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All-in-one High Energy Sorghum Silage
Compared With and Without Antibiotic and Conventional
High Energy Sorghum Silage for Feedlot Steers

L.I. Smart and C.L. Drake

Research done here in 1967 and 1968 indicated that adding a complete supplement to forage as it was ensiled gave results equal to using soybean meal at the time of feeding. The research continued to improve the complete silage. Previous work indicated that low levels of antibiotics increased bacterial growth and improved cellulose digestion in vitro. Therefore, two levels of antibiotics were tested in all-in-one silage ensiled and fed during 1968 and 1969.

Materials and Method

Forty Hereford steers averaging 676 pounds were randomly divided into 4 lots of 10 each and twelve (3 on each treatment) were fed individually. All steers were full fed sorghum silage as shown in table 25, for 100 days. Sorghum forage¹ used is being studied for improved digestibility of grain and forage. It is a high-grain, combine-type sorghum with less stalk and more leaves than many varieties.

Four silos were filled simultaneously to reduce field and day variation. All forage came from one field and was transferred to the silos in rotation to insure uniformity among

¹ Sorghum grain supplied by Funk Bros., Lubbock, Texas.

silos. Sorghum forage was field chopped into self-unloading wagons, weighed and supplements were placed on top of the forage. The forage and supplement were then reground² to crack the grain and to further reduce forage particle size. The fine ground and mixed silage was then blown into the silo and packed. Experimental treatments and ration analysis are shown in tables 26 and 27, respectively.

Results and Discussion

Data for group and individually fed steers are shown in tables 28 and 29, respectively; carcass data, in table 30.

Cost per pound of gain was greatest and feed efficiency lowest for both group and individually fed steers receiving sorghum silage with soybean meal added at feeding. Response of steers receiving all-in-one sorghum silage was equal to those on silage and soybean meal. Adding antibiotic to all-in-one sorghum silage increased gain, improved feed efficiency and reduced feed cost per pound gain. Both group and individually fed steers receiving the silage with low level antibiotic showed faster gains, greater feed efficiency and lower cost per pound of gain than those getting more antibiotic. Carcass weights were heaviest of the four groups. Steers receiving the lowest antibiotic level gained significantly faster than steers receiving sorghum silage with soybean meal added at feeding time.

² Wetmore "385" Grinder Blower to regrind sorghum forage was furnished by Wetmore Inc., Tonkawa, Oklahoma.

The data indicate that all-in-one alone and with antibiotic were comparable or superior to sorghum silage ensiled conventionally and fed with soybean meal. Performance of cattle on extremely low levels of antibiotics merits further investigation. Rate of gain shown is somewhat high because the cattle were thin when the experiment started, and end-of-test weights include some mud on the cattle.

One steer receiving all-in-one silage with low antibiotic and one receiving soybean meal were removed for reasons not related to treatments.

Table 25

Indicated Details on Composition of
Experimental Silages

Experimental	Treatment
Silages	
All-in-one silage, low antibiotic	Sorghum silage + 100 lbs. supplement ¹ and 0.2 gm. Chlortetracycline (Aureomycin) per ton added to the forage prior to being reground and blown into the silo.
All-in-one silage, high antibiotic	Sorghum silage + 100 lbs. supplement ¹ and 2.0 gm. Chlortetracycline (Aureomycin) per ton added to the forage prior to being reground and blown into the silo.
All-in-one silage	Sorghum silage + 100 lbs. supplement ¹ per ton added to the forage prior to being reground and blown into the silo.
Conventional silage	Sorghum silage; no supplement added

¹ Supplement composition, lbs.: Urea, 10; limestone, 10; powdered molasses, 10; trace minerals, 1*; vitamin A, 1 (10,000 IU per gm); soybean meal, 40; grain sorghum, 28.

* Trace minerals in % were; manganese, 10; iron 10; calcium, 14; copper, 1; zinc, 5; iodine, 0.3; cobalt, 0.1.

Table 26

Experimental Treatments of Group and Individually
Fed Steers

	Number Group fed	Number Individually fed	
Lots	10	2	All-in-one sorghum silage-low antibiotic ¹
Lots	10	3	All-in-one sorghum silage-high antibiotic ²
Lots	10	3	All-in-one sorghum silage
Lots	9	3	Conventional sorghum silage plus 2# SBM ³ per head per day

¹ 0.2 gm chlortetracycline (aureomycin) per ton sorghum silage.

² 2.0 gm chlortetracycline (aureomycin) per ton sorghum silage.

³ Soybean meal

Table 27

Indicated Contents of Experimental
Silages, Based on Partial Sampling, on
Three Bases: as Fed, 100% Dry Matter, and
Air Dry, Shown Respectively From Top to Bottom

Experimental silages	Dry matter	Crude protein	Ether extract	Ash	Crude fiber	NFE
Conventional	43.94	4.60	1.38	3.57	7.55	26.84
	100	10.47	3.13	7.60	17.19	61.61
	90	9.42	2.82	6.16	15.47	55.40
All-in-one	44.46	6.13	1.22	3.34	7.08	26.69
	100	13.80	2.75	7.52	15.93	60.01
	90	12.42	2.47	6.77	14.34	54.00
All-in-one + high antibiotic	45.08	6.15	1.16	3.39	7.50	26.88
	100	13.64	2.55	7.53	16.63	59.47
	90	12.28	2.30	6.78	14.97	53.67
All-in-one + low antibiotic	45.70	6.09	1.20	3.32	7.28	27.81
	100	13.31	2.62	7.26	15.93	60.88
	90	11.98	2.36	6.53	14.34	54.79

Table 28

Response of Steers Group Fed Sorghum Silage and Soybean Meal or
All-in-one Sorghum Silage With and Without Antibiotic¹

	<u>All-in-one sorghum silage</u> Low antibiotic ²	<u>All-in-one sorghum silage</u> High antibiotic ³	<u>All-in-one sorghum silage</u>	<u>Sorghum silage + 2 lb. SBM⁴ per head per day</u>
No. steers	10	10	10	9
Av. initial wt., lbs	683	670	680	680
Av. final wt. lbs.	994	976	955	956
Total gain, lbs.	311	306	275	276
Av. daily gain, lbs	3.11	3.06	2.75	2.76
Feed per gain (Wet Basis)	15.23	15.44	17.22	17.83
(Air dry basis)	7.73	7.73	8.51	9.08
Feed cost per cwt. gain, \$	11.48	11.72	12.97	13.61
Daily ration per steer, lb.				
All-in-one sorghum silage	47.4	47.2	47.4	--
Sorghum silage	--	--	--	47.2
Soybean meal	--	--	--	2.0
Av. feed consumed per day, lb. (Wet basis)	47.4	47.2	47.4	49.2
Feed per gain				
All-in-one sorghum silage	15.23	15.44	17.22	--
Sorghum silage	--	--	--	17.10
Soybean meal	--	--	--	.73
Total feed per lb. gain	15.23	15.44	17.22	17.83

¹ Chlortetracycline (Aureomycin)

² 0.2 gm chlortetracycline (aureomycin) per ton sorghum silage.

³ 2.0 gm chlortetracycline (aureomycin) per ton sorghum silage.

⁴ Soybean meal

Table 29

Response of Steers Individually Fed Sorghum Silage and Soybean Meal or
All-in-one Sorghum Silage With or Without Antibiotic¹

Ration	All-in-one sorghum silage Low antibiotic ²	All-in-one sorghum silage High antibiotic ³	All-in-one sorghum silage	Sorghum Silage + 2 lb. SBM ⁴ per head per day
No. steers	2	3	3	3
Av. initial wt., lbs.	666	670	669	671
Av. final wt., lbs.	1017	964	964	931
Total gain, lbs.	351	294	295	260
Av. daily gain, lbs.	3.51	2.94	2.95	2.60
Feed per gain (Wet basis)	12.28	13.33	14.13	15.27
(Air dry basis)	6.24	6.68	6.98	7.85
Feed cost per cwt. gain, \$	9.26	10.11	10.64	12.24
Daily ration per steer, lb.				
All-in-one sorghum silage	43.1	39.2	41.7	--
Sorghum silage	--	--	--	37.7
Soybean meal	--	--	--	2.0
Av. feed consumed per day, lb.	43.1	39.2	41.7	39.7
Feed per lb. gain, lb.				
All-in-one sorghum silage	12.28	13.33	14.13	--
Sorghum silage	--	--	--	14.50
Soybean meal	--	--	--	.77
Total feed per lb. gain	12.28	13.33	14.13	15.27

¹ Chlortetracycline (Aureomycin)

² 0.2 gm chlortetracycline (aureomycin) per ton sorghum silage.

³ 2.0 gm chlortetracycline (aureomycin) per ton sorghum silage.

⁴ Soybean meal

Table 30

Carcass Data of Steers Group or Individually Fed Sorghum Silage and Soybean Meal or All-in-one Sorghum Silage With and/or Without Antibiotic¹

Ration	All-in-one sorghum silage Low antibiotic ²	All-in-one sorghum silage High antibiotic ³	All-in-one sorghum silage	Sorghum silage + 2 lb. SBM ⁴ per head per day
<u>Group Fed:</u>				
Av. hot carcass wt., lb.	540	537	528	531
Estimated kidney knob, heart, and pelvic fat, lbs.	10.3	11.5	10.3	11.1
Av. fat thickness 12th rib, in.	.39	.35	.38	.33
Av. degree marbling ⁵	5.9	6.9	4.4	7.3
U.S.D.A. grade ⁶	9.9	9.5	10.7	9.9
Av. ribeye area, sq. in.	10.90	10.55	10.76	10.03
Estimated yield grade	2.7	2.7	2.7	2.8
<u>Individually Fed:</u>				
Av. hot carcass wt., lb.	562	517	517	519
Estimated kidney knob, lbs.	9.50	10.3	10.0	10.3
Av. fat thickness 12th rib, in.	.30	.33	.27	.30
Av. degree marbling	7.5	6.6	3.3	8.3
U.S.D.A. grade	9.0	9.7	11.0	9.0
Av. ribeye area, sq. in.	11.20	10.80	11.23	10.90
Estimated yield grade	2.5	2.6	2.4	2.2

¹ Chlortetracycline (Aureomycin)

² 0.2 gm chlortetracycline (aureomycin)
per ton sorghum silage.

³ 2.0 gm chlortetracycline (aureomycin)
per ton sorghum silage.

⁴ Soybean meal

⁵ Marbling

Small + 1	Trace + 7	Practically Devoid + 10
Small o 2	Trace o 8	Practically Devoid o 11
Small - 3	Trace - 9	Practically Devoid - 12
Slight + 4		
Slight o 5		
Slight - 6		

⁶ Grade

High Choice	14
Average choice	13
Low choice	12
High good	11
Average good	10
Low good	9

Table 31

Prices Used In Computing Costs of Rations, 1968-69

	<u>Per ton</u>
Dry rolled sorghum grain	\$ 36.00
Sorghum silage	12.00
All-in-one silage	15.06
All-in-one low antibiotic silage	15.07
All-in-one high antibiotic silage	15.18
Alfalfa hay	25.00
Prairie hay	20.00
Dry rolled shelled corn	46.00
Dry rolled wheat	50.00
Salt	20.00
Supplement, all-in-one silage	73.20
Urea	110.00
Ground limestone	22.00
Dehydrated alfalfa	64.00
Soybean oil meal	92.00
Dicalcium phosphate	110.00
	<u>Per lb.</u>
Stilbestrol premix (1 gram per lb.)	\$.55
Aurofac 10 (10 grams chlortetracycline per lb.)	.65
Vitamin A. premix (10,000 I.U. per gram)	.28
Trace mineral premix	.10
