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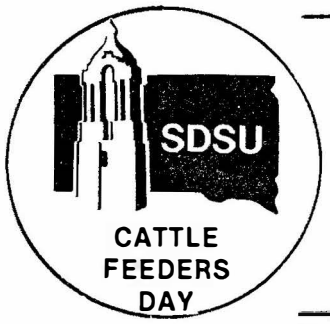

EAR CORN AND SHELLED CORN DIETS FOR FINISHING CATTLE

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Summary

Feed Replacement Values

Comparisons were made between ear corn and shelled corn in various types of diets for finishing cattle. These data should be considered most appropriate for heavy yearling cattle fed over a period of about 4 months. Feed replacement values (dry basis) and differences in gain for ear corn in comparison to shelled corn and for corn cobs in comparison to alfalfa as sources of roughage were as follows:

Ear Corn Compared To Shelled Corn

Ear Corn vs Shelled Corn (No Added Roughage)

Feed replacement: 100 lb ear corn + 5 lb SBM = 90 lb shelled corn

Weight gain: 15% more for shelled corn

Ear Corn vs Shelled Corn Each Fed with 10% Alfalfa

Feed replacement: 100 lb ear corn + 4 lb SBM + 2 lb alfalfa = 88 lb shelled corn

Weight gain: 15% more for shelled corn

Cob Portion of Ear Corn Compared to Alfalfa

Ear Corn vs Shelled Corn with 20% Alfalfa (Cobs vs Alfalfa at 20% of diet)

Feed replacement: 100 lb cobs + 46 lb SBM = 43 lb shelled corn + ~~24~~ 121 lb alfalfa

Weight gain: 6.7% more for shelled corn

Ear Corn (1/2) - Shelled Corn (1/2) vs Shelled Corn with 10% Alfalfa (Cobs vs Alfalfa at 10% of diet)

Feed replacement: 100 lb cobs + 48 lb SBM = 63 lb shelled corn + 133 lb alfalfa

Weight gain: About the same for either diet

Economic Considerations

These feed replacement values can be used as a base for estimating economy of various types of cattle finishing diets using ear corn or shelled corn. The relative economy for the different ones will vary with prices for corn grain, roughage source and supplemental protein.

The data show that value of the cob portion of ear corn will vary depending upon whether the cobs are used to replace grain or as a roughage substitute. When grain is replaced with the cob portion of ear corn, weight gain was reduced. This would be an important consideration in the economy of ear corn in comparison to shelled corn.

When the cob portion of ear corn is fed to replace diet dry matter from alfalfa, important considerations would be cost of supplemental protein to correct the deficiency brought about when cobs are substituted for alfalfa and the cost of the alfalfa replaced by the cobs.

Costs for harvesting, processing, storing and feeding of ear corn in comparison to shelled corn and a source of roughage should also be considered.

Introduction

The roughage portion of diets for cattle furnish food nutrients and contribute additional benefits in chemical and physical properties to the digesta. Animal response from various levels of roughage in the diet, the importance of quality of roughage, prices for various roughages and the price of roughage in relation to concentrates are factors to be considered in formulating diets for cattle.

The cob portion of ear corn can be a convenient source of roughage in many cattle diets. However, corn cobs are low in protein, minerals and vitamins in comparison to many roughages commonly fed to cattle. Cost of supplementing diets with corn cobs as the roughage may be a major factor in the economy of such diets. Cost of storing ear corn in comparison to the cost of storing shelled corn and the needed roughage is another consideration in determining the economy of cattle diets based upon ear corn or shelled corn.

The objective of this experiment was to compare various diets based upon ear corn or shelled corn for finishing cattle.

Procedures

The 192 steers used in this experiment were selected from a larger group purchased from an auction market about 2 months prior to the experiment. They were predominantly Herefords and Hereford crosses. During the pre-experimental period, the cattle were ear tagged, vaccinated for prevention of Bovine Virus Diarrhea (BVD) and Bovine Rhinotracheitis (IRR), injected with Clostridium-chauvoei-septicum-novyi-sordelli bacterin and given a pour-on treatment of Warbex for parasite control. The cattle were fed about 5 lb per head daily of shelled corn and a full feed of alfalfa haylage during this preliminary period. They were implanted with 26 mg of Ralgro at the beginning of the experiment.

The cattle were allotted into 24 pens of 8 each on basis of weight and breeding for the following dietary treatments replicated four times:

1. Ear corn
2. Ear corn with 10% alfalfa
3. Ear corn (1/2) and shelled corn (1/2)
4. Shelled corn
5. Shelled corn with 10% alfalfa
6. Shelled corn with 20% alfalfa

The percentage of alfalfa and ratio of ear corn to shelled corn as listed are on a dry basis. Each diet contained 10% of a soybean meal-corn supplement with added minerals, vitamins A and E, monensin and tylosin. The supplements were formulated for each diet to contain 12.0% protein, .50% calcium, .35% phosphorus, .60% potassium and .30% trace mineral salt. Vitamin A, vitamin E, monensin and tylosin primary premixes were added to furnish 1000 IU, 15 IU, 16 mg and 4 mg per pound of dry diet, respectively.

The shelled corn fed for about the first 3 months of the experiment was harvested from the same area as the ear corn. The shelled corn was stored as whole grain in a Harvestore silo. It was fed whole and samples taken at about weekly intervals during the experiment averaged 70.67% dry matter. Average protein content when stored was 10.7% (dry).

The ear corn was ground with a tub grinder (1/2 inch screen) and stored in a concrete stave silo. Average dry matter as fed was 65.21%. Average protein content when stored was 9.7% (dry).

The initial diet was 30 lb alfalfa haylage and 5 lb of ear corn, shelled corn or the mix of equal parts ear corn and shelled corn with 2 lb of the appropriate supplement. The alfalfa haylage was gradually reduced to the appropriate level or eliminated over a period of 10 days. The grain portion was increased to nearly a full feed over the 10-day period. Feeding was once daily so feed would be available at all times without excessive accumulation in the feed bunks.

The experiment was terminated after 119 days. The steers were marketed through a stockyards company and carcass data were not obtained.

Results

Results for feedlot performance are shown in table 1. Feed consumption and feed efficiency are also presented in table 2 with the grain and cob portions of ear corn shown separately on basis of 80% grain and 20% cob. This was the approximate dry ratio obtained from several samples of ears. The corn grain portion of the supplements was included in the total grain with the soybean meal and additives being shown separately in the feed efficiency data (table 2).

Results are presented and discussed on basis of direct comparisons between ear corn and shelled corn and on basis of comparisons between corn cobs and alfalfa as roughage at 10 and 20% of the dry diets.

Ear Corn Compared to Shelled Corn

Ear Corn vs Shelled Corn. Comparisons between ear corn and shelled corn when each was fed without added roughage show .41 more daily gain (15%) for steers fed shelled corn (table 1). Total feed consumption was about the same for these two treatment groups. This means that the cob portion of the ear corn replaced corn grain in the diet and reduced rate of gain.

The quantity of alfalfa shown for these two treatments was that used the first few days when changing to the test diets and was similar for the two treatments. The additive portion of the supplement was also similar in amount (table 2). Thus, the differences in feed requirements for gain were essentially in amounts of corn grain, cobs and soybean meal. On basis of feed efficiency (dry) in this comparison, 100 lb of ear corn plus 5 lb of soybean meal was equal to 90 lb of shelled corn. The economy of ear corn could be estimated from the prices for shelled corn and soybean meal, harvesting and storage costs for ear corn and shelled corn and considering about 15% increase in nonfeed cost for ear corn because of the slower rate of gain.

Ear Corn vs Shelled Corn Each with 10% Alfalfa. When ear corn or shelled corn was fed with 10% alfalfa, rate of gain was reduced slightly for each treatment in comparison to each type of corn without added roughage. Rate of gain was .39 lb more daily for steers fed shelled corn. This difference was 15% more for shelled corn and the same as obtained when each type of corn was fed without roughage.

Feed consumption was higher in each case than for the diets without added roughage and slightly higher for the shelled corn diet.

On basis of feed required per unit of gain calculated as before, 100 lb of ear corn plus 4 lb of soybean meal and 2 lb of alfalfa was equal to 88 lb of shelled corn (dry basis). The 15% lower rate of gain should also be considered in estimating the economy of ear corn in this comparison.

Corn Cobs Compared to Alfalfa for Roughage in Cattle Finishing Diets

Ear Corn vs Shelled Corn with 20% Alfalfa. Since the cob portion of ear corn is about 20% of the dry weight, ear corn without added roughage was compared to shelled corn fed with 20% alfalfa (dry basis). Daily gain averaged .18 lb more (6.7%) for steers fed shelled corn with 20% alfalfa hay. In this comparison with similar levels of roughage from corn cobs or alfalfa hay, ear corn compared more favorably with shelled corn than in the direct comparisons where the cob portion of ear corn replaced grain in the diet.

Steers fed shelled corn with 20% alfalfa consumed more feed than those fed ear corn. On basis of feed required per 100 lb of gain, 100 lb of cobs from ear corn plus 46 lb of soybean meal had feed replacement values equal to 43 lb of corn grain and ~~34~~ 121 lb of alfalfa. In addition to the comparative costs for these amounts of feed, consideration should be given to the 6 to 7% increase in nonfeed cost because of the slower rate of gain with ear corn, costs involved in harvesting and storing the two types of corn and how well each might fit into a farming and feeding operation.

Ear Corn (1/2) - Shelled Corn (1/2) vs Shelled Corn with 10% Alfalfa. Roughage levels of about 10% of diet dry matter appear most efficient from the standpoint of rate of gain, feed efficiency and management problems. To get this level with corn cobs, ear corn was fed at equal parts of dry matter with shelled corn. This diet was compared to one of shelled corn and 10% alfalfa.

In this comparison, average daily gain was about the same between the two treatment groups. Steers fed shelled corn with 10% alfalfa consumed 1.3 lb more daily feed. On basis of feed required for 100 lb of gain, 100 lb of cobs plus 48 lb soybean meal had a feed replacement value equal to 63 lb corn grain and 133 lb alfalfa.

Since rate of gain was about the same for these two diets, costs of these amounts of the ingredients would be the major consideration in the economy of these two diets. Cost of harvesting, storing and feeding for each corn in comparison to shelled corn and a source of roughage would be additional considerations.

TABLE 1. FEEDLOT PERFORMANCE OF FINISHING CATTLE FED EAR CORN OR SHELLED CORN DIETS
(JUNE 3 to OCTOBER 1, 1982-119 DAYS)

	Ear corn	Ear corn + 10% alfalfa	Ear corn 1/2 + shelled corn 1/2	Shelled corn	Shelled corn + 10% alfalfa	Shelled corn + 20% alfalfa
No. of steers	32	32	32	32	32	31
Avg init wt, lb	799	800	798	799	800	800
Avg final wt, lb	1120	1115	1153	1169	1161	1143
Avg daily gain, lb	2.70	2.64	2.99	3.11	3.03	2.88
Avg daily feed, dry basis, lb						
Ear corn	15.45	14.51	7.17	--	--	--
Shelled corn	--	--	8.47	15.78	14.98	13.27
Alfalfa haylage	.71	2.72	.70	.73	2.71	4.73
Supplement	2.19	2.03	2.05	1.90	2.00	2.01
Total	18.35	19.26	18.39	18.41	19.69	20.01
Feed/100 lb gain, dry basis, lb						
Ear corn	575	550	241	--	--	--
Shelled corn	--	--	284	507	486	462
Alfalfa haylage	26	103	24	23	88	165
Supplement	81	77	69	61	65	70
Total	682	730	618	591	639	697

TABLE 2. FEED CONSUMPTION AND EFFICIENCY DATA WITH EAR CORN FRACTIONATED INTO COB AND GRAIN

	Ear corn	Ear corn + 10% alfalfa	Ear corn 1/2 + shelled corn 1/2	Shelled corn	Shelled corn + 10% alfalfa	Shelled corn + 20% alfalfa
Avg daily feed, dry basis, lb						
Corn grain	12.36	11.61	14.21	15.78	14.98	13.27
Corn cobs	3.09	2.90	1.43	--	--	--
Alfalfa haylage	.71	2.72	.70	.73	2.71	4.73
Supplement	2.19	2.03	2.05	1.90	2.00	2.01
Total	18.35	19.26	18.39	18.41	19.69	20.01
Feed/100 lb gain, dry basis, lb						
Corn grain	476	474	499	533	529	525
Corn cobs	115	110	48	--	--	--
Alfalfa haylage	26	103	24	23	88	165
Soybean meal	53	34	35	22	12	0
Additives	12	9	12	13	10	7
Total	682	730	618	591	639	697