	22
Initial weight, lb.	579	569
Final weight, lb.	525	492
Weight lost, lb.	54***	77***
Condition score <sup>1</sup>		
Initial	6.04	5.86
Final	3.05	2.88
Supplement consumed		
Supplement/head/day, lb.	1.15 <sup>2</sup>	1.00
Crude protein/head/day, lb.	.35	.35

<sup>1</sup> On a scale of 1-9, with 1 the thinnest and 9 the fattest.

<sup>2</sup> Protein supplement consumed. In addition, 0.34 lb. salt/head/day was also consumed.

\*\*\*Means were significantly different from each other ( $P < .005$ ).

Table 2. Economic Analysis

Item	Supplement and % Crude Protein	
	Natural 30	Liquid 35
Cost/ton, \$	80.00 <sup>1</sup>	85.00
Cost/lb. crude protein, \$	.1330	.1130
Supplement cost/head/day, \$	.0460	.0425
Cost of salt/head/day, \$	.0034	—
Total supplement cost/head/day, \$	.0494	.0425
Total supplement cost/head, 132 days, \$	6.52	5.61
Advantage in total supplement cost, \$		0.91
Advantage in winter weight change, lb.	23	
Value at \$0.35 per lb., \$	8.05	
Net advantage, \$	7.14	

<sup>1</sup> Includes the cost of the protein supplement. Salt was mixed at various proportions to control intake. The average consumption of salt was .34 pounds per head per day.

used were those current when the trial was conducted during the winter of 1971-72; different prices can be substituted as appropriate in each individual projection.

## Conclusions

The results of this trial indicate that a liquid supplement can be used to winter calves on dry native grass, but that a lower level of performance should be expected compared to that obtained with a natural-protein supplement.