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Corn and Sorghum Distillers Grains for Finishing Cattle

Ki Fanning
University of Nebraska-Lincoln

Todd Milton
University of Nebraska-Lincoln

Terry J. Klopfenstein
University of Nebraska-Lincoln, tklopfenstein1@unl.edu

Mark Klemesrud
University of Nebraska-Lincoln

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Distillers grains produced from corn or sorghum grains are similar in energy concentration. Calculated NEg value for corn and sorghum distillers grains was 34 percent greater than for dry-rolled corn.

Summary

To evaluate corn and sorghum distillers grains in corn-based finishing diets, 60 crossbred, yearling steers were individually fed one of three finishing diets: dry-rolled corn, corn distillers grain or sorghum distillers grain for 127 days. Distillers grains were fed at 30 percent of the dietary dry matter, replacing dry-rolled corn. Distillers grains increased the final weight, daily gain, feed efficiency, hot carcass weight, fat thickness and yield grade compared with the control. Sorghum distillers grains increased dry matter intake and fat thickness compared with corn distillers grains.

Introduction

Compared with dry-rolled corn alone, finishing cattle are more efficient when distillers grains are added to the diet. Due to fat content (10-12 percent) distillers grains are enegy dense. Additionally distillers grains contain a greater concentration of protein (~30 percent CP) and other nutrients (P and K) than raw grains. Improved performance may be due to different rates of digestion (fibrous feeds compared with grains) which would minimize the drop in ruminal pH, and reduce the amount and severity of subacute acidosis.

The ethanol industry produces a wide range of by-products used in the beef industry. Differences are due to the process used to produce ethanol (wet milling versus dry milling) and the type of grain used. Although either corn or grain sorghum can be used in the dry milling industry, little research has been done to compare corn and sorghum distillers grains. Our research objectives were to determine the energy value of wet distillers grains produced from the fermentation of corn or sorghum grains and to compare production and carcass characteristics of yearling cattle fed high-grain diets containing corn or sorghum distillers grains.

Procedure

Sixty crossbred, yearling steers (791 lb) were used in a completely randomized designed experiment to compare corn (CORN) and sorghum (SORG) distillers grains as a source of energy in corn-based finishing diets. Distillers grains were fed at 30 percent of the dietary dry matter, replacing dry-rolled corn. Distillers grains were produced at a

Table 1. Ingredient and nutrient composition of diets fed (percent DM basis).

Item	DRC[a]	CORN[a]	SORG[a]
Ingredients			
Dry-rolled corn	84.0	54.0	54.0
Corn distillers grains	—	30.0	—
Sorghum distillers grains	—	—	30.0
Alfalfa hay	7.5	7.5	7.5
Molasses	3.5	3.5	3.5
Supplement[b]	5.0	5.0	5.0
Nutrients[c]			
Crude protein	13.0	16.1	17.2
DIP[d]	6.9	8.0	8.6
Calcium	.70	.70	.72
Phosphorus	.32	.44	.46
Potassium	.60	.67	.70
Sulfur	.16	.22	.22

[a]DRC = dry-rolled corn (control), CORN = corn distillers grains, SORG = sorghum distillers grains.
[b]Supplement provided urea, minerals, vitamins, and Rumensin and Tylan.
[c]Calculated values (Average Compositions of Feeds Used in Nebraska, NebGuide, 1995).
[d]DIP = rumen degradable intake protein

Table 2. Effects of diets on steer performance and carcass characteristics with distillers grains.

	Diets[a]				P-Values[b]	
Item	DRC	CORN	SORG	SEM	DRC/Dist	CORN/SORG
Performance						
No. of steers	19	20	19			
Initial weight, lb	791	790	792	11.6		
Final weight, lb[c]	1254	1292	1315	18.1	.03	.37
DMI, lb/day	23.5	22.9	25.4	.46	.71	.02
DMI, %BW	2.33	2.23	2.39	.04	.52	<.01
ADG, lb[c]	3.64	3.95	4.11	.09	<.01	.19
Feed/gain[cd]	6.48	5.81	5.97	.11	<.01	.31
Diet NEg[e], Mcal/cwt	58.2	65.2	63.0	1.02	<.01	.15
Carcasss Characteristics						
HCW[f], lb.	790	814	828	11.4	.03	.37
Dressing percent	64.8	64.9	65.4	.39	.50	.42
Yield grade	2.32	2.63	2.56	.07	.07	.66
Marbling score[g]	5.58	5.44	5.41	.37	.37	.88
Rib eye area, sq in	12.8	12.6	12.8	.26	.82	.63
Fat thickness, in	.44	.51	.57	.02	<.01	.08
Choice[h], %	95	70	74			

[a]DRC = dry-rolled corn (control), CORN = corn distillers grains, SORG = sorghum distillers grains.
[b]DRC/Dist = Control versus the average of sorghum and corn distillers grains; CORN/SORG = Corn versus sorghum distillers grains. Probabilities indicate the percentage chance that means are not different.
[c]Final weight was determined by dividing hot carcass weight by a common dressing percent (63).
[d]Feed/gain is the reciprocal of gain/feed.
[e]Dietary NEg calculated using actual DMI and ADG
[f]Hot carcass weight.
[g]Marbling scores: Small begins at 5.0, Modest at 6.0.
[h]Chi-Square Table, P = .08.

dry milling plant with the solubles added back to each product. Both CORN and SORG were produced from 100 percent corn and grain sorghum, respectively. Steers were adapted to the finishing diet (Table 1) by increasing the finishing ration 1 lb/head/day until steers were at an ad libitum consumption. Diets were formulated to contain a minimum of 6.8 percent DIP, .7 percent Ca, .3 percent P and .6 percent K, as well as 28 g/ton Rumensin and 10 g/ton Tylan (DM basis). Urea was added to the DRC supplement to achieve the minimum DIP requirement. Steers were individually fed using Calen gates. Steers were implanted with Revalor S at the beginning of the feeding period and fed experimental diets for 127 days. Final weights were determined by dividing the hot carcass weight by a common dressing percentage (63). Twelfth rib fat thickness, yield grade, quality grade, rib eye area, liver abscess score and marbling score were recorded at the time of slaughter. Dietary NEg values were calculated using 1996 NRC equations based on observed DM intake and ADG. Statistical analysis of the data was conducted with the General Linear Model of SAS. Contrasts were used to compare DRC versus distillers grains (average of CORN and SORG) and CORN versus SORG.

Results

Results of performance and carcass comparisons are presented in Table 2. Dry matter intake was greater (P < .02) for steers fed SORG than those consuming CORN. Compared with steers fed DRC, steers fed CORN or SORG gained 9.8 percent faster (P < .01; 3.64 versus 4.03 lb/day) and were 9.1 percent more efficient (P < .01; 6.48 versus 5.89) on the average. As a result of increased daily gain, cattle fed CORN or SORG had heavier (P < .05) final weights than those fed DRC. Daily gain and feed efficiency (F/G) were similar between CORN and SORG. Carcass weights were heavier (P < .05) for steers fed SORG or CORN compared with those fed DRC. Steers fed SORG had similar carcass weights to steers fed CORN. Steers fed SORG or CORN had greater (P < .01) twelfth rib fat thickness and higher (P = .07) yield grades compared with those fed DRC. Additionally, steers fed SORG had greater (P = .08) twelfth rib fat thickness than those fed CORN. Dressing percentage, longissimus muscle area, liver abscess score, marbling score and the percentage of carcasses grading USDA Choice were unaffected by treatment.

Distillers grains produced from corn or sorghum are similar in energy concentration. Based on performance, the calculated NEg value for corn and sorghum distillers grains was, on average, 34 percent greater than dry-rolled corn.

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[1]Ki Fanning, graduate student; Todd Milton, assistant professor; Terry Klopfenstein, professor Animal Science, Lincoln; Mark Klemesrud, former research technician.