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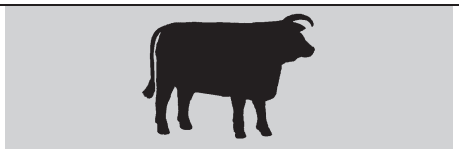

An evaluation of 10-G brand direct-fed microbial for yearling steers fed finishing diets containing wet distillers grains[1,2]

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ABSTRACT

One hundred forty-four Charolais crossbred yearling steers (335.5 kg ± 12.2) were used to determine the effect of 10-G brand direct-fed microbial product (10-G contains Lactobacillus acidophilus, Enterococcus faecium, Pediococcus acidilacticii, Lactobacillus brevis, and Lactobacillus plantarum) in a finishing diet containing steam-flaked corn and wet distillers grains with solubles (WDGS) on performance and carcass characteristics. Cattle were fed twice daily with dietary treatment applied only to the first feeding. Dietary treatments included 1) 10-G (TRT) product in the first round of feeding and 2) control (CON). The CON diet received a placebo in place of the 10-G product. Each diet contained 6% wheat straw (WS) and 15% WDGS and the finishing diet contained 68% steam flaked corn on a DM basis. Prior to the initiation of the experiment, WS and WDGS were mixed together using a vertical screw-type truck-mounted mixer box in the ratio of 2:5 (kg:kg) WS to WDGS on a DM basis, stored in a single pile, packed with a tractor, and covered with plastic. The WS and WDGS mixture was added to each batch of feed as one commodity during diet manufacturing. Overall ADG, DMI, G:F, and NE recovery were similar across treatments ($P > 0.10$). Hot carcass weight, YG, QG, maturity, and marbling score were similar across treatments ($P > 0.10$). Carcasses from steers receiving 10-G had a greater ($P < 0.05$) percentage of KPH compared with CON carcasses. Performance and carcass merit for yearling feedlot steers fed steam-flaked corn-based diets containing WDGS were not improved by 10-G brand DFM.

Key words: wet distillers grains, feedlot cattle, performance, direct-fed microbial, *Lactobacillus acidophilus*

INTRODUCTION

Yoon and Stern (1995) defined direct-fed microbials (**DFM**) as "a source of live, naturally occurring microorganisms." Direct-fed microbials can include both viable bacteria and fungi (Krehbiel et al., 2003) and have been proposed to be beneficial to livestock production. Although DFM research results are variable and little is known about the mechanisms by which they may influence production, DFM supplementation to cattle has been reported to increase ADG, improve feed efficiency, increase milk production, improve health, and decrease ruminal acidosis (Ghorbani et al., 2002).

Fox (1988) analyzed 6 separate feedlot experiments using DFM (Crawford et al., 1980; Hutcheson et al., 1980; Kiesling and Lofgreen, 1981; Davis, 1982; Kiesling et al., 1982; Hicks et al., 1986). Cattle in these experiments received DFM during receiving phase only, during processing only, or both at processing and during the receiving phase. The data analysis showed a 13.2% improvement in ADG, 6.3% improvement in feed efficiency, and 2.5% increased feed intake for DFM treatment over the control. The 6 experiments did not contain wet distillers grains with solubles (**WDGS**).

[1] Mention of a proprietary product does not constitute a guarantee or warranty of the product by Colorado State University or the authors, and does not imply its approval to the exclusion of other products that may also be suitable.

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Very little is known about the effectiveness of DFM in distillers grain diets. High amounts of yeast in WDGS may mask any positive effects of DFM products. Therefore, the objective of this study was to determine the effectiveness of a DFM in a finishing diet containing WDGS.

MATERIALS AND METHODS

Animals and Experimental Procedures

Before the initiation of these experiments, care, handling, and sampling of the animals defined in this experiment were approved by the Colorado State University Animal Care and Use Committee.

One hundred forty-four Charolais crossbred yearling steers were selected for the experiment from an initial group of 192 steers (335.5 kg ± 12.2). Steers arrived at a commercial feedlot near Lamar, Colorado, in early fall and were allowed overnight ad libitum access to long-stem grass hay and water. The next morning, cattle were relocated to the adjacent Southeast Colorado Research Center (**SECRC**) for processing. Processing included the application of an electronic identification tags, vaccination with Pasteurella Multocida Bacterial Extract-Mannheimia Pasteurell Hemolytica Toxoid (Presponse, Fort Dodge Animal Health, Overland Park, KS) and Bovine Rhinotracheitis Virus Diarrhea Types I and II (Pyramid 2, Fort Dodge Animal Health) for protection against respiratory disease, and treatment for internal and external parasites with Ivermectin (ProMectin, Vedco, St. Joseph, MO). Steers were implanted with 120 mg of trenbolone acetate and 24 mg of estradiol (Revalor-S, Intervet/Schering-Plough Animal Health, Millsboro, DE). During processing, individual weights were recorded. Cattle were housed in SECRC pens and had ad libitum access to long-stem grass hay and water overnight.

Following processing, mean weight was computed and steers were ranked by weight. Steers that were beyond ± 2 SD from the mean weight were excluded from the experiment (<421 or >266 kg). In addition, steers that appeared lame or that showed symptoms of respiratory disease were also excluded from the experiment. Remaining steers were assigned a random number between 1 and 1,000 using the random number function in Excel 2002 (Microsoft Inc., Redmond, WA). Sufficient steers with the lowest random numbers were eliminated from further consideration for the experiment, leaving 144 eligible steers. The 144 eligible steers were ranked by weight. Among the lightest 8 steers, the steer with the lowest random number was assigned to replicate 1, the steer with second lowest random number was assigned to replicate 2, and so forth until the last steer among the group of 8 with the largest random number was assigned to replicate 8. This process was continued for each successive group of 8 steers until all steers were assigned to a replicate. Next, the steers were sorted by weight within each replicate. For each successive group of 2 steers, the lowest random number was assigned to the control and the highest random number was assigned to the treatment. This process continued until all steers were assigned to a treatment within each replicate.

During the morning following processing, steers returned through the chute were individually weighed and visual tags were applied. Next, steers were sorted into treatment pens and the study was initiated. Steers were housed in soil-surfaced pens that measured 6.1 m × 18.3 m. Each pen had 3.5 m of linear bunk space located on a 3-m-deep concrete feeding apron. Every 2 pens shared a common water fountain that was located along the fence line with the feed bunks. No wind breaks or shade structures were provided.

The starting and step 1 diets contained 16.5 mg/kg DM monensin (Rumensin, Elanco Animal Health, Greenfield, IN) and were used to acclimate the steers to a high-concentrate finishing diet (Tables 1 and 2). Each diet contained 6% wheat straw (**WS**) and 15% WDGS on a DM basis. Prior to the start of the experiment, WS and WDGS were mixed together using a vertical screw-type truck-mounted mixer box in the ratio of 2:5 (kg:kg) WS to WDGS on a DM basis, stored in a single pile, packed with a tractor, and covered with plastic. The mixture was ensiled for 7 d before the start of the experiment. The WS and WDGS mixture were added to the batch during diet manufacturing as a single commodity. Alfalfa hay and corn silage provided the balance of the remaining roughage needed in each diet. Total roughage content in the finishing diet provided 6% NDF from WS and corn silage. Monensin and tylosin (Tylan, Elanco Animal Health) were included in the finishing diet at 33 and 11 mg/kg DM, respectively. The finishing diet contained 14.6% CP, 0.70% calcium, 0.25% magnesium, 0.70% potassium, 3,306 IU/kg DM vitamin A, and 33 IU/kg DM vitamin E.

All diets were fed 2 times daily. Feed bunks were evaluated at 0630 h, and the target was to have a few crumbles of feed remaining at this time. If the bunks were empty for 2 consecutive mornings, the daily feed amount was increased by 0.23 kg DM per steer. Diets were manufactured immediately before feeding, utilizing a 4-auger stationary mixer (Harsh Manufacturing, Dodge City, KS). Diet transitions were simultaneous for both treatments after 7 d on the starter and each step-up diet. The control diet was manufactured and fed before manufacturing and feeding the DFM diet. For the first feeding of each day only, a sugar-based placebo was dissolved in 3.8 L of lukewarm tap water. The dissolved placebo was evenly distributed over the control diet as the last item added to the mix during manufacturing. The 10-G treatment contained *Lactobacillus acidophilus*, *Enterococcus faecium*, *Pediococcus acidilacticii*, *Lactobacillus brevis*, and *Lactobacillus plantarum* and was formulated to supply 500 million cfu per animal daily in the finishing diet. For the 10-G treatment, the appropriate amount of 10-G was dissolved in 3.8