Table 3.—Average daily gains, feed conversions, and feed costs for medicated and control pigs over the entire feeding period.

Trial	Lot	Ration	No. pigs	Av. In. Wt., lbs.	Av. Fin. Wt. lbs.	Av. daily gain, lbs.	Lbs. feed per 100 lbs. gain	Feed cost per 100 lbs. gain, $
	1	Medicated	10	38.2	207.6	1.73	338	9.31
I	2	Control	10	39.1	205.3	1.58	408	10.78
		Difference		—0.9	2.3	0.15	—70	—1.47
	3	Medicated	9*	39.7	202.4	1.69	349	9.59
II	4	Control	10	36.1	201.9	1.42	350	9.25
		Difference		3.6	0.5	0.27	—1	0.34
	5	Medicated	10**	26.6	195.1	1.41	385	10.69
III	6	Control	10	25.8	198.7	1.29	369	9.76
		Difference		0.8	—3.6	0.12	16	0.93
	7	Medicated	10	24.5	207.7	1.59	333	9.13
IV	8	Control	9***	24.7	198.0	1.30	350	9.29
		Difference		—0.2	9.7	0.29	—17	—0.16
		Medicated	39	32.2	203.2	1.60	351	9.68
All		Control	39	31.4	201.0	1.40	369	9.77
		Difference		0.8	2.2	0.20	—18	—0.09

*One pig died.

**Two pigs were removed because of broken legs before they completed the test, but they were still counted in the test.

***One gilt in this lot was removed February 13 and not counted in the test. She had an extremely bad case of Rhinitus and weighed only 65 lbs. at the time of removal—120 days after the beginning of the test. One other gilt in this lot gained only 0.99 lbs. per day. She lost weight the last 2 weeks she was on test, but she was included in the results.

Improving the Utilization of Milo for Fattening Calves: Value of Fine Grinding and Supplemental Vitamin A[1]

Robert Totusek, Dwight Stephens and Lowell Walters

Milo (sorghum grain) is the most abundant feed grain available for fattening cattle in Oklahoma and in the southwest in general. Previous experiments at this station (see Feeders' Day Reports for former years), as well as results reported from other experiments stations, have shown that milo has a lower feeding value than corn. Milo is primarily inferior to corn in terms of feed efficiency, with as much as 10% more feed commonly required per unit of gain. Efforts are being continued to improve the utilization of milo in cattle fattening rations through research at this station.

[1] The vitamin A used in this study was generously provided by Dr. H. A. Bechtel, Dawes Laboratories Inc., 4800 South Richmond, Chicago 32, Illinois.

Previous tests with limited numbers of steers indiacted that the fine grinding of milo improved its efficiency of utilization. Coarse and fine grinds of milo were directly compared in this experiment, with sufficiently adequate numbers to justify rather definite conclusions.

The vitamin A requirements of beef cattle are being re-evaluated today. Since milo is almost devoid of carotene (the precursor of vitamin A), the value of supplemental vitamin A in a milo base ration was determined.

PROCEDURE

Eighty Hereford steer calves with an average weight of 475 lbs. and an average age of approximately 7 months were obtained from Experiment Station herds. They were divided into eight lots, primarily on the basis of sire and weaning weight. The heavier calves (average weight 516 lbs.) were assigned to Lots 1-4, and the lighter calves (average weight 435 lbs.) to Lots 5-8, with the four lots in each of the two replicates comparable in initial age, grade and weight. The feeding trial was conducted at the Ft. Reno Station.

The calves were fed 168 days, from November 15, 1962, to May 2, 1963. Both initial and final weights were obtained on a shrunk basis, with the calves allowed no access to feed and water for a 16 hour period. At the conclusion of the feeding period, the calves were shipped to Oklahoma City for slaughter. Carcass information was obtained after a 48 hour chill.

The ingredient makeup of the basal ration, formulated to contain 12% crude protein, is given in table 1. The average chemical composition of the ration is shown in table 2. Ration treatments consisted of coarse versus fine grinding of the milo grain, and supplemental vitamin A versus no supplemental vitamin A. The experimental design is shown in table 3. It should be noted that it was possible to compare 40 calves fed coarsely ground milo with 40 fed finely ground milo, and 40 fed supplemental vitamin A with 40 which received no supplemental vitamin A.

All rations were self-fed during the entire feeding period. A mineral mixture of equal parts salt and steamed bonemeal was offered free-choice

Table 1: Ingredient Makeup of the Ration

Feed	%
Milo, ground	40.0
Cottonseed meal	12.5
Ground alfalfa hay	10.0
Molasses	7.5
Cottonseed hulls	30.0

Table 2: Average Chemical Composition of Milo and the Complete Ration

	Crude Protein %	Crude Fiber %	Ether Extract %	Ash %	N.F.E. %	Calcium %	Phosphorus %
Milo	10.2	1.3	2.9	1.3	77.7	.02	.18
Complete ration	12.9	17.6	2.9	4.0	54.8	.27	.33

Table 3: Design of the Experiment

Lot	1	2	3	4	5	6	7	8
Milo grind*	Coarse	Coarse	Fine	Fine	Coarse	Coarse	Fine	Fine
Supplemental vitamin A**	0	+	0	+	0	+	0	+

*Coarsely ground milo was processed through a hammer mill with a 1/2 inch screen, finely ground milo with a 1/8 inch screen.

**Vitamin A, when included in the ration, was fed at a level of 1,000 I.U. per lb. of ration.

at all times. Water, heated in winter, was always available, and access to both an open shed and an outside pen was provided for each lot. Aureomycin was fed at an approximate level of 70 mg. per head daily. No hormones were used.

RESULTS

Coarse Vs. Fine Grinding of Milo

Feedlot Performance

Performance information is summarized in table 4. Calves fed coarsely ground milo gained slightly faster than calves fed finely ground milo. However, the difference was small, and more important are the differences in feed data. Even though the calves fed finely ground milo gained almost as rapidly, they consumed 1.8 lb. less feed daily and required 5.2% less feed (48 lbs. per 100 lbs. gain) than the calves fed coarsely ground milo. This supports and extends previous observations at this station. The fact that the ration containing finely ground milo was consumed in smaller quantity than the ration containing coarsely ground milo should not be considered strictly a disadvantage, since rate of gain was not greatly affected. Apparently, energy in the finely ground milo was more efficiently utilized and less feed was required to satisfy the daily energy requirement of the calves than was true of the coarsely ground milo.

Slaughter and Carcass Information

Dressing percentage and carcass data are given in table 5. Averages for dressing percentage, quality grade, ribeye area, and fat covering were almost identical for calves fed the two differently ground milo grains. The reason for the higher yield of trimmed retail cuts from the calves fed finely ground milo is not obvious, and certainly would not be anticipated when the similarity in fatness and apparent muscling is considered.

Table 4: Feedlot Performance of Steer Calves Fed Coarsely vs. Finely Ground Milo (168 Days)

	Milo Grind	
	Coarse	Fine
No. calves started	40	40
No. calves completed test	38*	36*
Av. initial wt., lb.	475**	475**
Av. daily gain, lb.	2.70**	2.65**
Av. daily feed intake, lb.	25.1	23.3
Feed per cwt. gain, lb.	929	881

*Losses were as follows, by treatment:
Coarsley ground milo:
Urinary calculi — 1 calf
Chronic bloat — 1 calf
Finely ground milo:
Urinary calculi — 4 calves

**Initial and final weights were taken after a 16 hour shrink without feed and water.

Table 5: Slaughter and Carcass Information of Steer Calves Fed Coarsely vs. Fine Ground Milo

	Milo Grind	
	Coarse	Fine
Dressing %*	60.8	61.0
Quality grade**	8.8	8.8
Ribeye area, sq. in.***	9.9	9.9
Fat over ribeye, in.†	.72	.68
Trimmed retail cut yield, %††	46.5	48.0

*Calculated on basis of shrunk Ft. Reno live weight and chilled carcass weight.

**U.S.D.A. quality grade converted to following numerical designations: high prime—15, average prime—14, low prime—13, high choice—12, average choice—11, low choice—10, high good—9, average good—8, low good—7.

***Determined by measurement of tracings of ribeye.

†Average of three measurements determined on tracings of the ribeye.

††Calculated as follows: % of carcass as boneless trimmed retail cuts from the four major wholesale cuts = 51.34 − 5.78 (fat thickness) − .462 (% kidney fat) + .740 (ribeye area) − .0093 (carcass weight).

Supplemental Vitamin A

Feedlot Performance

Gain and feed data are shown in table 6. Calves fed supplemental vitamin A (1,000 I.U./lb. of ration) gained slightly faster, consumed slightly more feed, and were slightly less efficient than calves which did not receive supplemental vitamin A. However, differences were small and probably of little significance. It appears that the carotene furnished by the basal ration, which contained 10% alfalfa, was adequate, along with liver stores of vitamin A, to meet the vitamin A requirements of the calves during the feeding period.

Slaughter and Carcass Information

Differences in dressing percentage, carcass quality grade, ribeye area, and fat covering between treatments were negligible (table 7). There seems to be no logical explanation for the difference in trimmed retail cut yield which was observed.

SUMMARY

Fine grinding of milo resulted in a 5.2% improvement in feed efficiency compared to coarse grinding. Rate of gain was only slightly decreased.

The use of finely ground milo in fattening beef cattle rations should be considered, especially in high roughage rations. However, a finely

Table 6: Feedlot Performance of Steer Calves With and Without Supplemental Vitamin A (168 Days)

	Supplemental Vitamin A	
	0	1,000 I.U./lb. Ration
No. calves started	40	40
No. calves completed test	36*	38*
Av. initial wt., lb.**	475	475
Av. daily gain, lb.**	2.64	2.70
Av. daily feed intake, lb.	23.7	24.7
Feed per cwt. gain, lb.	898	913

*Losses were as follows, by treatment:
No supplemental vitamin A:
Urinary calculi — 3 calves
Chronic bloat — 1 calf
Supplemental vitamin A:
Urinary calculi — 2 calves

**Initial and final weights were taken after a 16 hour shrink without feed and water.

Table 7: Slaughter and Carcass Information of Steer Calves With and Without Supplemental Vitamin A

	Supplemental Vitamin A	
	0	1,000 I.U./lb. Ration
Dressing %*	60.8	61.0
Quality grade**	8.8	8.9
Ribeye area, sq. in.***	10.0	9.9
Fat over ribeye, in.†	.68	.71
Trimmed retail cut yield, %††	48.1	46.4

*Calculated on basis of shrunk Ft. Reno live weight and chilled carcass weight.

**U.S.D.A. quality grade converted to following numerical designations: high prime—15, average prime—14, low prime—13, high choice—12, average choice—11, low choice—10, high good—9, average good—8, low good—7.

***Determined by measurement on tracings of the ribeye.

†Average of three measurements determined on tracings of the ribeye.

††Calculated as follows: % of carcass as boneless trimmed retail cuts from the four major wholesale cuts = 51.34 − 5.78 (fat thickness) − .462 (% kidney fat) + .740 (ribeye area) − .0093 (carcass weight).

ground product may be less desirable in high concentrate rations, and certain management factors may also influence the choice of grind. For example, if neither molasses nor fat is used, a coarsely ground or rolled milo may be most desirable due to the dustiness of finely ground milo.

The addition of supplemental vitamin A (1,000 I.U./lb. of ration) to a ration containing 10% alfalfa and milo as the grain was of little apparent benefit.

Trace Mineral Supplements to "All-Barley" Rations For Fattening Steers

R. Renbarger, L. S. Pope and George Waller

A serious problem to cattle feeders in the Southwest during recent years has been the high cost of roughage in finishing rations. Most feeders now use much more grain than in the past, and drop the roughage to 10-15%, in finishing rations. It has been possible in experiments to reduce the roughage content to zero and depend on steam-rolled grains for the necessary bulk in the diet.

Experiments at several stations over the past 5 years have demonstrated that steamed rolled barley, properly supplemented, can make up the entire ration. Studies at the Ft. Reno station have been designed to