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Grain dust for finishing cattle

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Grain Dust for Finishing Cattle

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Summary

Two finishing trials with heifers and steers were conducted to determine the value of grain dust (GD) to replace cracked corn and to compare soybean meal and urea as protein supplements.

Results of the 104-day heifer trial showed that 50% GD supported the least efficient gains. Heifers fed 0 and 25% GD rations had similar performances. In the 75-day steer trial, replacing 12.5 or 25% of the cracked corn in the ration with GD did not affect rate of gain. However, steers fed the GD rations consumed more feed and were less efficient than steers fed the cracked corn, control ration.

In both trials, soybean meal and urea supplements gave similar rates and efficiencies of gain.

Introduction

Grain dust is a problem in the grain marketing industry today. Historically, it has been dumped into rivers, blended in mill feeds, and disposed of in other ways. It is difficult to handle, feed manufacturers are reluctant to use it as a feed ingredient, and it is a dangerous explosive. Chemical analyses of grain dust vary with season, geographic location, grain source, and design of dust collection systems.

Objectives of our trials were to: 1) determine grain dust's value as a replacement for corn in feedlot rations and 2) compare soybean meal and urea as protein sources in grain-dust rations.

Experimental Procedure

Heifer trial: Thirty-six yearling Hereford heifers averaging 672 lb were allotted by weight to individual pens. Six heifers were assigned to each of the six rations. Soybean meal and urea were each fed with 0, 25, and 50% grain dust. The ration contained 80% cracked corn/grain dust, 15% prairie hay, and 5% pelleted supplement. Grain dust replaced corn in the dust rations (table 21.1), and proximate analyses of both are shown in table 21.2. All rations were formulated to contain 11.5% crude protein, and all were mixed and fed free-choice twice daily. The grain dust and supplements were fed as ¼-inch pellets.

Steer trial Sixty yearling steers averaging 816 lb were allotted to 12 pens of 5 steers each. Four pens were assigned to each level of grain

dust: 0, 12.5, or 25%; two pens from each grain dust level received a soybean meal supplement and two pens, a urea supplement. The ration and supplement composition are shown in table 21.3. All rations were formulated to contain 11.2% crude protein.

In both the heifer and steer trials, initial and final weights were taken after animals went 15 hours without feed or water. Final liveweights were then adjusted to a 62% dressing percentage.

Grain dust used in the two trials was provided by Far-Mar-Co Regional Terminal Elevator, Topeka, Ks., and was primarily of corn, milo, and wheat origin.

Results and Discussion

Heifer trial: Performances of all heifers are shown in table 21.4; effect of grain dust, in table 21.5; and effect of protein supplement in table 21.6. Heifers fed 0 and 25% grain dust rations had faster ($P<.05$) gains than those fed 50% grain dust. Daily feed consumption was not affected by level of grain dust, but the 50% grain dust ration gave the least efficient ($P<.05$) feed to gain ratio.

Steer trial: Performances of all steers are shown in table 21.7; effect of grain dust, in table 21.8; and effect of protein supplement in table 21.9. Steers fed 0, 12.5, or 25% grain dust rations had similar rates of gain; however, those fed 12.5 or 25% grain dust rations consumed more ($P<.05$) feed and were approximately 7% less efficient than those fed the control ration.

In neither the heifer nor the steer trial was there an interaction between levels of grain dust and supplemental protein sources. Soybean meal and urea supported similar feedlot performances.

Table 21.1. Ration and supplement compositions for the heifer trial.

	Level of grain dust and source of supplemental protein					
	0%		25%		50%	
Ingredient	SBM	Urea	SBM	Urea	SBM	Urea
	%, dry matter basis					
Cracked corn	80.0	80.0	55.0	55.0	30.0	30.0
Grain dust	---	---	25.0	25.0	50.0	50.0
Prairie hay	15.0	15.0	15.0	15.0	15.0	15.0
Supplement	5.0[a]	5.0[b]	5.0[a]	5.0[b]	5.0[a]	5.0[b]

[a]Soybean meal supplement (pelleted) containing these ingredients in lb/ton: 336.5 ground corn, 1176 soybean meal, 264 limestone, 90 potassium chloride, 12 dicalcium phosphate, 100 salt, 13.2 vitamin A premix (10,000 IU/g), and 8.3 Rumensin premix (60 g/lb).

[b]Urea supplement (pelleted) containing these ingredients in lb/ton: 1258.5 ground corn, 169 urea, 253 limestone, 135 potassium chloride, 45 dicalcium phosphate, 100 salt, 18 magnesium sulfate, 13.2 vitamin A premix (10,000 IU/g), and 8.3 Rumensin (60 g/lb).

Table 21.2. Proximate analyses of the cracked corn and grain dust fed in the heifer trial.

Item	Cracked corn	Grain dust
Dry matter, %	84.86	90.14
	%, dry matter basis	
Ether extract	5.68	6.58
Crude fiber	2.43	9.74
Crude protein	9.86	12.15
Ash	2.22	8.76
Nitrogen-free extract	79.81	62.77

Table 21.3. Ration and supplement compositions for the steer trial.

Ingredient	Level of GD and source of supplemental protein					
	0%		12.5%		25%	
	SBM	Urea	SBM	Urea	SBM	Urea
	%, dry matter basis					
Cracked corn	80.0	80.0	67.5	67.5	55.0	55.0
Grain dust	---	---	12.5	12.5	25.0	25.0
Corn silage	15.0	15.0	15.0	15.0	15.0	15.0
Supplement	5.0[a]	5.0[b]	5.0[a]	5.0[b]	5.0[a]	5.0[b]

[a]Soybean meal supplement containing these ingredients in lb/ton: 765.5 rolled milo, 723 soybean meal, 260 limestone, 108 potassium chloride, 22 dicalcium phosphate, 100 salt, 13.2 vitamin A premix (10,000 IU/g), and 8.3 Rumensin premix (60 g/lb).

[b]Urea supplement containing these ingredients in lb/ton: 1342 rolled milo, 104 urea, 255 limestone, 130 potassium chloride, 38 dicalcium phosphate, 100 salt, 9.5 magnesium sulfate, 13.2 vitamin A premix (10,000 IU/g), and 8.3 Rumensin premix (60 g/lb).

Table 21.4. Performances by heifers fed the indicated six grain dust rations.

Item	0% grain dust		25% grain dust		50% grain dust	
	SBM	Urea	SBM	Urea	SBM	Urea
No. of heifers	6	6	6	6	6	6
Initial weight, lbs	669	679	675	666	669	673
Final weight, lbs	880	876	876	864	804	790
Avg. total gain, lbs	211	197	202	198	136	118
Avg. daily gain, lbs	2.03	1.89	1.94	1.91	1.31	1.13
Avg. daily feed, lbs[1]						
corn	12.43	12.01	8.78	8.52	4.48	4.58
grain dust	---	---	3.98	3.88	7.46	7.62
supplement	.78	.75	.79	.78	.75	.76
prairie hay	2.33	2.25	2.39	2.33	2.24	2.28
total	15.54	15.01	15.94	15.51	14.93	15.24
Feed/lb of gain, lbs[1]	8.09	8.39	8.43	8.14	11.64	13.84
Dressing percentage	61.67	62.85	62.22	62.24	61.70	58.67

[1]100% dry matter basis.

Table 21.5. Performances by heifers fed 0, 25, or 50% grain dust rations.

Item	0% grain dust	25% grain dust	50% grain dust
No. of heifers	12	12	12
Avg. daily gain. lbs	1.96[a]	1.93[b]	1.22[b]
Avg. daily feed, lbs[1]	15.27	15.73	15.08
Feed/lb of gain, lbs[1]	8.24[b]	8.28[b]	12.74[a]
Dressing percentage	62.26[a]	62.23[a]	60.18[b]

[1]100% dry matter basis.

[a,b]Means on the same line with different superscripts differ significantly ($P<.05$).

Table 21.6. Performances by heifers fed SBM or urea supplements.

Item	Soybean meal	Urea
No. of heifers	18	18
Avg. daily gain, lbs	1.76	1.65
Avg. daily feed, lbs[1]	15.47	15.25
Feed/lb of gain, lbs[1]	9.3	10.13
Dressing percentage	61.86	61.25

[1]100% dry matter basis.

Table 21.7. Performances by steers fed the indicated six grain dust rations.

Item	0% grain dust		12.5% grain dust		25% grain dust	
	SBM	Urea	SBM	Urea	SBM	Urea
No. of steers	10	10	10	10	10	10
Initial weight, lbs	816	818	816	845	813	815
Final weight, lbs	1041	1041	1045	1054	1039	1038
Avg. total gain, lbs	225	223	229	209	226	223
Avg. daily gain, lbs	3.00	2.98	3.06	2.79	3.01	2.98
Avg. daily feed, lbs[1]						
corn	15.91	16.55	14.91	14.33	12.23	11.55
grain dust	---	---	2.65	2.57	5.38	5.01
supplement	.96	.98	1.06	1.03	1.08	1.00
silage	3.61	3.67	3.92	3.77	3.95	3.70
total	20.48	21.20	22.54	21.70	22.64	21.26
Feed/lb of gain, lbs[1]	6.82	7.11	7.38	7.81	7.52	7.41
Dressing percentage	59.08	58.28	58.41	59.53	59.02	58.91

[1]100% dry matter basis.

Table 21.8. Performances by steers fed 0, 12.5, or 25% grain dust rations.

Item	0% grain dust	12.5% grain dust	25% grain dust
No. of steers	20	20	20
Avg. daily gain, lbs	2.99	2.92	3.00
Avg. daily feed, lbs[1]	20.84[a]	22.12[b]	21.95[b]
Feed/lb of gain, lbs[1]	6.96[a]	7.60[b]	7.33[a,b]
Dressing percentage	58.75	58.97	58.97

[1]100% dry matter basis.

[a,b]Means with different superscripts differ significantly (P<.05).

Table 21.9. Performances by steers fed soybean meal or urea supplements.

Item	Soybean meal	Urea
No. of steers	30	30
Average daily gain, lbs	3.02	2.92
Average daily feed, lbs[1]	21.88	21.38
Feed/lb of gain, lbs[1]	7.24	7.35
Dressing percentage	58.84	58.96

[1]100% dry matter basis.