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Feeding steam-flaked diets with and without dry-rolled corn and dried distillers grains results in similar feedlot performance

Abstract

Increased ethanol production in the United States has increased availability of by-products, giving producers an alternative to cereal grains. The by-product we evaluated was dried corn distillers grains with solubles. Research has been conducted at Kansas State University to evaluate the quantity of distillers grains that can be added to a finishing diet without negatively affecting feedlot performance or carcass value. Feeding cattle distillers grains is an important option for feedlots to consider. The second issue that has arisen is the energy costs associated with processing grains. In Kansas, two of the more common methods for processing grains are steam flaking and dry rolling. Previous research has shown that the nutritive value of distillers grains can be influenced by grain processing method. This experiment was designed to evaluate feedlot performance and carcass merit in heifers fed flaked-corn diets with added dry-rolled corn and/or dried corn distillers grains.

Keywords

Cattlemen's Day, 2009; Report of progress (Kansas State University. Agricultural Experiment Station and Cooperative Extension Service); 1010; Kansas Agricultural Experiment Station contribution ; no. 09-168-S; Beef; Cattle; Distillers grains

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Feeding Steam-Flaked Diets With and Without Dry-Rolled Corn and Dried Distillers Grains Results in Similar Feedlot Performance¹

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Introduction

Increased ethanol production in the United States has increased availability of by-products, giving producers an alternative to cereal grains. The by-product we evaluated was dried corn distillers grains with solubles. Research has been conducted at Kansas State University to evaluate the quantity of distillers grains that can be added to a finishing diet without negatively affecting feedlot performance or carcass value. Feeding cattle distillers grains is an important option for feedlots to consider. The second issue that has arisen is the energy costs associated with processing grains. In Kansas, two of the more common methods for processing grains are steam flaking and dry rolling. Previous research has shown that the nutritive value of distillers grains can be influenced by grain processing method. This experiment was designed to evaluate feedlot performance and carcass merit in heifers fed flaked-corn diets with added dry-rolled corn and/or dried corn distillers grains.

Experimental Procedures

Crossbred yearling heifers (n = 689) were used in a finishing trial to evaluate the effects of feeding dry-rolled corn (DRC) and dried corn distillers grains with solubles (DDGS) in steam-flaked corn (SFC) diets. Diets consisted of SFC with 0 or 25% DDGS and 0 or 25% DRC in a 2 × 2 factorial arrangement. Heifers were blocked into light and heavy weight groups according to initial body weight and fed in 28 dirt-surfaced pens with 23 to 25 heifers per pen. Heifers in the heavy and light weight blocks were fed once daily for 137 or 157 days, respectively. Weights were determined at the beginning of the study and directly before shipment to a commercial abattoir in Emporia, KS. At slaughter, incidence and severity of liver abscesses and hot carcass weights were recorded. After a 24-hour chill, kidney, pelvic, and heart fat; ribeye area; 12th rib fat thickness; incidence of dark cutting beef; marbling scores; USDA quality grades, and USDA yield grades were recorded.

Results and Discussion

Cattle fed the different diets had similar average daily gains, feed intakes, and feed conversion efficiencies. Similar results were also found for quality and yield grades; 12th rib fat thickness; kidney, pelvic, and heart fat; incidence and severity of liver abscess,

¹ This project was funded in part by beef and veal producers and importers through their \$1-per-head checkoff and was produced for the Cattlemen's Beef Board and state beef councils by the National Cattlemen's Beef Association.

² Dakota Gold Research Association, Sioux Falls, SD

marbling score, and total carcass value. Cattle fed DRC had higher dressing percentages compared with their counterparts fed no DRC ($P < 0.05$). Cattle fed DRC also tended to have larger ribeye areas than cattle fed no DRC ($P < 0.10$).

Implications

Feeding flaked-corn diets with DDGS or DRC yielded similar feedlot performance and carcass value.

Table 1. Composition of finishing diets containing steam-flaked corn (SFC) with 0 or 25% dried corn distillers grains with solubles (DDGS) and/or 0 or 25% dry-rolled corn (DRC)

Ingredient, %	SFC		SFC + 25% DRC	
	0% DDGS	25% DDGS	0% DDGS	25% DDGS
SFC	82.1	58.2	56.8	33.1
DDGS	–	25.4	–	25.3
DRC	–	–	25.5	25.3
Alfalfa hay	5.9	5.9	5.9	5.8
Corn steep liquor	6.5	6.4	6.4	6.4
Supplement ^{1,2}	2.8	2.5	2.7	2.5
Limestone	1.5	1.6	1.5	1.6
Urea	1.2	–	1.2	–
Nutrients, %				
Crude protein	14.7	16.3	14.8	16.4
Calcium	0.6	0.6	0.6	0.6
Phosphorus	0.3	0.5	0.2	0.4
Potassium	0.4	0.3	0.2	0.3
Ether extract	0.0	2.7	0.0	2.7
Neutral detergent fiber	3.3	10.8	3.3	10.7

¹ Formulated to meet or exceed nutritional requirements and provide 300 mg monensin, 90 mg tylosin, and 0.5 mg melengestrol acetate per animal daily.

² Optaflexx was included at 200 mg/animal for the final 42 days on feed.

Table 2. Performance characteristics of heifers fed steam-flaked corn (SFC) diets containing 0 or 25% dry-rolled corn (DRC) and/or 0 or 25% dried distillers grains with solubles (DDGS)

Item	SFC		SFC + 25% DRC		SEM	P-values		
	0% DDGS	25% DDGS	0% DDGS	25% DDGS		DRC	DDGS	DRC*DDGS
Head count	172	172	172	173	–	–	–	–
Initial body weight, lb	675	676	676	676	14.5	0.97	0.98	0.98
Final body weight, lb ¹	1138	1132	1146	1146	15.1	0.12	0.65	0.66
Average daily gain, lb ¹	3.16	3.12	3.21	3.21	0.05	0.15	0.65	0.67
Dry matter intake, lb/day ¹	18.53	18.85	19.08	19.23	0.38	0.23	0.55	0.83
Feed:gain ²	5.85	6.02	5.95	5.99	0.71	0.91	0.43	0.58

¹ Final weight, average daily gain, and efficiency were computed by using carcass-adjusted final weights. Final live weight = hot carcass weight divided by a common dressed yield of 0.635.

² Statistics were performed as gain:feed, reported as feed:gain.

Table 3. Carcass characteristics of heifers fed steam-flaked corn (SFC) diets containing 0 or 25% dry-rolled corn (DRC) and/or 0 or 25% dried distillers grains with solubles (DDGS)

Item	SFC		SFC + 25% DRC		SEM	P-values		
	0% DDGS	25% DDGS	0% DDGS	25% DDGS		DRC	DDGS	DRC*DDGS
Hot carcass weight, lb	723	719	727	728	4.2	0.48	0.85	0.84
Dressed yield, %	62.92	63.64	63.75	64.61	0.4	0.04	0.07	0.87
USDA quality grade								
Prime, %	0.6	0.6	1.2	0.1	0.6	1.00	0.32	0.32
Upper 2/3 Choice or greater, %	43.8	42.0	49.0	39.5	3.8	0.66	0.16	0.27
Choice, %	32.3	31.1	39.8	32.1	3.6	0.24	0.22	0.36
Select, %	49.8	52.7	46.9	55.9	3.8	0.98	0.12	0.43
Standard, %	7.1	1.2	1.2	2.4	2.1	0.25	0.25	0.09
Dark cutter, %	1.9	0.5	0.5	0.0	0.7	0.16	0.16	0.58
USDA yield grade								
Average	2.69	2.78	2.76	2.67	0.10	0.79	0.98	0.18
Yield grade 1, %	11.6	7.0	8.1	13.9	2.3	0.46	0.81	0.02
Yield grade 2, %	26.3	29.3	30.4	26.7	3.5	0.82	0.92	0.34
Yield grade 3, %	45.7	45.1	41.6	41.4	3.8	0.31	0.91	0.97
Yield grade 4, %	14.5	16.2	16.8	15.0	2.7	0.83	0.98	0.52
Yield grade 5, %	1.9	2.5	3.1	3.0	1.2	0.46	0.81	0.81
Kidney, pelvic, and heart fat, %	2.31	2.30	2.29	2.28	0.02	0.46	0.60	0.97
12th rib thickness, in.	0.51	0.53	0.50	0.50	0.02	0.27	0.44	0.45
Marbling score ¹	492	493	499	485	5.83	0.97	0.27	0.22
Liver abscess incidence, %	2.85	2.85	4.01	2.83	1.35	0.67	0.66	0.66
Ribeye area, in. ²	12.72	12.65	12.92	12.88	0.13	0.09	0.67	0.92
Total carcass value, \$	935	932	948	935	9.0	0.33	0.36	0.60

¹ 500 = Small 000.