

# Comparison of Wheat-based DDGS to Barley as an Energy Source for Backgrounding Cattle

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## Introduction and Research Objectives:

Developing low-cost feedlot rations with alternative and by-product feed ingredients is one way to reduce overall feed costs. Some feed products that are available in western Canada are oat hulls and various co-products from the growing biofuel production industry. Dried distillers grains with solubles (DDGS) is a bioethanol co-product which has attractive nutritional characteristics for cattle feeding, and is becoming more available to western Canadian producers. The objective of this study was to evaluate the feeding value of wheat-based DDGS as a replacement to barley in low-cost backgrounding rations.

## Feeding Program:

A 55-day backgrounding trial was designed to test the effect of replacing barley grain with wheat DDGS on cattle performance. Three hundred and twelve steers (average initial weight of  $365 \pm 0.47$  kg) were grouped into 12 pens of 26 head and randomly assigned to one of three experimental diets formulated using oat hulls as a low-cost roughage source and varying levels of barley and DDGS as the concentrate source. On an 'as fed' basis, the control diet consisted of 30% barley silage, 25% oat hulls, 5% mineral supplement pellet and 40% barley grain. In treatments 2 and 3, wheat DDGS was used to replace barley grain at 20% and 40% of the total ration on an 'as fed' basis. On a dry matter basis, DDGS comprised 25 and 50% of the ration for treatments 2 and 3, respectively. Crude protein content was 11.5, 15.7, and 22.6% for the Control, 20% DDGS and 40% DDGS diets, respectively. All diets were formulated to a net energy of maintenance ( $NE_m$ ) content of 1.52 Mcal / kg of diet DM, based on the assumption that the energy value of DDGS is equal to that of dry rolled barley. Steers were given an estrogen-based implant (SYNOVEX<sup>®</sup>S) at the beginning of the trial period.

Individual animals were weighed at the beginning and end of the trial and at two week intervals during the experimental period. Ultrasound measurements of backfat thickness and ribeye area were obtained for individual animals at the start and end of the backgrounding period as a method of measuring animal performance in response to the experimental diets.

## Results

Overall cattle performance was excellent. Dry matter intake was similar for all three treatments (10.2, 10.3 and 10.3 kg/day for the control, 20% and 40% DDGS treatments, respectively) (Figure 3). During the backgrounding period, cattle fed the control, 20% DDGS and 40% DDGS diets gained 1.46, 1.62 and 1.62 kg per day, respectively, which was higher than expected for all three treatments. This high over-all rate of gain is likely attributable to compensatory gain as the steers were put onto feed for this trial as yearling cattle. Average daily gain for cattle fed 20 and 40% DDGS was greater ( $P < 0.05$ ) than the control diet which contained only barley grain (Figure 1). Cattle fed DDGS at both 20 and 40% also showed improved feed conversion (feed:gain) over the control diet (Figure 2), again indicating that

replacing barley with wheat DDGS does not have adverse effects on backgrounding cattle growth and performance. Cumulative backfat thickness and ribeye area over the 55-day trial period was not different among dietary treatments.

**Figure 1.** Effect of dried distillers' grain with solubles (DDGS) on average daily gain (ADG) of backgrounding cattle (n = 104 animals per treatment). P = 0.0001

**Figure 2.** Effect of dried distillers' grain with solubles (DDGS) on feed conversion of backgrounding cattle (n = 104 pens per treatment). P = 0.0113

**Figure 3.** Average dry matter intake (DMI) of steers fed three treatment diets of increasing levels of wheat DDGS. (n = 104 animals per treatment).

### **Conclusions and Significance to Industry:**

The experimental results of this trial indicate that barley grain can be replaced by wheat DDGS at up to 40% of the diet on an as fed basis in backgrounding rations without any adverse effects on cattle performance. This would indicate that wheat-based DDGS has a net energy of gain value equal to that of barley grain for backgrounding cattle. Economics of feeding DDGS at these levels would depend on availability and price relative to barley and other cereal grains. The results also highlight the potential of developing backgrounding programs with a blend diverse feeds such as oat hulls and DDGS that can reduce feed costs yet still target desired performance levels.

When feeding DDGS to growing and finishing cattle, producers should evaluate the impact on the nutrient content of the total mixed diet particularly crude protein and mineral levels such as phosphorus and sulfur. Overfeeding DDGS can elevate protein and phosphorus levels in the diet and ultimately in the manure of cattle. In order to avoid potential environmental problems when this manure is spread, producers should consult a nutritionist to assist them in optimizing DDGS inclusion rates in the diets of their cattle.

### **Acknowledgements:**

Appreciation is expressed to the following organizations for their involvement with this research:

Pound-Maker AgVentures Ltd. of Lanigan, Sk. for use of cattle;

Can Oat Milling of Martinsville, Sk., for supply of Oat Hulls

Husky Energy of Lloydminster, Sk., for the wheat-based DDGS

Funding for this research was provided by Advancing Canadian Agriculture and Agri-Food Saskatchewan and the Saskatchewan Agriculture Development Fund