

production of these young heifers has not been satisfactory even on the high level of wintering. Increased calf gains on the high level may not increase the value of the calf in an amount equal to the increased feed costs.

Preliminary results with different age groups of cattle indicate that relatively large quantities of supplemental winter feed are necessary to obtain differences in weight gains. The provision of large quantities of supplemental feed decreases considerably the voluntary intake of prairie hay.

Effect of Pelleting and Steam Rolling Milo, With and Without Enzymes, For Fattening Steer Calves

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Previous studies have shown that fine grinding and pelleting milo results in slightly greater gains than feeding dry, rolled milo, and 10 percent less milo is required to produce 100 lbs. gain. In these studies, however, there was a considerable difference in degree of fineness between the dry rolled product and the milo which was finely ground before pelleting. Hence, it is necessary to study the effect of pelleting milo of the same degree of fineness or particle size.

Research at the Maryland Station suggests that steam heating certain grains may alter the proportion of end products from rumen fermentation and thus improve the utilization of the feed for certain body processes. It is possible that this effect may occur to some extent when milo is pelleted. To test this hypothesis, two lots of steer calves received milo which had been pelleted and then reground to approximately the same particle size as was present prior to the pelleting process.

In an additional lot, milo was steam-rolled so that its value could be compared to either the ground or pelleted grain. Little information is available as to the value of steam-rolling vs. grinding or dry-rolling milo.

Recent research at Iowa has suggested that the addition of a starch-splitting enzyme product to rations containing dry corn improves gains and feed efficiency. If this is true, a certain amount of starch may escape breakdown and digestion in the rumen or intestinal tract of cattle. To date, few trials have been reported in which enzymes were added to milo rations. In the trial reported herein, one lot of steers receiving each of three different preparations of milo were fed a small amount (.0075 lb./day) of a commercial enzyme product, mixed with the protein supplement.

Procedure¹

Seven lots of nine Hereford steer calves each were selected from the station herds at Ft. Reno and Lake Blackwell in early October. Following an overnight shrink, they were divided in seven equal groups on the basis of weight, feeder grade, and source and the groups assigned to treatment at random.

All lots were started on a small amount of milo and worked up to a full-feed. In addition, all steers received 1.6 lb. of cottonseed meal, 1.0 lb. dehydrated alfalfa meal pellets per head daily, plus a limited amount of sorghum silage and cottonseed hulls. The different milo products were prepared in 30-day batches at a local mill. Five calves in each lot were implanted with 24 mg. stilbestrol at the beginning of the trial. In an attempt to avoid respiratory disorders which have plagued feeding trials in the past, 250 mg. aureomycin per calf daily was added to the protein supplement for 10 days early in the trial. All calves had access to a mineral mixture of 2 parts salt and one part bone meal.

The treatments, by lots, were as follows:

- Lot 1—Finely ground and pelleted milo.
- Lot 2—Same as Lot 1 plus .0075 lb. agrozyme per head daily in the cottonseed meal.
- Lot 3—Finely ground and pelleted milo (3/8 inch cube).
- Lot 4—Same as Lot 3 plus enzyme.
- Lot 5—Reground pelleted milo.
- Lot 6—Same as Lot 5 plus enzyme.
- Lot 7—Steam rolled milo.

Some difficulty was encountered in regrinding the pelleted milo to the same approximate particle size as was present in the ground milo before pelleting. The most suitable method appeared to be the use of a roller since processing the cubed milo through the same hammer mill as before caused an extremely fine and dusty product.

At the completion of the trial, a shrunk weight was obtained and the calves were appraised by a committee composed of the project leader and two representatives of the Oklahoma City yards. Following Feeders' Day, the cattle will be marketed at Oklahoma City and detailed slaughter data will be obtained.

Results

The average results, by lots, are shown in Table 1. Four of the 7 lots lost money due to relatively low gains and the severe negative margin existing between feeder calves and finished steers. Considering the quality of these calves and the low cost of feeds, they probably should have been fed for an additional 30 to 45 days for a higher selling price. A difference of \$3.00 per cwt. existed between live cattle of the Good and Choice grades in market value. However, in the comparison of the

¹The amylolytic enzyme preparation used in this study ("Agrozyme") was supplied by Merck and Co., Rahway, New York. The stilbestrol implants used were supplied by Chas. Pfizer and Co., Terre Haute, Ind.

Table 1.—Comparison of Finely Ground, Pelleted and Steam Rolled Milo, With and Without Enzymes, for Fattening Steer Calves (156 Days).

Preparation of Milo Lot Number Treatment	Finely Ground		Ground and Pelleted		Reground Pellets		Steam Rolled	
	1 Control	2 +Enzymes	3 Control	4 +Enzymes	5 Control	6 +Enzyme	7 Control	8 Control
No. calves/lot	9	9	9 ¹	9	9	9 ¹	9	9
Ave. weights, lb.								
Initial, Oct. 28	454	459	474	457	457	464	471	471
Final, April 1	794	788	794	752	781	780	784	784
Ave. daily gain	2.18	2.11	2.05	1.89	2.08	2.03	2.01	2.01
Ave. daily ration, lb.	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2
Milo	11.08	11.54	10.20	10.24	11.44	11.00	12.12	12.12
C. S. Meal ²	1.56	1.53	1.59	1.55	1.56	1.56	1.56	1.56
Dehyd. alfalfa meal pellets	1.11	1.09	1.14	1.09	1.11	1.13	1.11	1.11
Sorghum silage	7.69	7.56	7.64	7.55	7.62	7.55	7.55	7.55
C.S. hulls	1.87	1.92	1.79	1.88	1.89	1.87	1.89	1.89
2-1 mineral mix	.08	.08	.08	.08	.08	.08	.08	.08
Feed/cwt. gain, lb.	18.26	18.72	17.35	17.37	18.62	18.19	19.22	19.22
Milo	508	547	498	542	550	542	603	603
C. S. meal	72	73	78	82	75	77	78	78
Roughage	489	507	516	558	511	525	525	525
Feed cost/cwt. gain, \$ ³	15.37	16.24	16.32	17.62	18.08	18.07	17.63	17.63
Appraised value/cwt., \$ ⁴	24.11	24.33	25.00	23.56	24.33	24.50	24.67	24.67
Total value/steer, \$	191.43	191.72	198.50	177.17	190.02	191.10	193.41	193.41
Total steer & feed cost, \$ ⁵	188.46	191.15	194.38	189.06	195.77	196.42	196.59	196.59
Net return over steer & feed, \$	2.97	0.57	4.12	-11.89	-5.75	-5.32	-3.18	-3.18

¹One steer removed from Lot 3 early in test for urinary calculi, data on this steer not included.
²One steer removed from Lot 6 for urinary calculi late in trial, data included up to time of removal.
³0.075 lb. Agrozyme added to C.S. meal fed lots 2, 4, and 6.
⁴Cost of grinding or steam rolling milo—\$3.00/ton. Cost of pelleting—\$3.00/ton.
⁵Market value: Good = \$24.00/cwt., Top Good = 25.00/cwt., etc.
⁶Feeder calf value = \$30.00/cwt. Does not include other costs such as labor, transportation, equipment, marketing, etc.

8.28
8.46
8.96
9.18
8.96
8.96
9.58

different treatments, it is believed that these relatively low grades have little effect on the results.

1. Effect of Grinding, Pelleting, or Steam Rolling Milo

The performance of calves of Lots 1, 3, 5, and 7 may be compared to study the effect of pelleting or steam rolling milo on rate of gain, feed intake, feed efficiency, and appraised market value. The essential results have been summarized as follows:

Lot	Milo Treatment	Milo			Feed Cost Per Cwt. Gain	Appraised Mkt. Value Per Cwt.
		Average Daily Gain	Per Head Daily	Per Cwt. Gain		
		lb.	lb.	lb.	\$	\$
1	Finely ground	2.18	11.1	508	15.37	24.11
3	Ground and pelleted	2.05	10.2	498	16.32	25.00
5	Pelleted and reground	2.08	11.4	550	18.08	24.33
7	Steam rolled	2.01	12.1	603	17.63	24.67

The above data point up the fact that the physical state in which milo is fed affects feed intake, efficiency of feed use, and cost of producing 100 lbs. gain. It was pointed out, in past studies finely ground and pelleted milo was utilized about 10 percent more efficiently than dry, rolled milo of a medium degree of fineness. The ground product used in these studies (processed through a 1/8 inch screen) was considerably finer than most cattle feeders would prefer.² While less palatable than steam rolled milo, it resulted in faster gains. Pelleting the finely ground milo reduced its palatability, with calves eating about 1.0 lb. less per head daily. Reground pelleted milo was essentially as palatable as the meal before pelleting. Steam rolled milo was the most palatable of the four different milo products and calves consumed 1 to 2 lbs. more per head daily. However, average daily gains were 0.17 lb. less for calves fed steam rolled vs. the finely ground product.

Slightly less of the pelleted product was needed per cwt. gain as compared to ground milo or reground pellets. Part of this may be due to the lower feed intake of the pellet-fed cattle. The reground, pelleted milo group (Lot 5) required 52 to 42 lbs. more grain per cwt. gain than the ground or pelleted groups. A marked reduction in feed efficiency was noted with calves fed the steam rolled product. Approximately 100 lbs. or 25 percent more steam rolled milo was required when compared to the finely ground or pelleted milo groups.

Feed cost per 100 lbs. gain showed the effect of additional pelleting and grinding costs in Lots 3 and 5. Due to high grain consumption, calves fed steam rolled milo had higher feed cost per 100 lb. gain than ground milo or pellet-fed calves. Calves fed the pelleted product or steam rolled milo (Lots 3 and 7) had slightly higher appraised value than Lots 1 and 5 fed the ground products.

These results show no beneficial effect from the pelleting process, and raise fundamental questions as to the best particle size for most

² In regard to particle size, in one sample 89.4% of the ground milo passed through a 1/25 inch screen sieve, and 36% passed through a 1/40 inch screen.

efficient gains. Previous tests at Kansas have indicated a higher feed efficiency from finely ground vs. coarsely ground or rolled milos. Some scouring and looseness occurred among calves on the finely ground milo early in the trial, prompting the use of about 2 lbs. of cottonseed hulls per head daily after the second week of the test. During the latter half of the trial, there was no noticeable effect of milo fed on firmness of the droppings. Much of the steam rolled milo appeared to pass through the calves. One calf in Lot 7 foundered near the completion of the trial, but made gains nearly average of the lot and was included in the data.

2. Effect of Adding an Enzyme Preparation

The average performance of 3 lots of calves fed a small amount of a starch-splitting enzyme product can be compared with calves not receiving the enzyme preparation. The average results of the three lots are shown below.

Lots	Enzyme treatment	Ave. Daily Gain	Daily milo intake	Feed/Cwt. Gain			Feed cost/ cwt. gain	Appraised value per cwt.
				Milo	C.S.M.	Rough.		
		lb.	lb.	lb.	lb.	lb.	\$	\$
1,3,5	Control	2.10	10.9	519	75	505	16.59	24.48
2,4,6	Enzyme-fed lots	2.01	10.9	544	77	530	17.31	24.13

The results indicate no beneficial effect on rate of gain, milo intake, or feed efficiency from adding a crude enzyme product to the protein supplement. The enzyme-fed lots had a slightly higher feed cost per cwt. gain, although no charge was made for the enzyme product used. Appraised market values favored the control lots. It is apparent from individual lot data in Table 1 that the only marked effect from the addition of an enzyme to the three types of milo occurred in Lot 4, fed the pelleted milo. No reason is apparent for the depressing effect observed.

3. Effect of Stilbestrol Implants

As mentioned in the procedure, 5 calves in each lot were implanted with 24 mg. and 4 left as controls. The average results of all calves are shown in Table 2. Implanted calves gained 0.16 lb. per head daily or 8% faster, which is slightly less advantage than the majority of implanting tests have shown. In addition, implanted calves were slightly higher in appraised market value, and this combination resulted in about \$8.43 more value per head.

This phase of the study was not undertaken to demonstrate again the effect of stilbestrol implants, which has been observed many times. Rather, the aim was to provide carcasses for detailed studies of the effect of implanting on carcass grade—especially marbling, firmness, and fat cover of the rib eye. During the past few years, carcass grades of stilbestrol fed or implanted cattle at this station have been disappointing. Most tests on carcass characteristics as influenced by stilbestrol treatment

have been with yearling or older cattle. It was felt necessary under our conditions to reopen the issue with young calves fed to Good to Choice carcass grades to study the influence of the hormone-like drug.

Table 2.—Effect of 24 mg. Stilbestrol Implants on Performance of Fattening Steer Calves.

	Controls	Implanted
No. Calves ¹	27	35
Ave. Weights, lb.		
Initial	461	463
Final	767	793
Total Gain	306	330
Ave. Daily Gain	1.96	2.12
Initial Feeder grade	B(4.4)	B(4.37)
Final appraised value/cwt., \$	24.19	24.46
Total value per steer, \$	185.54	193.97

¹ 4 Control calves and 5 implants per lot. One calf from Lot 3 control removed early in the trial for urinary calculi.

Summary

Seven lots of 9 Hereford calves each were fed for 156 days in a study designed to test the effect of different methods of milo preparation, enzyme additions, and 24 mg. stilbestrol implants on rate of gain and feed efficiency. Results show that calves fed finely ground milo gained slightly faster than those fed pelleted or pelleted and reground milo. Calves receiving steam rolled milo consumed more grain, but were least efficient in feed conversion. Gains of this group of calves were more costly than for ground or pelleted milo groups. Pelleting the finely ground milo reduced grain intake and increased the feed cost per cwt. gain. The pelleting process had no beneficial effect on milo utilization. Adding a crude enzyme preparation had no beneficial effect on performance or feed efficiency in three comparisons. Implanting steer calves with 24 mg. at the start of the fattening trial increased gains by about 8% and increased market value by \$8.43 per head.