

Feed efficiency was markedly improved by protein supplementation within all processing methods. The improvement ranged from 9.3 (ground-reconstituted) to 15.6 (steam flaked) percent, and averaged 12.3 percent. These results show that the need for supplemental protein is not spared by processing methods such as reconstituting and steam flaking which greatly improved utilization of the grain. It is possible, of course, that alfalfa meal could have contributed to the superior performance of the high protein supplement.

Methods of Utilizing the Sorghum and Corn Plants for Finishing Cattle¹

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Story in Brief

Shelled corn produced higher gains and was utilized 13.1 percent more efficiently than ear corn, considering both dry and high-moisture-harvested (HMH) grains.

Daily gains were very similar for dry vs. HMH shelled corn, and also for dry vs. HMH ear corn. HMH shelled corn was utilized 11.9 percent more efficiently than dry shelled corn, while HMH ear corn was utilized only 3.9 percent more efficiently than dry ear corn.

Corn and sorghum stovers were similar in feeding value to corn silage at a level of 20 percent of the dry matter of the ration. Sorghum stover was slightly superior to corn stover.

Introduction

Considerable research has indicated a large (10-20 percent) advantage in efficiency of feed conversion for high-moisture-harvested (HMH) milo over dry milo. The relative value of HMH shelled corn and ear corn compared to the respective dry products has been rather variable in previous research reported in the literature. In general, processing methods

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have more potential to improve milo than corn because the starch of milo is more resistant to utilization.

The primary objective of this study was to determine the feeding value of dry shelled corn, dry ear corn, HMM shelled corn, and HMM ear corn.

A secondary objective was to determine the feeding value of the forage which remains after grain is harvested from the corn and sorghum plants. This residual forage is commonly called stover. In previous experiments the substitution of sorghum stover for corn silage at a level of 20 percent of the dry matter of the ration improved the efficiency of feed utilization (see Okla. Misc. Pub. 82, p. 33).

Materials and Methods

Ninety yearling Hereford steers with an average initial weight of 680 pounds were used in the study. Six steers were slaughtered at the beginning of the feeding trial to indicate the initial body composition of the steers which were fed. The remaining 84 steers were divided into two groups on the basis of weight and then randomly assigned to the ration treatments. Two pens of seven steers per pen were placed on each treatment. The following ration treatments were used:

1. shelled corn + corn silage
2. HMM shelled corn + corn silage
3. HMM ear corn + corn silage
4. ear corn + corn silage
5. shelled corn + corn stover
6. shelled corn + sorghum stover

All cattle received 1.6 pounds per head daily of the protein supplement shown in Table 1. The corn silage and corn and sorghum stovers were fed at a level to constitute 20 percent of the daily dry matter intake of the steers. All of the steers were implanted with two 15 mg. stilbestrol implants at the start of the trial.

Table 1. Composition of Protein Supplement.

Ingredient	Amount
	%
Dehydrated alfalfa meal (17%)	37.0
Soybean meal (50%)	40.0
Urea (45% nitrogen)	10.0
Stock salt	5.0
Dicalcium phosphate	2.0
Calcium carbonate	6.0
	<hr/> 100.0
Aureomycin	87 gm/ton

Except for the corn used in the stover treatments, all of the corn was produced on the college farm from one 40-acre field. Dry shelled corn and dry ear corn were harvested at about 15 percent moisture while HMH grains were harvested at about 30 percent moisture. Feed samples were taken each week; average moisture levels of grain and roughages fed are shown in Table 2.

Both the HMH shelled corn and HMH ear corn were ground through a hammer mill, then packed and stored in concrete-lined above-ground trench silos. A three-eighths inch screen was used for the shelled corn and HMH shelled corn, and a one-half inch screen for the ear corn and HMH ear corn.

The corn stover was harvested using a whirlwind ensilage chopper and then ground with a hammer mill prior to storage and feeding. The sorghum stover was purchased in baled form, and also ground through the hammer mill prior to feeding.

At the conclusion of the 115-day feeding trial the steers were slaughtered and specific gravity and other carcass data were collected. Initial and final weights were taken after a 16-hour shrink without feed and water.

Results and Discussion

No difficulty was encountered in harvesting or storing either of the two HMH products. Although the HMH ear corn ensiled satisfactorily and had a good aroma and texture, an additional three percent moisture might have been beneficial.

The performance of the steers is summarized in Table 3. Carcass traits are not reported. There was little difference in carcass merit; apparently none of the ration treatments affected carcass traits.

Grain Comparisons (Lots 1-4)

Daily gains of steers fed shelled corn were somewhat higher than those of steers fed ear corn. This was not unexpected since intake of

Table 2. Moisture Content of Grains and Roughage.¹

Feed	Moisture
	%
Dry shelled corn	15.8
Dry ear corn	15.0
HMH shelled corn	29.6
HMH ear corn	27.1
Corn silage	76.4
Corn stover	12.2
Sorghum stover	17.4

¹Each value is an average of all samples taken at weekly intervals throughout the trial.

Table 3. Feedlot Performance.

	Treatment					
	Shelled corn Corn silage	HMH ¹ shelled corn Corn silage	HMH ear corn Corn silage	Ear corn Corn silage	Shelled corn Corn stover	Shelled corn Sorghum stover
Lot No.	1	2	3	4	5	6
No. head	14	14	14	14	14	14
Initial wt., lb.	681	681	682	682	670	680
Final wt., lb.	1000	1006	983	980	974	999
Daily gain, lb.	2.78	2.83	2.59	2.59	2.61	2.77
Daily feed, lb. ²						
Grain	16.1	14.2	14.3	16.6	15.5	16.0
Silage	4.4	4.1	4.1	4.5	4.2	4.0
Supplement	1.6	1.6	1.6	1.6	1.6	1.6
Total	22.1	19.9	20.0	22.7	21.3	21.6
Feed/100 lb. gain, lb. ²	797	702	845	879	817	779
Feed cost/100 lb. gain, \$	18.44	16.39	16.11	16.23	16.90	16.39

¹HMH - high-moisture-harvested.²Expressed on a 90% dry matter basis.

of shelled corn vs. ear corn groups was similar, and the ear corn contained considerable cob portion of lower energy value. This was reflected in the feed efficiency; combining dry and HMH treatments, shelled corn had a feed conversion value 13.1 percent higher than ear corn.

Daily gains were very similar for dry vs. HMH shelled corn, and also for dry vs. HMH ear corn. This agrees with previous results observed with dry vs. HMH milo. Also, similar to results with milo, HMH shelled corn and ear corn was similar, and the ear corn contained considerable cob portion of lower energy value. This was reflected in ear corn was much smaller, only 3.9 percent.

Roughage Comparisons (Lots 1, 5, 6)

Steers fed corn stover gained only slightly more slowly and less efficiently than those fed corn silage. Steers fed sorghum stover gained equally as fast and slightly more efficiently than those fed corn silage. These results with sorghum stover agree with observations in an earlier trial (see Okla. Misc. Pub. 82, p. 33). The slightly better results observed with the sorghum stover was probably due to its greater leafiness. Very few leaves were left on the corn stalks after the combine was used to harvest the grain; the corn stover consisted mostly of stalks.

The results observed in this and a previous trial indicate that corn silage is not superior to stover when the roughage comprises 20 percent of the dry matter of the ration. It should be even more difficult to demonstrate an advantage for corn silage in a lower roughage (such as 10 percent) ration. If corn or sorghum stover could be economically harvested and processed, it could be a satisfactory replacement for corn silage in cattle finishing rations.

Cost of Gain

The feed costs per 100 pounds of gain reported in Table 3 are based on the following feed prices (as-fed basis):

Protein supplement	\$ 4.20/cwt.
Ground dry shelled corn	2.10/cwt.
Ground dry ear corn	1.50/cwt.
Ground HMH shelled corn	1.75/cwt.
Ground HMH ear corn	1.35/cwt.
Corn silage	10.00/ton
Ground corn stover	14.00/ton
Ground sorghum stover	14.00/ton

Cost of gain was greatest for the control ration of dry shelled corn and corn silage. Cost differences among other rations were small on the basis of feed prices used in the calculations.