Effect of Hull-less Barley in Finishing Diets on Performance and Carcass Characteristics of Feedlot Cattle

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Livestock production can contribute more to the agricultural economy in North Dakota with new opportunities to feed cattle for regional terminal markets. The variable climate in North Dakota allows for both corn and barley production. Corn is the predominant cereal grain grown and fed in much of the state, but the region has historically supported significant barley production, which can be used for growing and finishing cattle. Hull-less barley could provide a higher energy density feed ingredient than covered barley and contains more protein than corn.

One hundred and fifty eight crossbred steers were allotted randomly by weight to one of four diet treatments with corn and hull-less barley included in reciprocal levels of 0, 33, 67, and 100 percent of the grain component of the diets (Table 1). The totally-mixed ration (TMR) finishing diets (62 Mcal NEg) were fed to appetite in fenceline bunks, with daily bunk calls to adjust intake. Calves were weighed approximately every 28 days and feed intake and gain were summarized for each of the three weigh periods and over the entire feeding period. Feed samples were collected for each weigh period and analyzed at a certified laboratory. Cattle were bedded with straw approximately weekly during the winter period. All steers were marketed at the same time at the Tyson abattoir in Dakota City, NE. when it was estimated that 60 percent would grade USDA Choice. All steers were implanted with Synovex Plus (200 mg trenbolone acetate, 24 mg estradiol) prior to the start of the trial. Carcass characteristics and USDA yield and quality grades were determined by qualified personnel along with USDA graders in the plant.

Table 1. Rations with hull-less barley fed to finishing steers.

	Treatment, % Hull-less barley			
Ingredient	0	33	67	100
	%, DM basis			
Rumensin	1.23	1.26	1.33	1.39
$CaCo_3$	0.59	0.6	0.65	0.68
Canola	6.6	3.74	0.94	0
Corn	60.57	41.15	21.58	3.4
Barley	1.54	1.37	1.76	2.36
Hull-less Barley	0	19.77	38.94	56.73
DDG	17	17.1	17.25	15.41
Straw	6.82	6.83	6.89	6.89
Corn Silage	5.66	8.19	10.66	13.14
	100	100	100	100

All animals in this study were managed according to guidelines of the Institutional Animal Care and Use Committee.

Steers fed hull-less barley in finishing diets.

Results of the feedlot finishing trial are reported in Table 2 along with carcass data. The 33 percent hull-less barley treatment appears to be the superior ration from the animal gains, feed efficiency and carcass quality results. A higher forage level or more distillers grains in the ration may have been beneficial according to other work from this station testing levels of distillers grain.

Table 2. Performance of Central Dakota Feeder Calf Show: Increasing Levels of Hull-less Barley in Finishing Ration

	Treatment, Percent Hull-less Barley						Contrasts		
					St. Error	P-Value	HB vs. None	Linear	Quadratic
Item	0	33	67	100					
Number of Pens	4	4	4	4					
Number of Steers	40	40	39	39					
Body Weight, lbs									
Init Wt. Feb. 2	982	1010	1004	1004	67.56	0.14	0.03	0.12	0.12
Fin Wt. May 4	1319	1355	1340	1334	79.30	0.42	0.18	0.65	0.18
Dry Matter Intake	24.26	26.29	26.37	25.98	1.00	0.02	0.00	0.02	0.02
Avg Daily Gain, lbs	3.70	3.79	3.69	3.63	0.15	0.75	0.97	0.52	0.48
Feed to Gain Ratio	6.56	6.93	7.15	7.17	0.13	0.02	0.003	0.003	0.19
Dressing Percent	62.73	62.88	62.33	62.44	0.49	0.89	0.88	0.41	0.52
Marbling Score	447.78	439.78	412.76	421.86	14.36	0.150	0.096	0.051	0.476
Hot Carcass Wt, lbs	827.47	851.92	835.36	833.10	14.87	0.480	0.345	0.995	0.252
Fat Thickness, in	0.57	0.63	0.54	0.51	0.04	0.154	0.850	0.123	0.225
Rib Eye Area, sq in	13.56	13.51	13.94	13.67	0.16	0.259	0.444	0.309	0.499
KPH, %	2.51	2.47	2.44	2.43	0.05	0.526	0.194	0.145	0.763
Final YG	3.28	3.54	3.11	3.11	0.17	0.095	0.869	0.133	0.358
USDA Choice, %	65	62	47	52					

The value of hull-less barley was calculated in relation to corn on a bushel basis using the feed intake and gain data observed in this study. A bushel of hull-less barley is 48 pounds versus 56 pounds for corn. The cost of feed for one pound of gain in the control ration (all corn) is used as the basis for determining relative value of hull-less barley for each respective treatment. The base price used for corn was $6.00 per bushel, or $0.728 feed cost per pound of gain. At a 33 percent inclusion rate, hull-less barley creates equal feed cost when it is valued at 114 percent of corn or $6.89 per bushel. For a 67 percent inclusion rate of hull-less barley, the value decreases somewhat to 110 percent of the value of a bushel of corn or $6.61 per bushel. At 100 percent of the diet, hull-less barley has a value of 111 percent of corn or $6.65 per bushel. This data shows that hull-less barley has a higher intrinsic value for gain than corn and can be purchased at a higher price than corn to maintain equal feed costs. If hull-less barley is grown for feed grain, these values provide a basis for valuing the crop. If hull-less barley can be purchased, it would be prudent to not pay more than approximately 110 percent of corn price, with lower prices allowing greater profit. The relative yield of growing hull-less barley versus covered barley plus the cost of crop production are important considerations when deciding to produce this nutrient-dense feed.