

Market wt.	827	802	830
Gain per heifer, lbs.	256	230	263
Daily gain per heifer, lbs.	2.29	2.05	2.35
Daily ration per heifer, lbs.:			
Milo	12.74	13.59	13.68
Alfalfa hay	6.34	6.25	6.52
Salt03	.03	.02
Feed required per 100 lbs. gain, lbs.:			
Milo	557.19	661.61	582.78
Alfalfa hay	277.58	304.26	277.57
Salt	1.17	1.30	1.03
Cost of feed per 100 lbs. gain	\$ 17.55	\$ 20.56	\$ 18.21
Initial cost of heifer @ \$18 cwt.	106.56	105.84	106.20
Feed cost per heifer	44.93	47.29	47.89
Heifer cost plus feed cost	151.49	153.13	154.09
Necessary selling price per cwt.	18.32	19.09	18.56
Selling price per cwt.	23.50	22.50	23.50
Dressing %	60.9	60.2	60.7
Carcass grades:			
Choice	2	1	2
Choice—	5	4	3
Good +	3	2	3
Good		3	2
Marbling:			
Moderate	1		
Modest	1	1	2
Small	6	4	5
Slight	2	4	3
Traces		1	

Feed prices: Milo, \$2.60 per cwt.; alfalfa hay, \$22 per ton; salt, \$15 per ton.

The Value of Ammoniated Hydrol in Beef Cattle Wintering Rations, 1954-55.

PROJECT 537*

D. Richardson, F. H. Baker, and R. F. Cox

Ruminant animals are capable of utilizing many nonprotein nitrogen compounds, when properly fed, as a substitute for protein. Certain of these products are now being used in livestock feeds as a substitute for protein. Natural proteins are desired in livestock rations and usually produce better results. However, with our increasing population and its demand for meat, the supply of natural protein feedstuffs may become a limiting factor in livestock production. We should learn more about proper methods of production of protein substitutes and their utilization as a feed ingredient by ruminants.

In previous experiments at this and other stations, poor results were obtained with ammoniated blackstrap molasses. It is believed that the process of ammoniation was primarily at fault. This experiment was planned to evaluate ammoniated hydrol (corn molasses) as a partial

* This project was partially supported by Clinton Foods, Inc., Clinton, Iowa.

substitute for protein in the wintering ration of beef calves. This product was made by a different process from the one used previously.

Experimental Procedure

Twenty Hereford heifer calves were divided as equally as possible on the basis of size, weight, and type into two lots of 10 animals each. Atlas sorghum silage was used as the roughage and the amount fed was adjusted to the amount the animals would clean up daily. The remainder of the ration was kept the same throughout the experiment. The ration at the beginning of the experiment is shown in Table 43. The concentrate part of the ration was mixed with the silage. A mineral mixture of two parts steamed bone meal and one part salt and salt alone were fed free choice. Water was available at all times.

Table 43.—Daily ration used at the beginning of the experiment (pounds).

Lot	Atlas sorghum silage	Milo grain	Soybean oil meal	Ammoniated hydrol*
8 Control	20	2.0	1.0	
4 One-half protein concentrate as protein equivalent from ammoniated hydrol	20	0.9	0.6	2.00

* Contained 11.55 percent protein equivalent.

Results and Discussion

The results of this experiment are shown in Table 44. The average daily gain of the animals receiving ammoniated hydrol was satisfactory; however, it was not so good as the gain of the control animals. For some unknown reason the animals fed ammoniated hydrol did not eat as much silage as the control animals the first 84 days; however, they ate as much during the remainder of the experiment. Blood serum phosphorus taken February 15 showed an average of 9.74 mg. percent for the controls, and 9.91 mg. percent for those receiving ammoniated hydrol. These are normal values.

No craziness (as in animals fed ammoniated molasses in previous tests here) or other ill effects were observed during the entire feeding period. Further studies are being conducted on the blood of animals and digestibility of the ammoniated hydrol.

Table 44.—Results of feeding ammoniated hydrol in the wintering ration of beef heifer calves.

(Nov. 15, 1954, to April 4, 1955—140 days)

Lot	8	4
		(One-half protein concentrate as protein equivalent from ammoniated hydrol)
	(Control)	
Number heifers per lot	10	10
Number days on trial	140	140
Av. initial wt. of heifers, lbs.	430	431
Av. final wt. of heifers, lbs.	647	619.3
Av. gain per heifer, lbs.	217	188.7
Av. daily gain per heifer, lbs.	1.55	1.35
Av. daily ration per heifer, lbs.:		
Sorghum silage	29.46	26.93
Ground milo grain	2.00	1.05
Soybean oil meal	1.00	0.63

Table 44 (Continued).

Ammoniated hydrol		1.77*
Steamed bone meal and salt mix	0.12	.13
Salt	0.10	.05
Feed per 100 lbs. gain, lbs.:		
Sorghum silage	1900	1998
Ground milo grain	129	77.7
Soybean oil meal	64.5	46.4
Ammoniated hydrol		131.4
Steamed bone meal and salt mix	7.4	9.3
Salt	6.1	3.4

* There was a two-week period in which ammoniated hydrol was not fed.

Sources of Phosphorus for Wintering Beef Heifer Calves on Dry Bluestem Pasture

PROJECT 530*

D. Richardson, F. H. Baker, C. S. Menzies, and R. F. Cox

Roughages generally provide more calcium than phosphorus. There is usually sufficient calcium in a high roughage ration but additional phosphorus is needed. Present ingredients used to supply phosphorus also supply calcium in as great or greater quantities. It would be desirable to have an ingredient to supply phosphorus without having to add other elements not needed in the ration. This experiment was planned to determine whether or not phosphoric acid could be used as a source of phosphorus and, if so, the efficiency of utilization.

Experimental Procedure

Forty head of choice-quality Hereford heifer calves were divided into four lots of 10 animals each on the basis of weight and type. Each animal was branded with an individual number and lot number. All animals grazed together on dry bluestem grass and were divided each day to receive their respective supplemental feed. Prairie hay was fed when snow covered the grass. The prairie hay averaged 1.67 pounds per head daily for the entire time of the experiment. Water and salt were available at all times. The supplement fed per head daily was as follows:

- Lot 1—1.5 pounds soybean meal and 0.2 pound blackstrap molasses.
- Lot 2—1.5 pounds soybean meal, 0.2 pound blackstrap molasses, and 8 grams of phosphorus from steamed bone meal.
- Lot 3—1.5 pounds soybean meal, 0.2 pound blackstrap molasses, and 8 grams of phosphorus from phosphoric acid.
- Lot 4—1.5 pounds soybean meal, 0.2 pound blackstrap molasses, and 4 grams of phosphorus from phosphoric acid.

The phosphoric acid was mixed with the blackstrap molasses and then added to the soybean meal in the mixer. The ingredients were mixed in a mechanical mixer. The supplement was fed as a meal in bunks.

Weights were taken every 28 days. Blood serum phosphorus was determined to measure phosphorus utilization. These animals will continue on grass until sometime in July. After the grazing season, they will be placed in dry lot and fed to grade choice.

Results

Growth results are presented in Table 45. The gains were not so

* This project was in cooperation with Westvaco Mineral Products Division, Food Machinery and Chemical Corporation, New York 17, N.Y.

good as might be expected; however, it should be pointed out that the calves were in fleshy condition at the beginning of the experiment and the grass was covered by snow a good part of the time.

Blood samples were taken to determine the serum phosphorus levels. The dates taken and average results of these tests are shown in Table 46. It required two days to collect the blood because of laboratory facilities. It is obvious, as shown by the figures for November 16 and 17, that some error was made on one of the days of the first collection. One-half of the animals were bled on each of the two days for the other tests to equalize any error that might be made.

Observations

1. The supplements containing phosphoric acid were highly palatable. They seemed to be more palatable than the other supplements.
2. No harmful or ill effects of any kind were observed.
3. There was a definite lowering of serum phosphorus in Lot 1 which did not receive any supplemental phosphorus.
4. The serum phosphorus levels of Lots 2, 3, and 4 remained practically the same throughout the test. The values in these lots are considered normal.
5. Weight gains and serum phosphorus levels indicate that 4 grams of additional phosphorus are as efficient as 8 grams.

Table 45.—Sources of phosphorus for beef heifer calves on dry bluestem pasture.

(Nov. 17, 1954-April 6, 1955—140 days)

Lot	1	2	3	4
		8 grams from steamed bone meal	8 grams from phosphoric acid	4 grams from phosphoric acid
Number heifers per lot	10	10	10	10
Av. initial wt., lbs.	515.5	517.0	515.5	516.5
Av. final wt., lbs.	560.0	566.7	561.0	574.0
Av. gain, lbs.	44.5	49.7	45.5	57.5
Av. daily gain, lbs.32	.36	.33	.41

Table 46.—Average serum phosphorus levels.*

Lot	1	2	3	4
November 16 and 17	8.93	8.53	10.51	10.36
February 16 and 17	6.12	8.61	8.79	8.42
March 22 and 23	6.83	9.55	10.08	9.44

* Figures are expressed as milligrams percent.

The Performance of Phenothiazine-treated Cattle.

PROJECT 370

W. A. Moyer, F. H. Baker, D. S. Folsch, E. F. Smith, and R. F. Cox

Cattlemen, in recent years, have become interested in internal parasites and their control. A large number of cattle, particularly replacement calves and yearlings, move into Kansas from the Southwest each year. The level of parasitism of these cattle and the possible effect of control measures pose as questions in the minds of many cattlemen. These experiments were designed to study the level of parasitism in feeder calves and the effect of phenothiazine treatment.