

RESEARCH AND INNOVATION

Feeding wheat dried distillers grains with solubles (DDGS) to weaned pigs

Lifang Wang¹, Eduardo Beltranena^{1,2}, and Ruurd T. Zijlstra^{1*}

¹Department of Agricultural, Food and Nutritional Science, University of Alberta, Edmonton, AB; ²Alberta Agriculture and Forestry, Edmonton, AB
*E-mail address: ruurd.zijlstra@ualberta.ca

Take Home Message

Wheat distillers dried grains and solubles (DDGS) is the coproduct (what's leftover) of fermenting cereal grain (wheat, sorghum, triticale) to produce ethanol to blend with car fuel. Locally produced wheat DDGS contains more than 30 per cent protein and may replace imported soybean meal in pig diets to reduce feed cost. In this experiment, weaned pigs were fed zero, five, 10, 15 or 20 per cent wheat DDGS replacing up to 20 per cent soybean meal for 3 three weeks starting three weeks after weaning at 19 days of age. Pigs had increased feed conversion (feed:gain) mostly due to reduced weight gain in the first week on test, but maintained feed intake for the entire trial. We therefore recommend introduction of wheat DDGS into weaned pig diets by stepping up inclusions progressively by growth phase.

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Wheat DDGS

Wheat distillers dried grains and solubles (DDGS) contains 3 times more protein and fibre because yeast ferments most of the cereal grain starch to ethanol and carbon dioxide. Wheat DDGS is therefore a good source of protein and phosphorus for pigs and may reduce feed cost by sparing inclusion of soybean meal and phosphate. In a previous study that we conducted with weaned pigs starting one week after weaning at day 19, we saw that feeding DDGS reduced weight gain by one-half as a result of reducing feeding intake by one-third. That raised a research question whether older weaned pigs would have a similar response starting feeding wheat DDGS at three weeks after weaning at ~20 days of age. In this experiment, we evaluated inclusion of up to 20 per cent wheat DDGS in diets fed to older weaned pigs.

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Nutrient profile of wheat DDGS

Wheat DDGS was sourced from the Husky Energy plant in Lloydminster, SK. The wheat DDGS contained 33 per cent protein, 31 per cent total dietary fibre and 0.7 per cent phosphorus. Wheat DDGS was fluffy, having lower bulk density (41 kg/hL) than soybean meal (61 kg/hL) and wheat grain (56 kg/hL).

Weaned pig trial

We conducted this trial at the Swine Research and Technology Centre, University of Alberta (Edmonton, AB). In total, 160 pigs (Duroc × Large White/Landrace F1; Hypor, Regina, SK) with an initial weight of 12.5 kg were involved in this 3-week trial that started 3 weeks after weaning. After weaning at 19 days of age, pigs were fed sequentially a commercial pre-starter diet for five days and a starter diet for 16 days (Hi-Pro Feeds, Sherwood Park, AB). Pigs were housed in nursery rooms in pens containing two barrows and two gilts each.

A wheat-based control diet with no DDGS added and four diets including five, 10, 15 or 20 per cent wheat DDGS were formulated by replacing soybean meal with wheat DDGS. Fish meal and soy protein concentrate were included in test diets at 5 and one per cent, respectively. Diets were formulated without antimicrobials or growth promoters to provide 2.3 Mcal net energy/kg and five g standardised ileal digestible lysine/Mcal of net energy. Other amino acids were formulated as ideal ratio to lysine. Diets were mixed and steam-pelleted at 70°C. Pigs had free access to feed and water throughout the trial. Individual pigs, feed added and remaining were weighed weekly.

Trial results

For the entire three-week trial, increasing wheat DDGS inclusions up to 20 per cent did not affect feed intake, but each five per cent inclusion of wheat DDGS linearly reduced weight gain by 8.5 g per day and linearly increased feed consumed per kg gain by 16.2 g (Figure 1). Most importantly, each five per cent inclusion of wheat DDGS nearly reduced weight gain by 10 g per day for the first week. Each 5 per cent dietary inclusion of wheat DDGS linearly increased feed consumed per kg gain by 31.6 g for the first week on test. Final body weights were 27.8, 27.3, 27.2, 27.3 and 26.9 kg for pigs fed zero, five, 10, 15 or 20 per cent wheat DDGS, respectively and were not affected by increasing wheat DDGS inclusion.

Cost vs. benefit

Prices per MT were as follows: wheat \$199, soybean meal \$562, wheat DDGS \$220, canola oil \$1,100, L-lysine-HCl \$2,150, L-threonine \$3,050, DL-methionine \$5,850. Dietary inclusion of 5, 10, 15 or 20 per cent wheat DDGS to replace soybean meal reduced feed cost by \$9.70, \$18.03, \$26.64 or \$35.52 per MT, respectively and decreased feed cost per kg of body weight gain by up to 0.03 cents.

Recommendation

Increasing wheat DDGS inclusion up to 20 per cent replacing soybean meal in diets fed to weaned pigs may reduce feed cost when the price of soybean meal is relatively high. Increasing wheat DDGS inclusion reduced weight gain and increased feed conversion mostly during the first week on test that affected growth performance for the entire trial despite maintaining feed intake. The reduction in growth performance in

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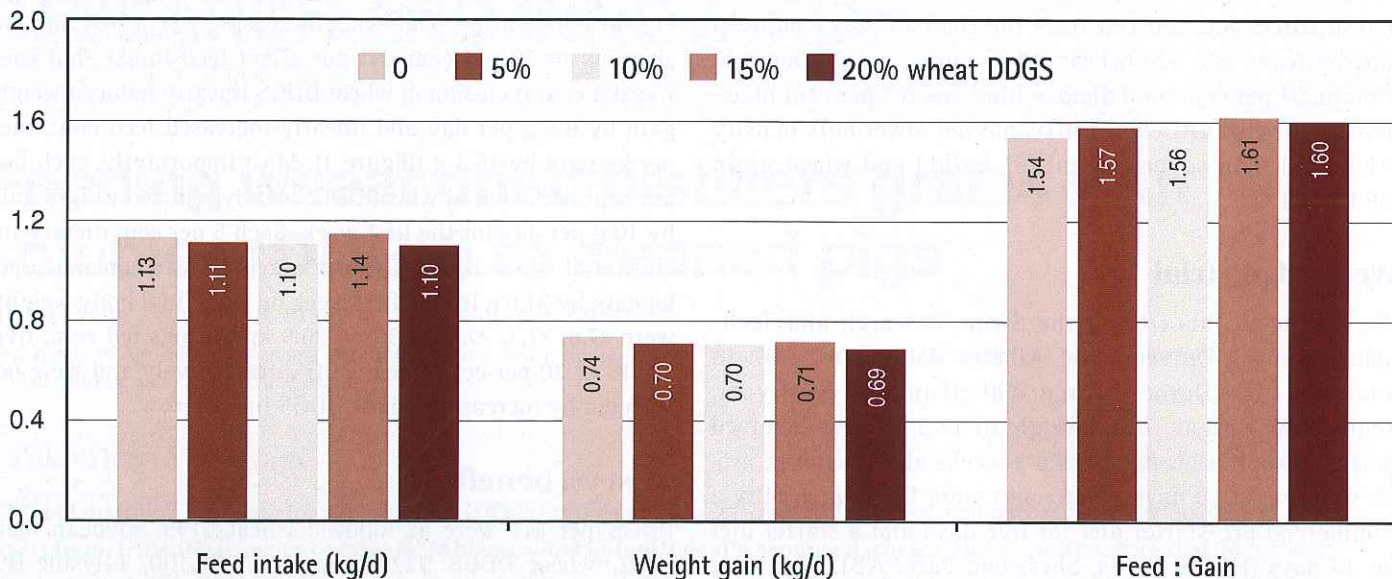
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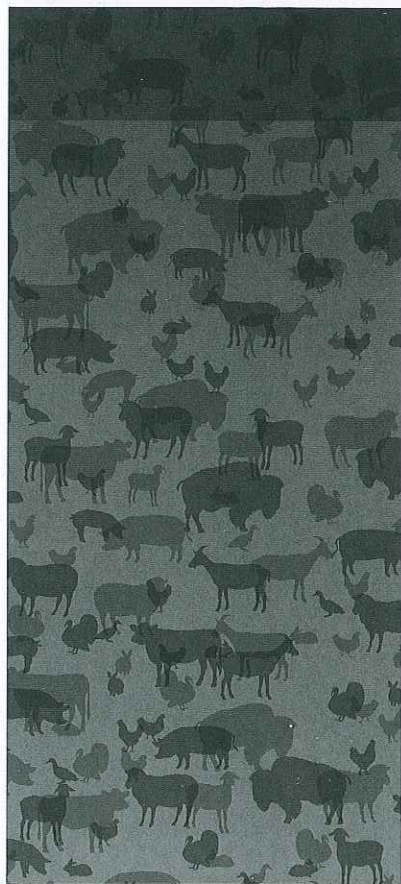
Figure 1. Growth performance of piglets fed diets with increasing wheat DDGS inclusion for 3 weeks starting 3 weeks after weaning at ~19 d of age.



weaned pigs delaying feeding of wheat DDGS until 3 weeks post-weaning was smaller than we reported previously for younger pigs. We therefore recommend introduction of wheat DDGS into weaned pig diets by stepping up inclusions progressively by growth phase.

Acknowledgements

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