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Use of Wet Distillers Grains with Solubles Mixed with Ground Hay and Bunker Stored in a Heifer Development Program

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Abstract
Cow-calf producers are asking questions concerning the use of wet distillers grain in their operations. Most small to moderate sized cow-calf producers cannot use a semi-load of wet distillers grain fast enough before it spoils, therefore, methods for extended storage are needed to use this product in their operation. Previous feedlot work suggested distillers grain are excellent sources of nutrients for the diets of feedlot cattle, but have not been used to a large degree in heifer development programs. The goal of this trial was to evaluate the use of modified distillers grain with solubles mixed with ground hay and stored for an extended period of time with growing and developing breeding heifers.

Keywords
Animal Science

Disciplines
Agricultural Science | Agriculture | Animal Sciences

Comments
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Introduction

Cow-calf producers are asking questions concerning the use of wet distillers grain in their operations. Most small to moderate sized cow-calf producers cannot use a semi-load of wet distillers grain fast enough before it spoils, therefore, methods for extended storage are needed to use this product in their operation. Previous feedlot work suggested distillers grain are excellent sources of nutrients for the diets of feedlot cattle, but have not been used to a large degree in heifer development programs. The goal of this trial was to evaluate the use of modified distillers grain with solubles mixed with ground hay and stored for an extended period of time with growing and developing breeding heifers.

Materials and Methods

Delivery of 102.25 tons of wet distillers grains (WDGS) in four walking bed semi loads took place on September 26 and 27, 2007. The storage procedure for this product was an 80:20 mix on an as-fed basis using 102.25 tons of WDGS and 26.8 tons of ground hay mixed via a loader tractor and packed into a large round bale bunker system. Feeding of the stored WDGS-Hay mix occurred from early January to mid-May, 2008, therefore, length of use from the large bale bunker was 99 to 250 days post-packing into the bunker. A total of 124 Angus heifers, 33 fall yearlings, and 91 spring calves, were split into treatment and control groups with three replicates. The rations used and outlined in Table 1 were formulated to achieve heifer development gains of 1.85 to 1.95 lb/day with limited intakes. Control diet fed heifers were done to reflect historical management procedures at the McNay Research Farm. Treatment diet fed heifers received more of the WDGS+Hay mix as the growing trial progressed due to lower gains. Tub ground hay was incorporated into the experimental diet to equalize the dry matter content of the control and experimental diets. All diets were evaluated and balanced for major and minor minerals plus vitamin A, D, and E. Originally sulfur intake was a concern, especially considering the experimental mixture contained .5 percent sulfur and the water analysis at the McNay Research Farm feedlot in 2007 showed sulfate levels from 1280 to 1410 ppm. However, when the WDGS and hay mix was incorporated with other feed ingredients diet sulfur was .35 percent sulfur, which is below maximum NRC levels for high roughage diets.

At the conclusion of the feeding experiment the heifers went through a culling routine for the animal breeding project and the remaining 80 head were placed on the control ration. These remaining heifers were artificially inseminated using the CO-Synch + CIDR fixed-time estrus synchronization protocol as outlined by the Beef Reproduction Task Force in their Beef Heifer Protocols. The protocol was initiated so heifers were fixed-time artificially inseminated (AI'd) on June 18 and 19, 2008. All heifers were bred once followed by a cleanup AI using the HeatWatch system until July 18 or 29 days followed by a 17-day natural service bull cleanup program. Heifers

were palpated for pregnancy using standard procedures.

Data were analyzed using the GLM procedure of SAS with the least square means option.

Results and Discussion

Performance variables measured include growth rate, feed intakes, efficiency of gains, and reproductive performance. Table 2 shows growth rate by period and for the entire feeding trial which was 148 days. For both periods and for the entire test, Control heifers consumed more dry matter on a daily basis, gained significantly faster, and had better feed conversion. Due to extremely harsh winter and spring conditions neither controls or WDGS+Hay mix fed heifers were close to meeting formulated growth expectations. At the end of trial all heifers were palpated by a veterinarian and at that time it was discovered that significant granulation was contained in the feces of the WDGS+Hay mix treatment group. Upon closer evaluation this granulation was due to the crushed limestone that was used to weigh down the plastic cover on the bunker. It is not certain if this highly affected ration fiber digestion, but it appears that it could have had some effect. Certainly protein and energy nutrient analysis of the mixed product would suggest that significantly higher gains should have occurred. Of interest was the dramatic change in both ash and calcium content in the analyses. Prior to covering the mixture, calcium and ash content were 1.94 and 13.15 percent, respectively. During the feeding trial, five samples were analyzed and the calcium and ash content increased to 3.33 and 16.03 percent, respectively.

Numerically Control heifers had higher AI breeding and overall pregnancy rates (Table 3) than heifers fed the WDGS+Hay mix, however, these pregnancy rate differences were not significantly different from one another. One replicate in the Control heifers had exceptionally high AI (86.7%) and overall pregnancy (100%) rates in comparison to the other replicates within that treatment group, which contributed most of the numerical differences presented in Table 3.

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Table 1. Rations for 2007–08 McNay DG heifer trial.

	Control rations			Rations using WDGS+Hay mix		
	1/3/08 to 2/14/08	2/15/08 to 4/18/08	4/19/08 to 5/30/08	1/3/08 to 2/14/08	2/15/08 to 4/18/08	4/19/08 to 5/30/08
WDGS + Hay mix	--	--	--	41.9%	52.7%	58.5%
Corn	13.2%	16.7%	17.3%	--	--	--
Haylage	82.8%	78.9%	78.6%	57.5%	40.7%	33.1%
Tub ground dry hay	--	--	--	--	6.0%	7.6%
Soybean meal	3.3%	3.8%	3.1%		--	--
Mineral mix and salt	0.7%	0.6%	0.9%	0.6%	0.6%	0.8%

Table 2. Heifer gains, feed intakes, and feed conversions by period for treatments versus control.

		Control	WDGS+Hay mix treatment
Period		Averages	Averages
	Number heifers	62	62
1st 63 days	ADG	1.72*	1.45*
	AF F/G	22.21	24.06
	DM/FG	13.28	12.11
	Avg daily AF intake	37.81	34.77
	Avg daily DM intake	22.61	17.50
2nd 85 day	ADG	1.44**	.73**
	AF F/G	30.09*	53.93*
	DM F/G	16.22*	25.69*
	Avg daily AF intake	43.42	39.40
	Avg daily DM intake	23.40	18.77
Entire 148 day feeding	ADG	1.55**	1.03**
	AF F/G	26.41	36.17
	DM F/G	14.85*	17.61*
	Avg daily AF intake	41.03	37.43
	Avg daily DM intake	23.06	18.23

*Means in same row significantly different: $P < .05$.
**Means in same row significantly different: $P < .01$.

Table 3. Summary of AI program and pregnancy rates by treatment group 2007–08.

Item	Control (head = %)	WDGS+Hay Mix (head = %)	Overall (head = %)
Pregnant to fixed-time AI	27/46 = 58.7%	16/34 = 47.1%	43/80 = 53.8%
Pregnant to cleanup AI	7/46 = 15.2%	6/34 = 17.6%	13/80 = 16.3%
Pregnant to cleanup bulls	3/46 = 6.5%	3/34 = 8.8%	6/80 = 7.5%
Total % pregnant	37/46 = 80.4%	25/34 = 73.5%	62/80 = 77.5%
Total % open	9/46 = 19.6%	9/34 = 26.5%	18/80 = 22.5%