

Sorghum Grain as the Only Protein Source in an All-concentrate Steer Finishing Ration; Value of Oyster Shell in an All-concentrate Ration. (Project 253-6) 1966.

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The National Research Council (publication 1137) recommends 10% protein (90% dry matter) to finish yearling steers. Sorghum grain in Kansas usually contains about 9 to 11 percent protein, although it may vary considerably depending on the variety, soil, weather and other variables (samples have ranged from 6 to 17%). Research has shown that under certain conditions, all-concentrate rations may be practical. Since low protein roughage is not used, a 10 percent protein ration can, in many cases, be formulated from sorghum grain alone.

This experiment was to evaluate sorghum grain as the only protein source in an all concentrate yearling steer finishing ration.

Three treatments were compared with two lots of 10 steers per treatment. The three treatments were:

- Sorghum grain as the only protein source.
- Sorghum grain with 1% urea added.
- Sorghum grain with 0.75% urea and 5% dehydrated alfalfa added.

One of the two lots of steers on each of the above treatments received 2.5 percent oyster shell (hen size) to determine its value as a roughage factor in an all-concentrate ration.

Except for the above variables all rations were formulated to be nutritionally adequate and as nearly equal as possible.

A supplement containing trace minerals, stilbestrol, vitamin A, antibiotic and other ration ingredients was mixed with the dry rolled sorghum grain; the complete ration was fed in a self-feeder.

All sorghum grain used the first half of the trial was from one source and tested 10.2% protein, the remainder, of unknown origin, was from a local elevator. The protein content of each ton of feed mixed was determined (table 22).

Steers were started on a self-feeder with a mixture of 40% bran and 60% dry rolled sorghum grain with all the prairie hay they would consume before the test. Bran and prairie hay were gradually eliminated over 20 days. The experiment started after the steers were on an all sorghum grain ration.

Results by lots are reported in table 22.

Average performance for the two lots on each treatment was as follows:

	Sorghum grain only	Sorghum grain and urea	Sorghum grain, urea and dehydrated alfalfa
Daily gain, lbs.	2.93	2.95	2.80
Daily feed intake	20.8	21.3	21.0
Feed per lb. of gain	7.1	7.2	7.5
Feed cost/100 lbs., gain	\$14.59	15.16	16.20

Sorghum grain was satisfactory as the only protein source for yearling steers when average protein content of the ration was between 9.5 and 9.8 percent protein (88% dry matter).

Average performance for the three lots on oyster shell compared with three lots not receiving oyster shell follows:

	Fed 2.5% oyster shell	No oyster shell fed
Daily gain, lbs.	2.78	3.01
Daily feed intake	20.2	21.9
Feed per lb. of gain	7.3	7.3
Feed cost per 100 lbs. gain	\$15.24	15.39

Oyster shell was of no benefit in this trial; feed costs and feed per lb. of gain were about the same with slightly less gain and finish with oyster shell.

Table 22  
Sorghum Grain as the Only Protein Source in a Steer Finishing Ration; Value of Oyster Shell in an All-concentrate Ration. June 21 to October 8, 1966 - 109 days

Protein source	Sorghum grain only		Sorghum grain and urea		Sorghum grain, urea dehydrated alfalfa	
	No	Yes	No	Yes	No	Yes
Fed 2.5% oyster shell						
Lot number	18	19	20	21	22	23
No. of steers per lot	10	10	10	10	10	10
Av. initial wt. lbs.	741	749	748	735	730	759
Av. daily gain, lbs.	3.02	2.83	3.01	2.89	2.99	2.61
Av. daily feed intake, lbs.	21.1	20.5	21.7	20.9	22.9	19.3
Feed per lb. of gain, lbs. <sup>5</sup>	7.0	7.2	7.2	7.2	7.7	7.4
Feed cost per cwt. of gain, \$	14.42	14.76	15.19	15.12	16.56	15.84
Carcass data:						
Av. carcass wt.	650	644	657	637	641	626
Dressing percent	63.3	63.4	63.6	63.2	63.2	62.5
Carcass grade <sup>1</sup>	19	20	19	19	19	19
Marbling score <sup>2</sup>	6	6	6	7	6	7
Rib eye area, sq. in.	12.10	12.17	12.00	12.05	12.44	12.04
Fat thickness, inches	.6	.5	.6	.5	.6	.5
Yield grade <sup>3</sup>	3	3	3	3	3	3
Composition of self fed concentrate mixture, %:						
Dry rolled sorghum grain	97.5	95.0	97.5	95.0	92.5	90.0
Oyster shell		2.5		2.5		2.5
Dehydrated alfalfa					5.0	5.0
Supplement	2.5	2.5	2.5	2.5	2.5	2.5
Composition of supplement, %:						
Trace mineral premix <sup>4</sup>	2.0	2.0	2.0	2.0	2.0	2.0
Stilbestrol premix (1 gm/lb.)	2.0	2.0	2.0	2.0	2.0	2.0
Vitamin A premix (10,000 IU/gm)	.6	.6	.6	.6	.6	.6
Chlortetracycline premix (10 gms./lb.)	1.4	1.4	1.4	1.4	1.4	1.4
Ground limestone	30.0	30.0	30.0	30.0	20.0	20.0
Urea, 42 percent nitrogen			40.0	40.0	30.0	30.0
Dry rolled sorghum grain	64.0	64.0	24.0	24.0	44.0	44.0
% protein in concentrate mixture (88% dry matter basis)	9.81	9.49	11.14	10.77	11.39	10.89
Cost, concentrate mixture/ton	\$41.24	41.04	42.24	42.04	43.07	42.87

1. Carcass grade score: Low choice, 19; Average choice, 20.
2. Marbling score: Lower score indicates greater degree of marbling.
3. Yield grade: Ranges from 1 to 5, 1 is most desirable.
4. Percent element in trace mineral premix: Manganese - 4.4; iron - 6.6; copper - 1.3; Cobalt - .2; Iodine - .3; Zinc - 12; Magnesium - 20; Sulfur - 2.7.
5. Cost of ingredient prices are on inside back cover.