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Limit Feeding Beef Cows with Bunkered Wet Distillers Grains plus Solubles or Distillers Solubles

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Summary

An experiment was conducted using 70 cows to evaluate performance when limit limit-fed grain byproducts. Cows in the wet distillers grains plus solubles (WDGS) treatment group and those in the distillers solubles (DS) treatment group were limit fed a diet containing 41% byproduct and 59% cornstalks. The control (CON) treatment consisted of ad libitum intake of 43% brome hay, 34% cornstalks and 23% alfalfa haylage. Cows fed WDGS were heavier compared to those in the DS and CON treatment groups. Average daily gain (ADG) tended to be greater for WDGS treatment compared to the CON treatment. These data suggest that performance of cows limit-fed either WDGS or DS stored in a bunker is similar to that of cows fed an ad libitum forage diet.

Introduction

Corn-based diets fed at a restricted intake can be used to meet nutrient needs for beef cows in gestation and early lactation without adverse effects on production. Grain byproducts from the ethanol industry are a viable source of nutrients for cows and could be used with low quality forages to provide a limit-fed ration that meets maintenance requirements. The objective of this experiment was to evaluate the performance of non-lactating, non-pregnant beef cows limit limit-fed grain byproducts compared with an *ad libitum* forage diet.

Procedure

Seventy non-lactating, non-pregnant beef cows (1,303 ± 139 lb) were stratified by age, BW and body

Table 1. Effects of limit feeding non-lactating, non-pregnant beef cows.

| Performance Characteristics | Treatment ¹ | | | SEM | P-value |
|-----------------------------|------------------------|--------------------|--------------------|------|---------|
| | WDGS | DS | CON | | |
| Initial BW, lb | 1315 | 1295 | 1311 | 10 | 0.20 |
| Final BW, lb | 1379 ^a | 1348 ^b | 1346 ^b | 7 | 0.01 |
| Initial BCS | 5.7 | 5.8 | 5.7 | 0.08 | 0.49 |
| Final BCS | 6.0 | 6.0 | 5.9 | 0.11 | 0.48 |
| Change in BW, lb | 64 | 52 | 34 | 8 | 0.09 |
| ADG, lb | 0.82 | 0.68 | 0.44 | 0.20 | 0.09 |
| DMI, lb/d | 17.00 ^a | 17.00 ^a | 22.80 ^b | 0.32 | 0.01 |

¹Dietary treatments: WDGS = wet distillers grains plus solubles mixed with corn stalks; DS = distillers solubles mixed with corn stalks; CON = corn stalks, alfalfa haylage and brome hay.

^{a,b}Within a row, means without a common superscript differ ($P < 0.01$).

condition (1 = emaciated, 9 = obese), then assigned randomly to one of three treatments and fed to maintain BW. Cows were fed at the UNL ARDC feedlot near Mead, Neb. Treatment diets were formulated to be isocaloric and isonitrogenous for the 76-day experiment. Cows (three pens/treatment) were limit fed a 41:59 ratio of bunkered wet distillers grains plus solubles (WDGS; n = 24) and cornstalks limited to 17 lb/head/day (1.3% of BW); bunkered distillers solubles (DS; n = 22) and cornstalks at a 41:59 ratio offered at 17 lb/head/day (1.3% of BW); or a control diet (CON; n = 24) containing 43% brome grass, 34% cornstalks and 23% alfalfa haylage to provide *ad libitum* intake.

The WDGS and DS diets were mixed and stored 30 days prior to the start of the trial. To prepare the material to be bunkered, cornstalks were ground through a 7-in screen. Distillers solubles or WDGS and cornstalks were weighed into a Roto-mix truck and mixed for five minutes, then packed into a concrete bunker using a skid steer loader.

The targeted byproduct to cornstalks (DM basis) ratio for storage in the bunker was 65:35. However, the mixed material in the DS bunker would not pack at this ratio, so cornstalks were added until the material would pack. The optimal distillers solubles to cornstalks ratio was 41:59.

The WDGS:corn stalks mix was adjusted to a storable bunker ratio of 70:30 of wet distillers grains plus solubles and cornstalks, respectively. Wet distillers grains plus solubles and DS bunkered material were covered with plastic.

WDGS was mixed at feed delivery with cornstalks to attain the 41:59 WDGS:cornstalks treatment ratio. The DS:cornstalks mixture was fed directly from the bunker. Prior to trial initiation and at trial conclusion, cows were limit-fed for five days using a diet that was 40% brome hay, 10% alfalfa hay and 50% wet corn gluten feed to minimize error due to gut fill (1.9% BW).

Two-day consecutive initial and final BW were recorded to determine performance characteristics. Limestone was added to limit-fed diets to achieve a minimum Ca:P ratio of 1.5:1. Salt and trace mineral blocks were offered free choice in the bunks. Data were analyzed using the PROC MIXED procedure of SAS with pen as the experimental unit.

Results

Initial and final body condition scores did not differ among treatments and averaged 5.9 (Table 1). Initial BW across treatments was similar among treatment groups. Final BW

(Continued on next page)

was greater ($P = 0.01$) for the WDGS (1,379 lb) treatment compared to DS (1,348 lb) and CON treatments (1,346 lb). Change in BW did not differ between WDGS (63 lb) and DS (52 lb) treatments but tended ($P = 0.09$) to differ between WDGS (63 lb) and CON (34 lb) treatments.

Dry matter intake (DMI) was 22.8 lbs for cows fed the CON diet compared with 17 lbs for the limit-fed WDGS and DS treatments. Performance differences were not observed between cows limit-fed WDGS or DS treatments.

Previous data suggest that corn oil supplementation decreases neutral detergent fiber (NDF) digestibility by 6% and 12% when corn oil is supplemented at 0.75 g/kg of BW and 1.5 g/kg of BW, respectively. As fat level

in the diet increased, we hypothesized that ADG would be negatively impacted, thus anticipating a lower ADG when comparing WDGS and DS treatments to CON. Fat levels of the diets were 9.2% and 4.9% for DS and WDGS treatments, respectively, when using ether extract fat analysis. However, a new laboratory procedure for determining fat content of DS determined fat content of DS was 13.6% (observed) versus 22.7% (formulated; determined using ether extract analysis). Using the new fat values, the dietary fat level of DS cows calculated to be 5.6%. The CON treatment effects were likely due to lower DMI (1.8% of BW) than predicted by the National Research Council. In addition cows in the CON treatment visually sorted their diet. Cows on

the WDGS and DS treatments did not sort their diets and consumed 100%.

With the increasing availability of grain byproducts, producers may consider using bunkered WDGS and DS in limit-fed rations. Although fat level showed no negative effect on animal performance in our experiment, dietary fat should be closely monitored because of its possible negative effect on forage digestion. Non-lactating, non-pregnant mature beef cows can be maintained on a limit-fed diet of WDGS or DS similar to feeding forage diets *ad libitum*.

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