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Effects of Dried Distillers Grains Supplementation Frequency on Heifer Growth

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Summary

Dried distillers grains were fed as an energy source to growing heifers as a supplement to grass hay. Heifers were fed the equivalent of 3 lb/head daily, either three or six times per week of the same supplement. Heifers fed dried distillers grains six times per week gained more weight than heifers fed three times per week but those fed three times per week had greater allantoin to creatinine ratios. Better animal performance may result from more frequent supplementation of dried distillers grains.

Introduction

As the corn milling industries continue to expand, an increased availability of distillers grains is expected. Dried distillers grains (DDG) are appropriate for forage based production systems when forage quality is poor (winter) or quantity is limiting (drought). Dried distillers grains are considered a protein supplement when fed at less than about 15% of the diet DM and as an energy source when fed at levels greater than 15% of the diet. Energy supplied by DDG is in the form of digestible fiber and fat (1996 *Nebraska Beef Report*, pp. 65-66) making its energy value superior to corn in forage based diets (2003 *Nebraska Beef Report*, pp. 8-10). Dried distillers grains contain approximately 65% undegraded intake protein (% of CP), consequently forage based diets that include dried distillers grains fed as an energy source are com-

monly deficient in degradable intake protein (DIP) but contain excess metabolizable protein (MP). However, recent studies indicate adding urea to meet the degradable intake protein requirement is not necessary when dried distillers grains are fed as an energy source in forage based diets (2004 *Nebraska Beef Report*, pp. 20-21). The objective of this experiment was to determine the influence of supplementation frequency of dried distillers grains fed as an energy source without added urea on weight gain in heifers.

Procedure

Forty-eight crossbred heifers (425 + 44 lb) were stratified by weight then assigned randomly to one of eight pens. Pens were then assigned randomly to one of two supplement treatments. Heifers were fed for ad libitum consumption of grass hay (53% TDN, 6.6% CP) and supplemented with the daily equivalent of 3 lb (DM) DDG/head either three or six times per week. Supplement composition is listed in Table 1. Heifers were fed DDG Monday through Saturday or on Monday, Wednesday and Friday. Heifers were weighed on two consecutive days at the beginning and end of the 84-day trial without limiting intake prior to weighing. Beginning on day 55 of the experiment, approximately 50 mL of urine was spot collected from each heifer for three consecutive mornings. Urine samples were composited by animal and analyzed for allantoin and creatinine concentrations by high performance liquid chromatography. The ratio of allantoin to creatinine is indicative of the amount of microbial crude protein

produced (2004 *Nebraska Beef Report*, pp. 20-21).

Feedstuffs used in the trial were analyzed for DM, OM, CP and IVDMD (Table 2).

Data were analyzed using pen as the experimental unit.

Results

Heifers fed distillers grains six times per week gained more weight than heifers fed three times per week (Table 3). One explanation for reduced gain in less frequently supplemented heifers is ruminal fat concentration. Distillers grains are approximately 10% fat and feeding three times per week at the levels used in this experiment would result in dietary fat concentration of 5.4% on the day of supplementation. High levels of fat in the diet depress fiber digestion via negative effects on ruminal microorganisms. Theoretically allantoin to creatinine ratios are indicative of microbial growth in the rumen and if fat content of the diet is the reason for decreased gains in the infrequently supplemented treatment a decreased allantoin to creatinine ratio would be expected. However, the ratio of allantoin to creatinine was greater in the infrequently supplemented group. This apparent inconsistency may be a result of the short (three day) urine collection period in relation to the supplementation schedule. Supplement was fed on Monday and Wednesday and urine was collected Tuesday through Thursday. Increased concentrations in the infrequently supplemented treatments would be expected if allantoin and creatinine concentrations in the urine were reflective of the previous day's diet.

(Continued on next page)

Table 1. Ingredient composition of supplement (%DM) used to determine the influence of dried distillers grain supplementation frequency.

Ingredient	% of Supplement ^a
Dry distillers grains	94.20
Molasses	2.90
Limestone	1.60
Salt	1.00
Trace mineral premix	1.16
Vitamin premix	0.06

^aSupplement comprised 30% of the diet.

Table 2. Chemical composition (+ SD) of feedstuffs used in Experiment 1.

Item	Grass Hay	Dried Distillers Grains
DM, %	95.9 + 0.0003	92.1 + 0.0009
OM, %	90.2 + 0.0004	97.7 + 0.003
IVDMD, %	53.4 + 0.035	—
CP, %DM	6.7 + 0.002	34.1 + 0.265

Table 3. Performance and allantoin to creatinine ratios in urine of animals fed the daily equivalent of 3 lb (DM) dried distillers grains either 3 (3X) or 6 (6X) times per week.

Item	Treatment		SEM	P-value
	3X	6X		
Initial BW, lb	426	424	1.22	0.420
Final BW, lb	559	571	1.93	0.005
ADG, lb	1.58	1.74	0.031	0.010
Allantoin: creatinine	1.29	1.20	0.026	0.050

It is also possible that additional refinements to the technique of using allantoin to creatinine ratios need to be made before it can be used as an effective research tool. Other explanations for decreased gains in the infrequently supplemented treatment include decreased forage intake and inefficient nitrogen recycling. Decreased forage intake has been observed when high levels of distillers grains are fed in high forage diets (2003 *Nebraska Beef Report*, pp. 8-10). Also, efficiency of nitrogen recycling is inversely related to nitrogen intake. It is possible that inefficiency of nitrogen recycling in infrequently supplemented heifers created a degradable protein deficiency.

In conclusion, heifer gain was greater when dried distillers grains were fed six times compared to three times per week.

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