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Abstract

Two 28-day receiving experiments were conducted using 620 exotic x British cross steers to evaluate differences in growth performance, morbidity, and mortality when fed diets containing dry-rolled corn, distiller's dried grains with solubles, or wheat middlings. All diets contained approximately 60% concentrate and 40% roughage (alfalfa hay). Gain and efficiency tended to be poorer for cattle fed the wheat middling-based diet than for those fed corn. No notable differences were evident in terms of the percentage of cattle treated for respiratory disease. Feed intake and daily gain were improved slightly when corn was replaced by distiller's dried grains, but efficiency was not changed. However, the incidence of respiratory disease also was higher for cattle fed the distiller's grains diet in comparison to corn.

Keywords

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COMPARATIVE VALUE OF DRY-ROLLED CORN, DISTILLER'S DRIED GRAINS, AND WHEAT MIDDLINGS FOR RECEIVING DIETS

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Summary

Two 28-day receiving experiments were conducted using 620 exotic × British cross steers to evaluate differences in growth performance, morbidity, and mortality when fed diets containing dry-rolled corn, distiller's dried grains with solubles, or wheat middlings. All diets contained approximately 60% concentrate and 40% roughage (alfalfa hay). Gain and efficiency tended to be poorer for cattle fed the wheat middling-based diet than for those fed corn. No notable differences were evident in terms of the percentage of cattle treated for respiratory disease. Feed intake and daily gain were improved slightly when corn was replaced by distiller's dried grains, but efficiency was not changed. However, the incidence of respiratory disease also was higher for cattle fed the distiller's grains diet in comparison to corn.

(Key Words: Distiller's Grains, Wheat Middlings, Receiving Cattle, Health.)

Introduction

Typically, feed intake of stressed feeder calves is low and extremely variable following transportation and introduction into the feedlot. Adequate energy intake may be key to mounting an effective immune response. However, when intake is excessive, cattle may experience digestive disturbances that further challenge their ability to cope with the stresses of weaning, comingling and transportation. Diets with a high proportion of rapidly fermentable grains may predispose animals to digestive disturbances. By-product feeds such as wheat middlings and distiller's dried grains with solubles are good sources of energy but are higher in fiber than feed grains. These by-products are digested more slowly than feed grains such as corn or grain sorghum and theoretically would be less likely to cause digestive disturbances when eaten too rapidly or in excess quantity. Consequently, we designed these studies to compare performance of stressed feeders fed receiving diets based on rolled corn, wheat middlings, or distiller's dried grains with solubles.

Experimental Procedures

Six hundred twenty weaned steer calves were used in two receiving experiments to evaluate growth performance, morbidity, and mortality when fed either a standard corn-based diet or diets based on distiller's dried grains or wheat middlings. Calves were purchased from sale barns in Ohio and Indiana and transported to the KSU Beef Cattle Research Center in Manhattan. Calves were placed into a large pen on arrival, given free access to long-stem prairie hay and water, and processed within 24 hours of arrival. Weight and temperature were recorded, and steers were administered Bovishield®-IV, Fortess®-7, injectable Ivomec®, and a Synovex®-S implant. Additionally, steers were given a metaphylactic dose of Micotil® at 1.5 ml per 100 lb body weight. Calves were allotted randomly to their respective treatments in each study and placed into pens ranging from 22 to 32 head each. A second dose of Bovishield®-IV was given 12 to 14 days after initial processing. Diets are shown in Table 1. Steers were fed their respective diets once daily.

Animals that exhibited clinical signs of respiratory disease were identified each morning

as candidates for treatment. They were treated for respiratory disease if clinical signs were accompanied by a rectal temperature of $103.5EF, or if they exhibited clinical signs for 2 consecutive days. The initial respiratory disease treatment was a subcutaneous injection of Micotil® at 1.5 ml per 100 lb body weight. Steers were returned to their original pen following treatment. Where necessary, calves were retreated after 48 hours, regardless of rectal temperature. The third-time treatment was a combination of 6 ml/cwt Biomycin® 200 and 5 ml/cwt Tylan® 200, administered intramuscularly.

Calves were weighed at the end of the 28-day receiving trials. Average daily gains and efficiencies were computed using the initial weight at processing and the final weight, both of which were measured approximately 24 hours after feeding.

Results and Discussion

Performance during the 28-day receiving experiments is summarized in Table 2. Feed intake, treatment rate, and retreatment rate were not different for calves fed the corn-based diet in comparison to those fed the middling-based diet in trial 1. Cattle fed the corn tended (P=.20) to gain more rapidly and were more efficient (P=.09).

In trial 2, feed intake was greater (P=.05) for cattle fed the distiller's grains diet than for those fed corn. Gain also was marginally higher for cattle fed the distiller's grains diet, but efficiency was not different for cattle fed the two diets. Contrary to our expectations, both treatment and retreatment rates were higher (P=.09) for cattle fed the distiller's grains diet.

These studies indicate that grain by-products are reasonable substitutes for grain in receiving cattle diets. However, the incidence of respiratory disease apparently is not reduced when grain is replaced by low-starch by-products.

Table 1. Compositions of Receiving Diets (100% Dry Basis)

Ingredient, %	Dry-Rolled Corn	Distiller's Dried Grains with Solubles	Wheat Middlings
Dry-rolled corn	51.62		
Distiller's dried grains with solubles		53.36	
Wheat middlings			52.73
Ground alfalfa hay	40.15	40	40
Cane molasses	5	5	5
Dehulled soybean meal	1.43		
Limestone	.51	.74	1.67
Urea	.37		
Potassium chloride	.32	.30	
Mineral-vitamin premix[1]	.60	.60	.60
Crude protein, actual %	13.48	16.83	20.47
Calculated NEg, Mcal/100 lb	49	51	39

[1]Formulated to provide .35% salt, 2:1 Ca:P; 1.5 IU/lb vitamin A, 20 IU/lb vitamin E, .04 ppm cobalt, 8 ppm copper, .5 ppm iodine, 50 ppm manganese, .3 ppm selenium, 50 ppm zinc, and 25 grams per ton Rumensin® on a dry matter basis.

Table 2. Performance of Feeder Steers Fed Receiving Diets Containing Corn, Distiller's Dried Grains with Solubles, or Wheat Middlings

Item	Dry-Rolled Corn	Distiller's Dried Grains with Solubles	Wheat Middlings	SEM	P=
Trial 1					
No. pens (head)	6 (155)		6 (136)		
Dry matter intake, lb/day	11.4		11.5	.3	.86
Daily gain, lb	2.64		2.33	.16	.20
Feed:Gain	4.38		5.00	.23	.09
Pulls, %	13.8		18.1	4.1	.48
Repulls, %	3.6		2.2	1.7	.56
Trial 2					
No. pens (head)	7 (186)	7 (187)			
Dry matter intake, lb/day	11.0	11.9		.3	.05
Daily gain, lb	2.36	2.72		.15	.11
Feed:Gain	4.73	4.48			.55
Pulls, %	14.8	26.7		4.5	.09
Repulls, %	3.1	8.7		2.1	.09