Kansas Agricultural Experiment Station Research Reports

Volume 0
Issue 1 *Cattleman's Day (1993-2014)*

Article 153

2007

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M.L. May

M.J. Quinn

James S. Drouillard

Charles E. Walker

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Abstract
The purpose of this experiment was to determine optimal levels of distiller's grains in finished diets with steam-flaked corn or dry rolled corn. Distiller's grains have been used extensively in regions of the country in which dry-rolled and high-moisture grains are prevalent. Production of fuel ethanol is now expanding into the High Plains, where feedlots more commonly use steam flaking. The cost to produce flaked corn is higher than the cost to produce dry rolled corn, and with rising energy costs (especially natural gas), this spread is becoming more dramatic. Comparing the use of wet distiller's grains fed in conjunction with these grains provides useful information concerning optimum use level.

Keywords
Cattlemen's Day, 2007; Kansas Agricultural Experiment Station contribution; no. 07-179-S; Report of progress (Kansas State University. Agricultural Experiment Station and Cooperative Extension Service); 978; Beef; Cattle; Distillers grains; Steam flaking; Dry-rolled corn

WET DISTILLER'S GRAINS WITH SOLUBLES IN BEEF FINISHING DIETS COMPRISED OF STEAM-FLAKED OR DRY-ROLLED CORN

M. L. May, J. S. Drouillard, M. J. Quinn, and C. E. Walker

Introduction

The purpose of this experiment was to determine optimal levels of distiller's grains in finished diets with steam-flaked corn or dry rolled corn. Distiller's grains have been used extensively in regions of the country in which dry-rolled and high-moisture grains are prevalent. Production of fuel ethanol is now expanding into the High Plains, where feedlots more commonly use steam flaking. The cost to produce flaked corn is higher than the cost to produce dry rolled corn, and with rising energy costs (especially natural gas), this spread is becoming more dramatic. Comparing the use of wet distiller's grains fed in conjunction with these grains provides useful information concerning optimum use level.

Procedures

In November 2005, 624 crossbreed yearling steers were used in a finishing trial. Dietary treatments consisted of steam-flaked corn or dry-rolled corn each, containing 10, 20, or 30% wet distiller's grains on a dry matter basis. Cattle were blocked by initial weight and randomly allocated, within block, to each of the eight treatment groups. A total of three weight blocks were used, providing a total of 24 pens with 25 to 26 animals per pen. Cattle were maintained in dirt-surfaced outdoor pens. The dimensions of each pen were 32.5 feet wide × 150 feet deep. Each pen provided 12 to 13 linear inches of bunk space per animal. Cattle were fed once daily (morning) *ad libitum*. Upon arrival, cattle were processed with a combination estradiol/trenbolone acetate implant, seven-way clostridial bacterin, a four-way viral vaccine, and a topical parasiticide. Pen weights were taken before delivery to a commercial slaughter facility in Emporia, KS. Cattle were harvested by block on days 69, 96, and 119. At slaughter, hot carcass weight and incidence and severity of liver abscesses were recorded. After a 24-hour chill period, measurements were taken for USDA yield grade; USDA quality grade; marbling; 12th rib fat thickness; kidney, pelvic and heart fat; rib-eye area; and incidence of dark cutting beef.

Results and Discussion

Dry matter intakes were less for cattle fed steam-flaked corn than cattle fed dry-rolled corn. Intakes also decreased in steam-flaked corn and increased in dry-rolled corn diets as the wet distiller's grains percentage increased in the diet. Feed-to-gain and average daily gain were not different among treatments. Cattle fed dry-rolled corn with 10% wet distiller's grains showed efficiencies that appear to be fairly close to those of steam-flaked corn with no wet distiller's grains. Feeding dry-rolled corn produced a higher percentage of Choice carcasses. Marbling scores also showed that cattle fed dry-rolled corn had more marbling than steam-flaked corn cattle. Cattle fed wet distiller's grains had a lower percentage of cattle grading 1. The other yield grades showed no differences, but these cattle were quite lean and the averages for the groups all were very close to 2. There was no change in liver abscess, back fat over the 12th rib, and rib eye area. Kidney, pelvic, and

heart fat percentages were higher in cattle fed dry-rolled corn compared to steam-flaked corn.

Cattle fed steam-flaked corn diets showed little improvement when wet distiller's grains were added to the diets. Adding wet distiller's grains to the diet when dry-rolled corn is the grain processing method used could have similar performance values when compared to cattle fed steam-flaked corn. Price of wet distiller's grains is the most important factor to consider if it is feasible to include the by-product in the diet of finishing cattle. With the increase in production, many areas have an excess of the product and prices of wet distiller's grains vary from region to region. Factors should also include market strategy (i.e., live marketing versus a grid program). Market strategies should also be a consideration when feeding wet distiller's grains; the reason is cattle showed trends to deposit more external fat. The overall cost of the product has many factors that go past inclusion into the diet.

Table 1. Composition of Diets Fed to Steers During Finishing Periods

	Dry-Rolled Corn				Steam-Flaked Corn			
Wet distiller's level	0	10	20	30	0	10	20	30
Item, % Dry Matter								
Dry-rolled corn	83.75	78.84	---	59.89	---	---	---	---
Steam-flaked corn	---	---	---	---	83.75	78.84	68.89	59.89
Alfalfa hay	6.00	6.00	---	6.00	6.00	6.00	6.00	6.00
Wet distiller's grains	0	10	---	30	0	10	20	30
Corn Steep	5.00	---	---	---	5.00	---	---	---
Rumensin /Tylan premix[1]	2.23	2.23	---	2.23	2.23	2.23	2.23	2.23
Supplement[2]	3.42	---	---	---	3.42	---	---	---
Supplement high[2]	---	2.93	---	1.88		2.93	1.88	1.88
Nutrients Formulated								
Diet dry matter %	83.35	78.84	---	59.89	85.87	79.84	---	65.82
Crude protein	14.00	14.00	---	16.89	14.00	14.00	14.40	16.89
Calcium	.70	.70	---	.70	.70	.70	.70	.70
Phosphorus	.28	.34	---	.50	.28	.34	.42	.50
Non-protein nitrogen	3.46	2.17	---	---	3.46	2.17	---	---

[1]Formulated to provide 300 mg/day Rumensin, 90 mg/day Tylan.
[2]Formulated to provide 0.1 ppm cobalt, 8 ppm copper, 0.5 ppm iodine, 48 ppm manganese, 0.25 pm selenium, 48 ppm zinc, and 1000 IU/lb vitamin A in the diet dry matter.

Table 2. Performance Data for Steers Fed Wet Distiller's Grains

	Dry-Rolled Corn				Steam-Flaked Corn					
Wet distiller's level	0	10	20	30	0	10	20	30		
Item									SEM	P-Value
Number of pens	8	8		8	8	8	8	8	-	-
Number of steers	77	77	-	78	78	78	78	78	-	-
Initial weight, lb	998	999	-	997	997	999	997	997	0.88	0.45
Final weight, lb‡	1241	1268	-	1281	1262	1257	1243	1233	15.46	0.13
Dry matter intake, lb*†‡	20.53	21.67	-	21.83	20.27	20.07	19.90	19.13	0.48	0.001
Average daily gain, lb[1]	2.52	2.87	-	3.08	2.83	2.72	2.59	2.53	0.21	0.21
Feed gain, lb[1],[2]	8.06	7.51	-	7.10	7.13	7.33	7.64	7.51	0.01	0.67
Feed cost/lb gain, $[3]	0.465	0.440	-	0.446	0.437	0.445	0.456	0.457	-	-

[1]Average daily gain and efficiency were computed by using carcass-adjusted final weights. Final live weight = hot carcass weight /63.5% dress.
[2]Statistics were performed as gain:feed, reported as feed:gain.
[3]Assumptions: Corn purchased at $2.25, WDGS purchased at $31/ton, $1.50/ton for dry rolling, $6.00/ton for steam flaking, $10/ton margin on feed.
* Grain interaction P < 0.05, † Linear interaction P<0.05, ‡ Quadratic interaction P<0.05

Table 3. Carcass Performance for Cattle Fed Wet Distiller's Grains

	Dry-Rolled Corn				Steam-Flaked Corn					
Wet distiller's level	0	10	20	30	0	10	20	30		
Item									SEM	P-Value
Hot carcass weight, lb	788	805	-	814	801	798	789	783	9.82	0.13
Choice %	26.85	32.69	-	30.97	28.61	21.79	31.33	15.38	5.45	0.21
Select %	66.78	64.74	-	64.08	67.44	73.08	64.82	78.21	6.02	0.59
No roll, %	6.37	2.56	-	5.28	3.95	2.13	2.56	6.41	2.82	0.89
Dark cutter, %	0.00	0.00	-	0.00	1.28	0.00	1.28	0.00	0.66	0.47
Marbling score[1]*	358	381	-	379	353	362	362	357	8.86	0.53
Yield grade average, %	1.98	2.05	-	2.22	2.03	2.00	2.15	1.98	0.09	0.35
Yield grade 1, %	28.48	23.29	-	17.95	24.61	29.48	18.00	24.36	3.75	0.17
Yield grade 2, %	43.73	52.67	-	44.87	50.67	42.31	49.38	56.41	6.78	0.61
Yield grade 3, %	24.10	21.37	-	32.05	18.21	26.92	27.38	12.82	6.71	0.34
Yield grade 4, %	2.47	1.28	-	3.85	3.90	1.28	3.95	3.85	1.74	0.78
Yield grade 5, %	0.00	1.39	-	0.00	1.33	0.00	0.00	1.28	0.84	0.47
Liver abscess, %	8.99	6.41	-	10.36	3.90	10.25	9.13	8.97	3.14	0.68
Kidney, pelvic, and heart fat, %*†	2.51	2.47	-	2.47	2.44	2.37	2.48	2.36	0.04	0.92
12th Rib fat, inches	0.37	0.41	-	0.42	0.41	0.40	0.43	0.38	0.02	0.18
Rib eye area, square inches	13.46	13.78	-	13.75	13.54	13.72	13.26	13.49	0.23	0.11
Dress, %	64.3	64.1	-	64.6	63.9	63.8	63.4	63.9	0.005	0.37

[1]Marbling Score 300 = Slight; 400 = Small. *Grain interaction P<0.05, † Linear interaction P<0.05.