Table 5 (Continued)

Cracked sorghum grain	13.3			
Corn		13.0		
Pelleted sorghum grain			12.6	
Finely-ground sorghum grain				13.2
Soybean oil meal	1.0	1.0	1.0	1.0
Mineral mixture	0.04	0.03	0.03	0.04
Salt	0.04	0.03	0.03	0.03
Lbs. feed per cwt. gain, lbs.:				
Sorghum silage	210	153	126	145
Alfalfa	336	238	167	238
Cracked sorghum grain	720			
Corn		591		
Pelleted sorghum grain			619	
Finely-ground sorghum grain				569
Soybean oil meal	54	45	49	43
Mineral mixture	2.2	1.5	1.6	1.6
Salt	2.4	1.5	1.4	1.2
Cost per cwt. gain[1]	$19.80	17.67	16.55	15.35
Summary—Wintering and fattening—December 7, 1957, to August 2, 1958—238 days.				
Av. total gain, lbs.	460	499.5	478.3	509.5
Av. daily gain, lbs.	1.93	2.10	2.01	2.14
Av. feed cost per cwt. gain	$15.69	15.27	14.17	13.84
Av. initial cost per animal (27¢ per lb.)	$116.37	116.64	115.10	116.64
Av. total feed cost per animal	$72.16	76.25	67.75	70.52
Av. total cost, animals and feed	$188.53	192.89	182.85	187.16
Av. carcass value (Ch 41¢ and G 38¢)	$192.51	214.70	202.28	211.73
Net per animal	$3.98	21.81	19.43	24.57
Percent shrink to market	3.6	3.5	3.5	3.7
Av. dressing % (inc. 2% cooler shrink):				
Based on final feedlot wt.	56.9	60.1	58.1	58.7
Based on market wt.	59.0	62.3	60.2	61.0
Av. carcass grade before ribbing[3]	10.5	11.7	11.7	11.6
Av. carcass grade after ribbing[4]	9.9	10.7	11.0	11.1
Av. fat thickness at 12th rib, vis. est.[4]	4.2	3.4	3.5	3.6
Av. uniformity of fat distribution[5]	4.2	3.8	3.6	4.0
Av. degree of marbling[6]	8.2	7.6	7.6	7.4
Av. size ribeye, vis. est.[7]	4.7	4.5	4.4	4.2
Av. size ribeye, sq. in.	10.3	10.2	9.9	10.2
Av. degree of firmness[8]	5.0	4.5	4.5	4.7

3. Based on top choice 15, av. choice 14, low choice 13, top good 12, av. good 11, low good 10.
4. Based on thick 2, moderate 3, modest 4, slightly thin 5.
5. Based on uniform 2, moderately uniform 3, modestly uniform 4, slightly uneven 5.
6. Based on modest amount 6, small amount 7, slight amount 8, traces 9.
7. Based on large 2, moderately large 3, modestly large 4, slightly small 5.
8. Based on firm 2, moderately firm 3, modestly firm 4, slightly firm 5.

Self-Feeding Ammoniated Blackstrap Molasses to Beef Heifers. Project 537.

D. Richardson, E. F. Smith, B. A. Koch, F. W. Boren, and R. F. Cox

This is the second test to study the value of ammoniated blackstrap molasses when self-fed in beef cattle rations.

Experimental Procedure

Forty Hereford heifer calves from the same herd were divided as equally as possible on the basis of weight and conformation into four lots of 10

animals each. Animals in all lots received all the sorghum silage they would clean up each day. The remainder of the daily ration for the wintering phase was as follows:

Lot 9. Control, 1 pound soybean oil meal and 2 pounds sorghum grain.

Lot 10. Free-choice ammoniated blackstrap molasses (16 percent protein equivalent) and 0.5 pound soybean oil meal.

Lot 11. Free-choice ammoniated blackstrap molasses (16 percent protein equivalent), 0.5 pound soybean oil meal, and 1.5 pounds sorghum grain.

Lot 12. Free-choice ammoniated blackstrap molasses (16 percent protein equivalent) and 2½ pounds sorghum grain. At the beginning of the fattening phase, sorghum grain was added in all lots. The grain was increased until the animals were on full feed and then the grain was fed free choice. After 25 days, prairie hay replaced sorghum silage as the roughage and was fed free choice. The protein supplement portion of the ration was continued the same as in the wintering phase.

Salt and a mineral mixture of equal parts limestone, steamed bonemeal, and salt were fed free choice in all lots. Water was provided by electrically-heated water fountains.

Results and Observations

Results of this test are shown in Table 6. No unusual behavior or toxic effects were observed even though the rate of consumption of ammoniated molasses was high during the wintering phase. Rate of gain was very satisfactory in all lots receiving ammoniated molasses; however, results indicate that a small amount of natural protein concentrate improves the ration.

Rate of gain during the fattening phase was the same in all lots except number 11. Lots 10 and 11 were fed identical rations; however, there was a difference of 0.17 pound average daily gain between the lots. This points out differences that may be observed even when the same ration is used, and the fallacy of forming a conclusion from one test. There were no significant differences in shrink to market, dressing percentage, or carcass grade. This and previous tests show that ammoniated molasses is a safe and satisfactory product to use in beef cattle rations.

Table 6

Results of self-feeding ammoniated blackstrap molasses to beef heifer calves.

Wintering phase—December 12, 1957, to March 21, 1958—100 days.				
Lot number	9	10	11	12
No. calves per lot	10	10	10	10
Av. initial wt., lbs.	441	441.5	442.5	440.5
Av. final wt., lbs.	585	574	591	567
Av. daily gain, lbs.	1.44	1.32	1.48	1.26
Av. daily ration, lbs.:				
Sorghum silage	25.9	24.5	23.3	23.2
Sorghum grain	2.0		1.5	2.0
Soybean oil meal	1.0	0.5	0.5	
Amm. blackstrap molasses[1]		4.58	5.11	5.09
Salt	.09	.07	.07	.12
Mineral mixture[2]	.12	.09	.08	.08
Lbs. feed per cwt. gain:				
Sorghum silage	1799	1851	1569	1832
Sorghum grain	138.9		101	158.1
Soybean oil meal	69.4	37.7	33.7	
Amm. blackstrap molasses[1]		345.4	344.1	402.7
Salt	6.1	5.5	4.5	9.2
Mineral mixture	8.7	6.9	4.4	6.6
Cost per cwt. gain	$11.71	15.77	16.55	18.92
Fattening phase—March 21, 1958, to August 2, 1958—134 days.				
Av. initial wt., lbs.	585.0	574.0	591.0	567.0

1. 16% protein equivalent.
2. Equal parts steamed bonemeal, limestone and salt.

Table 6 (Continued)

Av. final wt., lbs.	834.5	824.5	819.0	891.5
Av. total gain, lbs.	249.5	250.5	228.0	252.5
Av. daily gain per heifer, lbs.	1.86	1.87	1.70	1.88
Av. daily ration, lbs.:				
Sorghum silage[4]	21.5	21.5	21.3	21.3
Prairie hay[5]	4.5	3.8	3.8	4.0
Sorghum grain	15.8	16.7	15.8	17.4
Soybean oil meal	1.0	0.5	0.5	
Amm. molasses		0.8	1.0	1.5
Mineral mixture	.06	.04	.02	.03
Salt	.06	.05	.05	.06
Lbs. feed per 100 lbs. gain:				
Sorghum silage	215	215	234	211
Prairie hay	197	166	181	172
Sorghum grain	848	892	928	925
Soybean oil meal	54	27	29	
Amm. molasses		42	58	80
Mineral mixture	3.0	2.4	1.4	1.6
Salt	3.0	2.8	2.8	3.0
Cost per 100 lbs. gain[3]	$21.09	21.74	23.04	22.30
Summary—Wintering and fattening—December 12, 1957, to August 2, 1958—234 days.				
Lot number	9	10	11	12
Av. total gain, lbs.	393.5	383.0	376.5	379.0
Av. daily gain, lbs.	1.68	1.64	1.61	1.62
Av. feed cost per cwt. gain	$17.66	19.68	20.48	21.18
Av. initial cost per animal @ 24¢/lb.	$105.84	105.96	106.20	105.72
Av. total feed cost per animal	$69.48	75.36	77.11	80.26
Av. total cost, animal and feed	$175.32	181.32	183.31	185.98
Av. carcass value (Ch 41¢ and G 38¢)	$181.70	179.70	186.13	179.92
Net per animal	$6.38	−1.62	2.82	−6.06
% shrink to market	4.1	3.9	4.3	3.8
Av. dressing % (inc. 2% cooler shrink): based on final feedlot wt.	56.4	57.4	57.8	57.3
Av. dressing % based on market wt.	58.8	59.7	60.4	59.6
Av. carcass grade before ribbing[6]	11.1	11.4	11.3	11.2
Av. carcass grade after ribbing[6]	11.2	11.5	12.4	11.5
Av. fat thickness at 12th rib, vis. est.[7]	3.7	3.5	3.7	4.1
Av. uniformity of fat distribution[8]	3.8	4.2	3.7	3.9
Av. degree of marbling[9]	7.6	7.5	6.7	7.5
Av. size ribeye, vis. est.[10]	4.6	4.2	4.5	4.6
Av. size ribeye, sq. in.	9.8	9.8	10.0	9.6
Av. degree of firmness[11]	4.6	4.5	3.9	4.4

3. Based on silage $7 per ton, prairie hay $14 per ton, grain $2 per cwt., soybean oil meal $70 per ton, ammoniated molasses $45 per ton, mineral mixture $50 per ton and salt $20 per ton.

4. Sorghum silage fed only first 25 days.

5. Prairie hay fed last 109 days.

6. Based on top choice 15, av. choice 14, low choice 13, top good 12, av. good 11, low good 10.

7. Based on thick 2, moderate 3, modest 4, slightly thin 5.

8. Based on uniform 2, moderate 3, modest 4, slightly uneven 5.

9. Based on slightly abundant 4, moderate 5, modest 6, small amount 7, slight amount 8.

10. Based on large 2, moderately large 3, modestly large 4, slightly small 5.

11. Based on firm 2, moderately firm 3, modestly firm 4, slightly firm 5.

The Value of Aureomycin[1] for Steer Calves on Winter Bluestem Pasture and on Fattening Rations, 1957-58. Project 253-1.

E. F. Smith, B. A. Koch, and D. Richardson

Aureomycin at the rate of 70 mgs. per head daily was fed to steer calves being wintered on bluestem pasture. At the close of the wintering phase the steers were continued on summer pasture but without supplemental feed until late July, when grain was fed in addition to grass.

The steers were moved to drylot August 7 and Aureomycin was again added to the ration at the rate of 70 mgs. per head daily. In addition to the group fed Aureomycin, another group of steers received identical treatment without Aureomycin being added to their ration. Each steer in both lots received a 24-mg. stilbestrol implant August 9, 1958.

The good-to-choice grade Hereford steer calves used in the test came from near Clovis, N.M., and were assigned to treatments on the basis of weight.

Observations

Aureomycin had no apparent effect during the wintering period but increased gains .61 pound per head daily and improved feed efficiency considerably during the fattening period. The steers fed Aureomycin had a dressing percentage 1.2 percent lower than the control lot, which is difficult to explain.

Increased gains on fattening rations previously reported from feeding Aureomycin usually have been considerably less than obtained in this trial.

1. The Aureomycin was furnished by the American Cyanamid Co., Pearl River, N.Y.

Table 7

The value of Aureomycin for steer calves on winter bluestem pasture and on fattening rations.

Treatment	No Aureomycin	Aureomycin[1]
Wintering—December 27, 1957, to April 19, 1958—113 days.		
Number of steers	9	10
Initial wt. per steer, lbs.	529	530
Gain per steer, lbs.	79	76
Daily gain per steer, lbs.	.70	.67
Daily ration per steer:		
Soybean meal	1.0	1.0
Sorghum grain	4.0	4.0
Mineral and salt, free choice[2]		
Bluestem pasture, free choice		
Aureomycin, 70 mgs. per steer daily[1]		Yes
Feed cost per steer[3]	$15.33	16.67
Grazing—April 19, 1958, to August 7, 1958—110 days.		
Initial wt. per steer, lbs.	608	606
Gain per steer, lbs.	217	226
Daily gain per steer, lbs.	1.97	2.05
Fattening—August 7, 1958, to November 14, 1958—99 days.		
Initial wt. per steer, lbs.	825	832
Gain per steer, lbs.	307	367
Daily gain per steer, lbs.	3.10	3.71
Daily ration per steer, lbs.:		
Sorghum grain, self-fed	21.6	22.3
Soybean meal	1.0	1.0
Alfalfa hay	5.4	5.4
Aureomycin, 70 mgs. per head daily		Yes
Stilbestrol implant, 24 mgs. to each steer	Yes	Yes
Salt, free choice		

1. Aureomycin was fed as Aurofac 2A in amounts to furnish 70 mgs. of Aureomycin per head daily.

2. The mineral fed free choice was equal parts by weight of bonemeal and salt; salt was also fed free choice.

Table 7 (Continued)

Feed per cwt. gain, lbs.:		
Sorghum grain	696	601
Soybean meal	32	27
Alfalfa hay	172	145
Feed cost per steer[3]	$50.31	52.72
Feed cost per cwt. gain	$16.39	14.37
Summary—December 27, 1957, to November 14, 1958—322 days.		
Final wt. per steer, lbs.	1132	1199
Gain per steer, lbs.	603	669
Daily gain per steer, lbs.	1.87	2.08
Feed cost per steer[3]	$81.64	85.39
Feed cost per cwt. gain	$13.54	12.76
Sale price per cwt., live weight, based on carcass value[4]	$26.69	26.45
Dressing %	59.4	58.2
Av. carcass grade[5]	16.4	17.0
Av. marbling score[6]	8.3	7.8

3. Feed prices may be found inside back cover.

4. Carcasses were evaluated per cwt. as follows: Choice, $46.50; good, $45.50; standard, $43.58.

5. The USDA low good grade was assigned a value of 16; average good, 17.

6. The description of the marbling score was as follows: Small amount, 7; slight amount, 8; traces, 9.

Wintering Heifers on Bluestem Pasture; Molasses vs. Sorghum Grain, Soybean Meal vs. Soybean Meal Plus Beef Tallow, 1957-1958. Project 253-2.

E. F. Smith, F. W. Boren, and B. A. Koch

In this experiment two feeds were evaluated as possibilities for economically increasing gains on winter pasture. Molasses was self-fed to heifer calves in one pasture and compared with sorghum grain hand fed to heifer calves in another pasture. The dry matter intake was maintained at about the same level by varying the sorghum grain intake to equal molasses consumption. Soybean meal was fed as a source of protein to both lots.

A third lot was fed soybean meal with beef tallow added to study beef tallow as a source of energy and to observe its effect on palatability. The beef tallow varied in percentage fed, but the soybean meal fed this lot contained an average of about 10% tallow. Inedible stabilized bleachable fancy tallow was fed.

Good to choice Hereford heifers used in the test came from near Clovis, N.M., and were assigned to their experimental treatment on the basis of weight. The lots were fed as follows:

Lot 1. One pound of soybean meal per head daily and sorghum grain to equal the dry matter intake of molasses by lot 2.

Lot 2. One pound of soybean meal per head daily and cane molasses self-fed.

Lot 3. One pound of soybean meal per head daily with added beef tallow (about 10%) and molasses self-fed.

Plenty of old grass was available in all pastures, about 6 acres per head. A mineral mixture of 2 parts bonemeal and 1 part salt by weight and salt alone were offered free choice.

The winter feeding period was discontinued April 19 but the heifers were grazed with no supplemental feed until July 19.

Observations

Molasses was equal to sorghum grain as a source of nutrients, primarily energy, on winter pasture. An attempt was made to keep the dry matter intake of the lots about the same by regulating the sorghum grain consumption in keeping with molasses intake; the molasses was self-fed.

Due to the larger consumption of molasses on an "as fed basis" the cost of production was somewhat higher for the molasses lots.

The tallow fed to lot 3 was unpalatable. The first soybean meal fed carried 10% inedible bleachable fancy tallow; it was refused by the animals. They were then gradually introduced to the tallow by mixing only minute quantities with the soybean meal. The last 60 days the soybean meal carried 17% tallow. There appeared to be a great deal of individual variation in regard to acceptance of the tallow: one heifer was never observed eating the supplement, whereas a few ate it readily after a few days.

The tallow did not improve the performance of the heifers.

Table 8

Wintering heifers on bluestem pasture; molasses vs. sorghum grain, soybean meal vs. soybean meal, plus tallow.

Treatment	Sorghum grain and soybean meal	Molasses and soybean meal	Molasses and soybean meal plus tallow
Pasture number	1	2	3
Number of heifers per pasture	10	10	9
Initial wt. per heifer, lbs.	523	524	530
Final wt. per heifer	589	591	584
Gain per heifer	66	67	54
Daily gain per heifer	0.52	0.53	0.43
Daily ration per heifer:			
Soybean meal	1.0	1.0	
Soybean meal, 10% tallow			1.0
Sorghum grain	3.4		
Molasses, self-fed		5.1	4.2
Bonemeal and salt mixture		Free choice	
Salt		Free choice	
Bluestem pasture		Free choice	
Feed cost per heifer[1]	15.31	19.83	17.47
Grazing—April 19, 1958, to July 19, 1958—91 days.			
Initial wt. per heifer, lbs.	589	591	584
Final wt. per heifer	761	753	767
Gain per heifer	172	162	183
Daily gain per heifer	1.89	1.78	2.01
Grazing cost per heifer	$16.00	16.00	16.00
Summary—December 13, 1957, to July 19, 1958—218 days.			
Initial wt. per heifer, lbs.	523	524	530
Final wt. per heifer	761	753	767
Gain per heifer	238	229	237
Daily gain per heifer	1.09	1.05	1.09
Feed cost per heifer[1]	$31.31	35.83	33.47
Feed cost per 100 lbs. gain[1]	$13.16	15.65	14.12

1. Feed prices may be found inside the back cover.

The Value of Supplementary Trace Minerals[1] and Trace Minerals Plus Bonemeal in a Fattening Ration, 1958. Project 253-2.

E. F. Smith, B. A. Koch, and F. W. Boren

This is the fifth experiment in this series conducted to determine the value of added trace minerals in a typical cattle-fattening ration. The four previous experiments are reported in Kansas Agricultural Experiment Station Circulars 279, 308, 335, and 358. No response has been obtained when trace minerals were added to high roughage rations of sorghum silage, sorghum grain and a protein concentrate, or to a fatten-

1. Supplied by Calcium Carbonate Company, Chicago, Ill.