

**Table 49.—Results with stilbestrol in the wintering ration of beef heifer calves.**

(Nov. 16, 1954-April 5, 1955—140 days)

Lot number .....	16	17*
Number heifers per lot .....	5	5
Av. initial wt., lbs. ....	336	338
Av. final wt., lbs. ....	577	592
Av. total gain, lbs. ....	241	254
Av. daily gain, lbs. ....	1.72	1.82
Av. daily ration, lbs.:		
Soybean meal .....	1.00	1.00
Ground milo .....	4.00	4.00
Atlas sorghum silage .....	22.57	22.54
Salt .....	.13	.11
Mineral (bone meal + salt) .....	.18	.18
Lbs. feed per 100 lbs. gain:		
Soybean meal .....	58.09	55.03
Ground milo .....	232.37	220.13
Atlas sorghum silage .....	1311.20	1240.17
Salt .....	7.72	5.90
Mineral (bone meal + salt) .....	10.79	10.22
Feed cost per 100 lbs. gain .....	\$13.63	\$13.33

\* Received 10 mg. of stilbestrol per head daily. Cost figured at .08c per mg. or .8c per head daily.

## The Use of Live Yeast Suspensions in Beef Cattle Rations.

### PROJECT 370

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It has long been recognized that the rumen of cattle and sheep normally contains innumerable microorganisms which function in the fermentation of complex carbohydrates and the synthesis of nutrients beneficial to the host animal. However, the modern era of feed additives has resulted in a renewed interest in the feeding of live yeast to ruminants.

An experiment was initiated to study the value of two strains of yeast in wintering and fattening rations for beef cattle. This progress report is on a digestion study of a fattening ration and the wintering phase of an experiment that includes wintering, grazing, and fattening steer calves.

### Procedure

Forty head of choice-quality steer calves were used in the wintering phase of this test. These calves were part of a shipment from the Lonker Ranch, Medicine Lodge, Kan. The steers were assigned to lots on the basis of weight and feeder grade.

The live yeast suspensions used in this experiment are *Torula utilis* and *Saccharomyces cerevisiae*. The yeast suspensions were prepared weekly and stored at the optimum temperature until fed. They were prepared to supply 3 billion live yeast cells per animal daily. The suspensions were mixed with ½ pint of water and sprinkled over the rations in the feed bunks each morning.

Results of this phase of the study are presented in Table 51.

A digestion study was conducted to determine the influence of the two strains of yeast on the digestibility of a cattle-fattening ration composed of 3 parts milo grain and 1 part alfalfa hay. Eleven yearling Hereford steers weighing 700 pounds each were used in this study.

The results of this study are given in Table 52.

**Table 50.—Results of digestion study with stilbestrol using 11 yearling Hereford steers and a ration of 1 part alfalfa hay to 3 parts milo grain.**

Steer number	% Apparent Digestibility of				% T.D.N.			
	Crude protein		Ether extract		N-free extract		Control	
	Control	Treated*	Control	Treated*	Control	Treated*	Control	Treated*
1 .....	65.6	60.3	70.0	54.1	52.4	77.9	68.3	67.4
2 .....	70.2	58.1	65.4	55.0	49.6	86.7	74.5	66.5
3 .....	70.1	66.3	70.7	64.9	51.7	82.2	72.4	71.1
4 .....	68.2	57.4	72.5	64.0	58.6	77.5	68.9	63.4
5 .....	61.3	53.2	63.7	46.4	50.4	75.6	65.6	55.2
6 .....	61.4	50.5	55.4	54.2	50.1	77.1	66.0	57.0
7 .....	66.1	52.7	62.6	51.7	50.9	83.2	71.3	58.0
8 .....	67.2	56.6	60.5	50.1	50.4	80.3	69.4	55.2
9 .....	67.2	60.0	69.0	59.1	52.2	81.3	70.4	67.9
10 .....	66.2	57.3	65.1	62.3	50.8	77.0	66.9	61.0
11 .....	62.3	57.5	50.7	46.6	53.9	76.8	64.9	64.7
Weighted Av. ....	66.1	57.3	64.0	55.0	51.3	79.6	69.0	62.6

\* Received 10 mg. of stilbestrol per head daily.

### Observations

1. The rate of gain and feed efficiency were essentially the same for the four lots of steers.
2. The digestibility of the rations, which included the yeast suspensions, was no higher than that of the control ration.
3. The fecal excreta of the yeast-fed steers in both the digestion stalls and the feed lots contained as much coarse grain as did that of the control steers. A more pungent fecal odor was observed among the yeast-fed steers during the digestion study.

Table 51.—Feeding live yeast cultures in wintering rations of steer calves.

(Nov. 16, 1954-April 5, 1955—140 days)

Experimental treatment	None	None	Torula utilis yeast	Saccharomyces cerevisiae yeast
Lot number .....	10	15	13	14
Number steers per lot .....	10	10	10	10
Av. initial wt., lbs. ....	454	457	454	456
Av. final wt., lbs. ....	723	714	712	713
Av. total gain, lbs. ....	269	257	258	257
Av. daily gain, lbs. ....	1.92	1.84	1.84	1.84
Av. daily ration, lbs.:				
Soybean meal .....	1.00	1.00	1.00	1.00
Ground milo .....	4.00	4.00	4.00	4.00
Atlas sorgo silage .....	29.05	29.04	28.93	29.04
Salt .....	.10	.11	.10	.12
Mineral .....	.09	.10	.10	.10
Lbs. feed per cwt. gain:				
Soybean meal .....	52.12	54.45	54.24	54.52
Milo .....	208.49	217.81	216.97	218.07
Atlas sorgo silage .....	1514.89	1581.09	1569.15	1582.94
Salt .....	5.14	5.72	5.58	6.31
Mineral .....	4.80	5.60	5.66	5.69
Feed cost per cwt. gain* .....	\$13.38	\$13.99	\$13.93	\$14.02

\* Feed prices listed on page 3 of this publication.

Table 52.—Digestion coefficients for cattle fattening rations that contained live yeast suspension.

	Crude protein	Ether extract	Crude fiber	Nitrogen-free extract	Total digestible nutrients
Control .....	66.1	64.0	57.5	79.6	69.0
Torula utilis .....	66.31	60.38	52.54	80.82	68.49
Saccharomyces cerevisiae .....	58.34	54.60	57.45	75.98	65.17

Adapting Roughages Varying in Quality and Curing Processes to the Nutrition of Beef Cattle; Prairie Hay vs. Corn Cobs; A Special Supplement vs. Milo Grain and Soybean Meal, 1954-1955.

### PROJECT 370

E. F. Smith, D. Richardson, F. H. Baker, and R. F. Cox

This is the third test in an experiment designed to compare the value of certain roughages and supplements in the wintering ration of beef calves. A three-year summary of this experiment is given in Table 54.

### Experimental Procedure

Forty choice-quality Hereford heifers were divided as equally as possible into four lots of 10 animals each. The heifers originated in Barber county, Kansas. The rations used are shown in Table 53. An attempt was made to equalize the protein and total digestible nutrient intake between the lots receiving prairie hay and lots receiving corn cobs as roughages. The animals receiving corn cobs were given 50,000 International Units of vitamin A per head daily. The 3 pounds of special supplement fed daily to Lot 7 was composed of 2.25 pounds soybean meal, 0.50 pound molasses, 0.18 pound steamed bone meal, 0.06 pound salt, and 0.01 pound vitamin supplement (2,250 International Units of vitamin A and 400 International Units of vitamin D per gram). A mineral mixture of 1 part salt and 2 parts steamed bone meal and salt were fed free choice. Water was available at all times.

### Results and Discussion

The results of this test are shown in Table 53. The animals receiving the special supplement gained faster than the control lot. There were no differences in the first two years' tests. It is believed that the difference in this test was due to chance. Even though animals on the special supplement gained faster, their cost per 100 pounds of gain was greater because of the higher cost of the supplement. The animals receiving corn cobs as the only roughage did not gain quite so well as those receiving prairie hay but their gains were more economical. This shows that corn cobs can be used as the only roughage when properly supplemented.

Table 53.—A comparison of roughages and supplements for wintering beef heifer calves.

(Nov. 15, 1954-April 4, 1955—140 days)

	Atlas sorghum silage, soybean meal, milo grain	Atlas sorghum silage, special supplement	Prairie hay, soybean meal, milo grain	Corn cobs, soybean meal, milo grain, vit. A*
Lot number .....	8	7	1	2
Number heifers per lot .....	10	10	10	10
Av. initial wt., lbs. ....	430	431	432	432
Av. final wt., lbs. ....	647	695	641	622
Av. total gain, lbs. ....	217	264	209	190
Av. daily gain, lbs. ....	1.55	1.89	1.50	1.36
Av. daily ration, lbs.:				
Soybean meal .....	1.00		1.00	1.50
Ground milo .....	2.00		3.00	2.50
Special supplement .....		3.00		
Atlas sorghum silage .....	29.46	29.54		
Prairie hay .....			11.46	
Corn cobs .....				8.56
Salt .....	.10	.11	.04	.07
Mineral (bone meal + salt) .....	.12	.11	.11	.07
Lbs. feed per 100 lbs. gain:				
Soybean meal .....	64.50		66.79	110.47
Ground milo .....	129.00		200.38	184.11
Special supplement .....		158.79		
Atlas sorghum silage .....	1900.00	1563.32		
Prairie hay .....			765.12	
Corn cobs .....				630.45
Salt .....	6.10	5.90	2.43	5.21
Mineral (bone meal + salt) .....	7.40	5.78	7.11	5.21
Feed cost per 100 lbs. gain ....	\$13.77	\$13.87	\$15.56	\$14.75

\* 50,000 I.U. per head daily. Total cost of vitamin A, \$18.20.