

Table 51

Comparative Results with Rolled Corn, Pelleted Milo Grain, and Rolled Milo Grain in Beef Steer Calf Fattening Ration.

January 15, 1957, to April 19, 1957—84 days.

Lot number	4	5	6
Number calves per lot	12	11 ¹	12
Av. initial wt., lbs.	541.3	537.3	538.8
Av. final wt., lbs.	763.3	747.3	741.7
Av. daily gain per calf, lbs.	2.64	2.50	2.42
Av. daily ration, lbs.:			
Sorghum silage	14.8	14.0	16.7
Alfalfa hay	2.0	2.0	2.0
Soybean oil meal	1.0	1.0	1.0
Rolled corn	10.3		
Pelleted milo grain		10.3	
Rolled milo grain			10.3
Lbs. feed per 100 lbs. gain:			
Sorghum silage	559.0	560.0	692.0
Alfalfa hay	74.7	79.0	81.8
Soybean oil meal	37.3	40.0	40.9
Rolled corn	388.1		
Pelleted milo grain		409.6	
Rolled milo grain			424.8
Feed cost per 100 lbs. gain ²	\$16.86	\$17.67	\$18.14

1. One animal removed because of urinary calculi.

2. Grain was prepared by Department of Flour and Feed Milling Industries, Kansas State College. Cost per 100 lbs.: rolled corn, \$3; rolled milo, \$2.85; and pelleted milo, \$2.99.

Table 52

Results of Implanting 24 and 36 Milligrams Stilbestrol and Synovex Pellets with Beef Steer Calves on a Fattening Ration.

February 12, 1957, to April 9, 1957—56 days.

Treatment	Control	24 mgs. stilbestrol	36 mgs. stilbestrol	Synovex ²
Number calves per treatment	9	9	8 ¹	9
Av. initial wt., lbs.	618.9	614.4	611.3	610.0
Av. final wt., lbs.	737.8	755.6	757.5	745.0
Av. daily gain per calf, lbs.	2.12	2.52	2.61	2.41

1. One calf removed because of urinary calculi.

2. Contains 1000 mgs. progesterone and 20 mgs. estradiol benzoate.

The Use of a Pelleted Ration for Fattening Beef Heifers (Project 222).

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

An experiment previously conducted at this station demonstrated that beef heifers fed a completely pelleted ration made inferior gains, and had significantly lower carcass grades and dressing percentages than heifers fed the same balanced fattening ration in a natural state. However, these heifers consumed materially less of the pelleted ration and converted the feed to flesh as efficiently as the more rapidly gaining control group of heifers. There was definite evidence that the heifers consuming the pelleted ration ruminated less and craved coarse roughage. The experiment reported here was designed to determine if feeding limited quantities of natural roughage would stimulate feed consumption and permit normal rumination and normal gains of heifers fed pelleted rations.

(68)

Procedure

Twenty yearling heifers of good to choice quality were used. The heifers were purchased in the fall of 1954, used in wintering experiments until May 7, 1955, and continued on a growing ration in dry lot until June 15. Assignment of the heifers to lots in this experiment was on the basis of weight, feeder grade, and winter treatment.

The experimental rations were prepared in the following manner:

Lot 1—Coarsely cracked corn, cottonseed meal, and blackstrap molasses were commercially mixed together. The alfalfa hay was chopped as coarsely as possible in a forage chopper and blended with the other ingredients as the ration was self-fed to the heifers.

Lot 2—This ration was prepared by finely grinding, mixing, and pelleting the ingredients into pellets $\frac{3}{8}$ inch in diameter. In addition to these pellets, 10 pounds of long alfalfa hay was fed per heifer daily for the first 3 days of the experiment. The hay intake was gradually decreased until a level of 1½ pounds per head daily was reached at the end of 12 days. This amount of hay was hand-fed daily while the pellets were self-fed during the remainder of the trial. For the first 43 days of the study the composition of the pellets was corn, 65 percent; molasses, 5 percent; cottonseed meal, 5 percent; and alfalfa hay, 25 percent. During the last 70 days the corn content of the pellets was increased to 70 percent and the alfalfa decreased to 20 percent. This change permitted the concentrate intake to be maintained at a higher level during the latter phase of the full-feeding period. The concentrate-to-hay ratio was equalized as nearly as possible between lots throughout the experiment.

It is recognized that these rations in the quantities consumed by the heifers provided more protein than is normally fed to fattening cattle. The cottonseed meal was included in the mixture to insure that the daily protein intake would be adequate for maximum gains in both lots even though the total feed consumption might be lower in one of the lots. Molasses was included in the rations to improve the consistency of the mixture and to facilitate the pelleting process.

Observations

1. Feed consumption was materially higher for the cattle fed the coarsely ground grain and chopped hay ration.
2. Feed efficiency was significantly improved by pelleting the ration.
3. Rate of gain, rumination, and the general feed-lot performance were normal for the heifers fed the pelleted ration and a small quantity of alfalfa hay. This small quantity of coarse roughage appears to be essential in obtaining a normal rate of gain and feed-lot performance from cattle fed pelleted rations. This observation is based on a comparison of these results with those of the previous experiment as well as results of tests conducted at other experiment stations.

Table 53

A Study of the Preparation of Rations for Fattening Beef Heifers.

Management	Chopped hay and coarsely ground grain ration	Pelleted ration
Lot number	1	2
Number heifers per lot	10	10
Initial wt., lbs.	710	710
Final wt., lbs.	1011	1000
Gain per heifer, lbs.	301	290
Daily gain per heifer, lbs.	2.66	2.57
Daily ration per heifer, lbs.:		
Corn	14.74	
Cottonseed meal	1.13	
Molasses	1.13	
Alfalfa hay	7.13	2.01
Salt	.02	.02
Pellets		17.58
% concentrate	70.5	70.0

(69)

Table 53 (Continued).

% roughage	29.5	30.0
Lbs. feed per cwt. of gain:		
Corn	553.2	
Cottonseed meal	42.6	
Molasses	42.6	
Alfalfa hay	267.8	78.3
Salt8	.9
Pellets		685.2
Total	907.0	764.4
Feed cost per cwt. of gain ¹	\$ 22.62	\$ 21.80
Initial cost of heifer @ \$19	\$134.90	\$134.90
Feed cost per heifer	\$ 68.10	\$ 63.22
Heifer cost plus feed cost	\$203.00	\$198.12
Market wt., lbs.	987	995
Necessary selling price	\$ 20.57	\$ 19.91
Selling price per cwt.	\$ 21.50	\$ 21.50
Dressing %	61.8	60.8
Carcass grades: ²		
Choice +	1	
Choice	6	3
Choice -	1	3
Good +	1	3
Good	1	
Marbling score:		
Moderate	6	2
Modest	2	3
Small	1	3
Slight	1	1

1. Feed prices: corn, \$2.87 per cwt.; cottonseed meal, \$72 per ton; alfalfa hay, \$20 per ton; molasses, \$2.20 per cwt.; salt, \$15 per ton; preparation of pelleted ration (grinding, mixing, pelleting, and hauling), \$12 per ton; preparation of coarse concentrate mixture (mixing and hauling), \$5 per ton.

2. The carcass grade for one heifer from lot 2 was lost.

Sources of Phosphorus for Beef Cattle (Project 536¹).

D. Richardson, E. F. Smith, B. A. Koch, and R. F. Cox

In a previous test it was found that phosphoric acid can be used as a source of phosphorus for beef heifer calves on dry bluestem pasture. A phosphorus balance study with lambs also indicated efficient use of phosphorus from phosphoric acid. This test was conducted to further evaluate phosphoric acid as a source of phosphorus in the wintering and fattening ration under dry-lot feeding conditions.

Experimental Procedure

Seventy-four Hereford heifer calves were divided into five lots as equally as possible on the basis of weight and type. Ten animals were placed in the control lot and 16 animals in each of the others.

The control ration consisted of $\frac{3}{4}$ pound of soybean oil meal, $\frac{1}{2}$ pound of dehydrated alfalfa meal, 2 pounds of dehydrated ammoniated hydrol product (Dex-Mo-Lass made with ammoniated hydrol), and all of a corncob-blackstrap molasses mixture that the animals would clean up each day. The corncob-molasses mixtures contained approximately 22 percent molasses for the first 84 days. It was then increased to 40-45 percent molasses. When the molasses concentration was increased, $1\frac{1}{2}$ percent each of ground limestone and salt was added to retard "setting up" of the mixture. The limestone was decreased to $\frac{3}{4}$ percent after about 30 days. The soybean oil meal and dehydrated alfalfa meal were made into pellets containing approximately 10 percent molasses. The added phosphorus was put in these pellets in the form of phosphoric acid

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

or steamed bonemeal. Salt alone and a mixture of ground limestone and salt were available to all animals free choice.

The control ration supplied approximately 6 grams of phosphorus per head per day. This is one half the National Research Council recommendation of 12 grams per head per day. Source and amount of phosphorus in the ration were the only variations. The treatments were as follows, which indicate the amount of added phosphorus per head per day:

Lot 1—Control ration.

Lot 2—Control ration + 3 grams phosphorus from phosphoric acid.

Lot 3—Control ration + 6 grams phosphorus from phosphoric acid.

Lot 4—Control ration + 3 grams phosphorus from steamed bonemeal.

Lot 5—Control ration + 6 grams phosphorus from steamed bonemeal.

Blood samples were taken at the end of the wintering phase to determine serum phosphorus and calcium levels.

After the end of the wintering phase, approximately 30 days were used to adjust the animals to hay and grain before starting the fattening phase. At the beginning of the fattening phase, lots 2, 3, 4, and 5 were subdivided into two groups each, i.e., 2 and 2A. One group continued to receive supplemental phosphorus; the other group did not. This was to determine the value of supplemental phosphorus in the fattening ration. The control animals in lot 1 never got any supplemental phosphorus. Carcass data were obtained after slaughter. The shank bone from the right front leg was obtained for measurements and ash determination.

Results and Discussion

Wintering phase: Results are presented in Table 54. As the experimental ration used in this test was designed to be low in phosphorus, the roughage and source of energy had to be from ingredients low in phosphorus. Although there was considerable variation from time to time in consumption of the corncob-molasses mixture, no difficulty was experienced in keeping the animals on feed. After increasing the percentage of molasses, the animals were getting approximately 1 pound of molasses per 100 pounds bodyweight. Trouble with scouring was observed when the consumption of molasses exceeded that quantity.

Fattening phase: Feedlot, carcass, and bone data are shown in Table 55. It was discovered early in the fattening phase that four of the heifers were pregnant and they were removed from the test (3 from lot 2 and 1 from lot 3A). Two animals in lot 3A died but no reason for death was determined by postmortem examination. All animals went on feed without any trouble except the control lot. Some trouble was experienced in getting them on a full feed of grain. They would eat well for a time and then refuse to eat. This happened twice.

Supplemental phosphorus made no significant differences in rate of gain. Feed efficiency tended to be highest with animals that received phosphoric acid as a source of phosphorus. There were no significant differences in carcass grades, dressing percentage, degree of marbling, size of ribeye, or degree of firmness. Shank bones from animals that had received supplemental phosphorus tended to be longer and greater in diameter and thickness.

Observations

Wintering phase:

1. No harmful or ill effects of any kind were observed from feeding phosphoric acid as a source of phosphorus.

2. No deficiency symptoms, phosphorus, vitamin A, etc., were observed. Animals in all lots gnawed on the fence; however, there were no differences among lots.

3. Feed containing phosphoric acid was highly palatable and the total consumption tended to be greater.

4. Rate of gain and feed efficiency increased as the level of phosphorus was increased. There was no difference between steamed bonemeal and phosphoric acid at the higher level; however, phosphoric acid tended to be more efficient at the lower level.