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Influence of Mixtures of High Moisture Corn and Dry Rolled Wheat on Finishing Performance and Carcass Characteristics¹

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Summary

Dry rolled wheat and high moisture corn were fed singly and in three combinations in a 132-day finishing trial. Daily gain, feed intake, and final live weight were greatest on the 75% corn:25% wheat diet. Feed efficiencies and carcass characteristics were not affected by grain combination. Daily gain and feed intake tended to decrease as percentage of wheat in the diet increased above 25%.

Introduction

Low prices make wheat attractive in cattle finishing diets. Since it is so highly fermentable, cattlemen have believed that no more than 50% wheat could be fed in a finishing diet without causing acidosis. Ionophores have helped relieve this problem. Other methods may be used to improve wheat utilization; one is combining wheat with a slower fermenting grain, such as corn or grain sorghum. Combining grains with differing fermentation rates has led to associative effects; the combination will outperform either grain alone. However, the combination to obtain the greatest associative effect is not known. We explored the feeding value of different high moisture corn and dry rolled wheat combinations with respect to finishing performance and carcass merit.

Experimental Procedure

Ninety large frame crossbred steers averaging 804 lbs. and purchased from one ranch in Nocona, Texas, were fed 132 days on five different finishing diets at the Southwest Kansas Branch Experiment Station. Upon arrival, the steers were branded, implanted with Compudose®, dewormed with Ivomec®, and given modified live IBR, PI3, BVD, and seven-way Clostridium vaccines. Animals were allotted to pens by weight and breed type, six steers per pen. Each diet was replicated in three pens. High moisture corn (HMC) and dry rolled hard red winter wheat (DRW) were blended as follows and incorporated in 90% concentrate diets: 1) 100HMC, 2) 75HMC:25DRW, 3) 50HMC:50DRW, 4) 25HMC:75DRW, and 5) 100DRW (Table 3.1). The wheat (TAM 105) was coarsely dry-rolled prior to feeding. The high moisture corn was coarsely ground prior to ensiling and had a final moisture content of 28%. Animals were individually weighed before feeding, every 28 days. Two consecutive daily weights were used for initial and final weights. Steers were fed once daily.

¹The cooperation of Brookover Ranch Feedyard, Inc. was greatly appreciated.

²Southwest Kansas Branch Station.

Results and Discussion

Performance data are shown in Table 3.1. Final live weights on the 75HMC:25DRW diet were greater ($P<.05$) than liveweights on diets containing 50 and 75% wheat. Average daily gain did not differ significantly between diets from day 0 to day 26 (not shown in table). However, from day 27 through 57, average daily gain for the steers consuming the 75HMC:25DRW diet increased in comparison to steers on all other diets ($P<.01$). The trend continued for the remainder of the feeding period (day 57 to 132); however, the differences were not statistically significant. Over the entire 132-day feeding period, average daily gains were greater for the animals on the 75HMC:25DRW than for those on the diets containing 50 and 75% wheat ($P<.05$). Similarly, the 75HMC:25DRW intake was greater ($P<.05$) than intake of diets containing 50% or more dry rolled wheat. These differences were exhibited through all 28-day feeding periods and overall. Feed per pound of gain did not differ significantly. However, animals on 100 HMC and 75 HMC diets tended to be more efficient.

Carcass characteristics were similar across all treatments, except for hot carcass weight (Table 3.2), which paralleled the final live weights as expected. Research is in progress to determine the cause of the positive associative effects of the 75HMC:25DRW mixture, as well as the negative associative effects of the 50HMC and 25HMC diets.

Table 3.1. Composition of High Moisture Corn (HMC) and Dry Rolled Wheat (DRW) Mixtures^{1,2}

Ingredient	100 HMC	75 HMC: 25 DRW	50 HMC: 50 DRW	25 HMC: 75 DRW	100 DRW
High moisture corn	80.0	60.0	40.0	20.0	0
Dry rolled wheat	0	20.0	40.0	60.0	80.0
Chopped alfalfa hay	5.5	5.5	5.5	5.5	5.5
Corn silage	5.5	5.5	5.5	5.5	5.5
Blended molasses ³	4.5	4.5	4.5	4.5	4.5
Corn supplement ⁴	4.5	3.4	2.25	1.1	0
Wheat supplement ⁵	0	1.1	2.25	3.4	4.5
Net energy (gain), Mcal/100 lbs.	60.7	60.9	61.1	61.3	61.5

¹ Dry matter basis.

² Formulated to contain 11.5% CP, .7% Ca, .46% P and .69% K.

³ Contained 65% corn steep liquor, 30% cane molasses and 5% whey.

⁴ Contained 38.8% ground corn, 16.7% urea, 1.1% trace minerals, .7% Vitamin A, D, & E, 4.2% salt, 1% tallow, 26.8% limestone, 10.3% dicalcium phosphate, and Bovatec (30 g/ton of total diet).

⁵ Same as corn supplement except 62.9% ground corn, .5% urea, 29.3% limestone, and 0% dicalcium phosphate.

Table 3.2. Finishing Performance and Carcass Characteristics of Steers Fed Mixtures of High Moisture Corn (HMC) and Dry Rolled Wheat (DRW)^a

Item	Treatment					SE
	100 HMC	75 HMC: 25 DRW	50 HMC: 50 DRW	25 HMC: 75 DRW	100 DRW	
No. of steers	18	18	18	18	18	
<u>Performance Data</u>						
Initial wt., lbs.	808	803	800	805	803	5
Final wt., lbs.	1281 ^{bc}	1308 ^b	1215 ^c	1211 ^c	1239 ^{bc}	28
Avg. daily gain, lbs.	3.58 ^{bc}	3.82 ^b	3.14 ^c	3.07 ^c	3.30 ^{bc}	.22
Avg. daily feed intake ^d , lbs.	22.17 ^{bc}	23.55 ^b	20.84 ^c	20.96 ^c	21.39 ^c	.66
Feed/gain	6.22	6.16	6.64	6.99	6.51	.43
<u>Carcass Data</u>						
Hot carcass wt., lbs	778 ^{bc}	795 ^b	738 ^c	736 ^c	753 ^{bc}	16
Ribeye area, in. ²	12.8	12.8	12.1	12.2	12.2	.3
Backfat, in.	.40	.36	.37	.31	.35	.03
Marbling score ^e	Sm ¹⁹	Sm ³²	Sm ¹¹	Sm ⁰⁹	Sm ⁰³	.13
Dressing percent	61.13	61.07	60.90	60.67	61.21	.63
USDA Yield Grade	2.74	2.69	2.72	2.52	2.69	.18

^a All reported values are least square means with 3 pens per treatment for performance data 18 animals per treatment for carcass data.

^{bc} Means in a row with different superscripts differ ($p < .05$).

^d Dry matter basis.

^e Sm=Small; evaluated on a 100 point scale within each marbling score.