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High protein sorghum grain with no added protein in all concentrate cattle finishing rations; Urea and soybean oil meal in all concentrate rations

Abstract

Trials at several research centers as well as in Kansas (Bulletin 483, page 32) have shown roughage may be satisfactorily omitted from finishing rations for cattle and doing so, often reduces feed required per pound of gain. That has made it feasible to try to finish cattle on all grain diet⁵, when the grain has sufficient protein, and to omit other protein sources as well as roughage. Other research on this subject is reported in Kansas Bulletins 493 and 507 and on page in this bulletin.

Keywords

Cattlemen's Day, 1968; Report of progress (Kansas State University. Agricultural Experiment Station); 518; Beef; Protein; Sorghum grain; Finishing rations; Urea; Soybean oil

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High Protein Sorghum Grain With No Added Protein in all Concentrate Cattle Finishing Rations; Urea and Soybean Oil Meal in all Concentrate Rations, (Project 253-6), 1967.

E. F. Smith, D. Richardson, C. L. Drake and B. E. Brent

Trials at several research centers as well as in Kansas (Bulletin 483, page 32) have shown roughage may be satisfactorily omitted from finishing rations for cattle and doing so, often reduces feed required per pound of gain. That has made it feasible to try to finish cattle on all grain diets, when the grain has sufficient protein, and to omit other protein sources as well as roughage. Other research on this subject is reported in Kansas Bulletins 493 and 507 and on page in this bulletin.

To further evaluate sorghum grain as the only source these rations were compared: sorghum grain with no added protein, sorghum grain and 1 percent urea; and sorghum grain and soybean oil meal. Sufficient soybean oil meal was added to equal the protein equivalent supplied by 1 percent urea.

The rations were made as nutritionally adequate as possible by using calcium, trace minerals, stilbestrol, antibiotic and vitamin A in a 50 lb. premix which was added to all rations, as shown in table 8. The premix was added at the mixer as were urea or soybean oil meal. Feed was delivered from the mixer to a self-feeder about once weekly.

Hereford steer calves in this study weighed about 400 lbs. each when received from New Mexico in November, 1966. They were fed alfalfa hay and sorghum silage from November until December 16. On December 16 the alfalfa hay was discontinued (silage continued to be fed in a separate bunk) and the steers were started on a self-feeder containing 40% dehydrated alfalfa crumbles and 60% ground sorghum grain. The proportion of grain in the mixture was gradually increased until by Jan. 3 the steers were receiving only ground sorghum grain in the self-feeder with sorghum silage which was fed in a separate bunk. The silage was gradually reduced until January 9 when the steers were on an all grain diet and this test began.

The sorghum grain came from several fields and varied from 10.4 to 11.2% protein on an air dry basis. Only that from higher protein fields was used.

Results

Differences among the treatments (table 9) were small. Steers receiving urea required least feed per lb. of gain (5.9 to 1); those receiving soybean oil meal required slightly above 6 lbs. and the two lots getting no added protein averaged 6.5 to 1. Feed cost per 100 lbs. of gain was also lowest for steers receiving urea.

Two steers, one with urinary calculi and one that foundered, were removed from the test. No other health problems were observed.

The carcasses graded high good and low choice, however, 16 of the 58 were shipped by the packer before complete carcass data were obtained.

This test indicates that sorghum grain as the only protein source does as surprisingly good job in an all concentrate ration. The addition of urea or soybean oil meal improved feed efficiency slightly. If analysis indicates or if there is any reason to believe grain may be borderline in protein value urea makes a low cost addition for insurance.

Table 8
Composition of Rations¹, 1967

	Sorghum grain	Sorghum grain and 1% urea	Sorghum grain and soybean oil meal
<u>Ingredients per ton</u>			
Ground sorghum grain	1950	1930	1815
Premix	50	50	50
Urea	0	20	0
Soybean oil meal	0	0	135
Total, lb.:	2000	2000	2000

Ingredients in 50 lbs. of premix

Ground limestone	20.0
Trace mineral premix ²	1.0
Stilbestrol premix (1 gram stilbestrol per lb.)	1.0
Vitamin A. premix (10,000 IU per gram)	0.3 (140 grams)
Chlortetracycline premix (10 grams per lb.)	0.8 (380 grams)
Fine ground sorghum grain (enough to make the premix up to 50 lbs.)	26.9
Total, lbs.:	50.0

¹ Salt, free choice

² Percentages of indicated elements in trace mineral premix: manganese, 4.4; iron, 6.6; copper, 1.32; cobalt, 0.23; iodine, 0.30; zinc, 5; magnesium, 20; sulfur, 2.70.

Table 9

High Protein Sorghum Grain With No Protein Added
 In All Concentrate Cattle Finishing
 Rations, Jan. 9, 1967, to June 30, 1967, - 112 days

	Sorghum grain, ground		Sorghum grain, ground and 1% urea		Sorghum grain, ground, and soybean oil meal	
Lot number	18	19	20	21	22	23
Number of steers per lot	10	10	10	9*	10	9**
Av. initial wt. lbs.	494	498	498	500	510	520
Av. final wt. lbs.	939	960	991	944	983	956
Av. daily gain lbs.	2.59	2.69	2.87	2.58	2.75	2.53
Av. daily feed intake, lbs.	16.7	17.6	17.0	15.2	17.0	15.7
Feed required per lb. of gain, lbs.	6.5	6.5	5.9	5.9	6.2	6.2
Feed cost per cwt. of gain, ¹ \$	11.96	12.11	11.20	11.14	12.71	12.79
Percent protein in concentrate mixture (88% dry matter basis)	10.06	10.07	12.11	12.66	12.12	12.27
Cost of concentrate mixture per ton ¹ \$	37.09	37.09	37.83	37.83	41.14	41.14

* Foundered steer removed April 20.

** Steer with urinary calculi removed April 28.

¹ Feed costs used are on inside back cover.