Animal Performance, Storage Losses and Feasibility of Ensiling a Mixture of Tub Ground Low Quality Hay and Wet Distillers' Grains for Growing Cattle

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Summary and Implications

This study was designed to evaluate long term storage options for wet distillers' grains including storage losses and performance of backgrounding calves. Thirty six tons of wet distillers' grains were mixed by mixer wagon with 9 tons of tub ground fescue hay in August of 2007. This mixture packed and stored in a bunker silo, covered with plastic and stored until December at the ISU Beef Nutrition Farm. The mixture was fed to growing cattle and compared to the same feeds mixed daily, and also conventional feeds for a 112 day trial. Performance of all treatments exceeded projections, averaging approximately 3 pounds per day. There were no differences in daily gain or feed conversion among treatments, although cattle fed WDG consumed less feed. Sulfur content of the WDG containing diets exceeded .5% of the diet dry matter. Storage losses were 10.9% for the bunker-stored mixture.

Introduction

Long term storage of high moisture corn co products limit their use in small-medium size beef operations. Seasonal demand for distillers' grains by cattle feedlots often create opportunities for beef producers to take advantage of low cost feeds if they can store them long term. This study evaluated the comparative feeding value of wet distillers' grains in beef backgrounding rations that were stored long term in a mixture with ground hay with the same feeds mixed daily and conventional diets.

Materials and Methods

Wet distillers' grains (WDG) were delivered to the Iowa State Beef Nutrition Farm on August 30, 2007. On August 30 and 31, 72,159 lb. of WDG and 18,181 lb. of tub ground, low quality fescue hay were mixed in 30 mixer-wagon loads, delivered to a small concrete bunker silo, packed with a skid loader, and covered with plastic. The nutrient analysis of the WDG hay and mixture are shown in Table 1.

Fifty four predominately Angus, age and source verified steer calves were purchased in Bellevue, Nebraska and transported to the ISU Beef Nutrition Research Farm. On arrival at the feedlot calves were vaccinated with Bovi-Shield Gold 5, Ultrabac 7, ear tagged and weighed for allotment. The cattle were then stratified by weight and randomly allotted to nine pens on December 6, 2007. Three pens were each fed one of three diets. The diets consisted of the bunker mixture (Bunker), the same combination of feedstuffs mixed daily (daily mix) and a control ration. The specific diets fed are shown in Table 2. The control ration was formulated to be similar in energy to the two WDG diets. Ration nutrient analyses calculated from ingredients are shown in Table 3.

Cattle were weighed on days 28, 56 and 85 and 112. Feed consumption was measured on a daily basis. The data were analyzed using the General Linear Models statement of SAS. Means were separated using orthogonal contrasts comparing the content to the two WDG treatments and also the storage methods within the two WDG treatments. Pen was the experimental unit.

Results and Discussion

Results of cattle performance are shown in Table 4. In contrast to the prior year study using condensed distillers solubles and hay, this mixture packed and stored very well. Performance of all treatments was excellent and exceeded expectations. No significant differences existed in any performance parameters other than dry matter intake. Control cattle consumed more feed than the cattle receiving WDG. Cattle weights and daily gains did not differ, however. The level of WDG necessary to provide enough moisture for proper packing and long term storage (80% as fed, 60% of dry matter) provided a feed mixture that was over .5% sulfur. This is certainly above most recommendations for feeding levels of sulfur. However, performance and health was not affected negatively. This experiment confirms recent NRC recommendations that suggest cattle fed higher forage diets can tolerate higher levels of sulfur, up to .5% of the ration dry matter.

Over the course of the study, 81,438 lb. of feed from the bunker was fed. This represents a storage loss of 10.9%. This level of storage losses is well within acceptable levels.

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Table 1. Nutrient analysis of WDG, hay and 80:20 (as fed) mixture.

	WDG	Fescue Hay	Mixture
Dry matter	34.9	87.0	63.35
	----------% of Dry Matter----------		
Crude protein	30.6	10.3	14.63
Fat	12.5	2.83	.93
Ash	5.0	---	10.2
Calcium	.13	.46	.93
Phosphorus	.91	.25	.58
Magnesium	.38	17	.34
Potassium	1.27	2.24	1.91
Sulfur	.79	.12	.48
pH	3.6	6.0	5.3
Acid detergent fiber		47.11	31.5
Neutral detergent fiber		69.12	48.5

Table 2. Diets fed.

	Control	WDG/hay Mixture (Bunker)	WDG/hay (mixed daily)
	----------% of Dry Matter----------		
WDG/hay mixture	---	97.62	---
WDG	---	---	59.38
Hay	38.46	---	38.24
Corn	48.41	---	---
Soybean meal	11.80	---	---
Molasses	1.50	---	---
Limestone	0.95	2.00	2.00
Salt	.25	.25	.25
TM Premix	.04	.04	.04
Vit A Premix	.04	.04	.04
Rumensin 80	.02	.02	.02

Table 3. Nutrient analyses of diets (calculated from ingredients).

Nutrient	Control	WDG/hay Mixture (Bunker)	WDG/hay (mixed daily)
Dry Matter, %	85	43.7	42.7*
	----------% of Dry Matter----------		
Crude protein	15.8	24.3	23.4*
Calcium	.60	1.05	1.05
Phosphorus	.36	.60	.53.53
Magnesium	.20	.32	.32
Potassium	1.3	1.78	1.78
Sulfur	.20	.50	.54*

Analyzed value*

Table 4. Cattle Performance.

Item	Control	WDG/hay mixture (Bunker)	WDG/hay (mixed daily)	SE	Contrast Control vs. WDG	Contrast Bunker vs. Mixed daily
Initial weight	564	565	562	1.8	NS	NS
Final weight	900	909	878	9.2	NS	NS
118-day performance						
Dry matter intake	16.3	15.7	15.2	.23	< .05	NS
Average daily gain	3.00	3.08	2.82	.08	NS	NS
Feed/gain	5.42	5.10	5.39	.13	NS	NS

Unloading the Mixture into the Bunker Silo.

Packing the WDG-Hay mixture.