Increasing Inclusions of Wheat DDGS in Diets for Grower-Finisher Pigs: Growth Performance, Carcass Traits, Pork Yield, Loin and Belly Quality

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Background

Distillers dried grains with solubles (DDGS) resulting from the fermentation of cereal grains for fuel ethanol is becoming a more common ingredient in swine diets. Wheat is the most commonly used ethanol feedstock in Western Canada. While similar in most respects to corn DDGS, wheat DDGS has much lower fat content (5% vs. 11%) and therefore lower net energy (NE) value compared to corn DDGS.

Currently there is little published information regarding the impact of increasing dietary inclusions of wheat DDGS on growth performance and no published information about how the same affects carcass characteristics and pork quality.

Objective

The objective of this experiment was to determine the effect of increasing dietary levels of wheat DDGS on growth performance, carcass traits, dissected pork yield, loin and belly quality.

Approach

In a commercial-scale study, crossbred barrows (550) and gilts (550) housed in single-sex pens (50 pens, 22 pigs per pen) were divided into 5 blocks based on their location in the test room. Pens were randomly assigned to dietary treatments consisting of 0, 7.5, 15, 22.5 or 30% wheat DDGS. Diets were formulated to contain the same NE, SID Lys:NE and other nutrients within each phase (Table 1).

Table 1. Targeted NE and nutrient levels in test diets, by phase

Nutrient	Grower 1	Grower 2	Grower 3	Finisher 1	Finisher 2
NE, MCal/kg	2.40	2.40	2.35	2.35	2.30
SID Lys:NE, g/Mcal	4.00	3.70	3.30	3.10	2.80
Calcium, %	0.70	0.65	0.60	0.55	0.55
Av. Phosphorus, %	0.30	0.28	0.25	0.23	0.23

Pen weights and feed disappearance were measured on d 0, 17, 38, 59, 75 and weekly thereafter. Average daily gain (ADG), feed intake (ADFI) and Feed to Gain ratio (F:G) were calculated for each growth phase. Beginning on d 66, pigs that had achieved market weight were removed and sent for slaughter. Most of the pigs on test (~1040) were slaughtered at Britco Pork (Langley, B.C.).

A representative group of pigs (60) were slaughtered at Agriculture and Agri-Food Canada's (AAFC) Lacombe Research Centre (Lacombe, AB) in two groups on d 86 and 92. The chilled carcasses were divided into primal cuts and dissected. Additional quality measurements were conducted on loins and bellies.

Results

1. Growth Performance

Increasing the level of wheat DDGS in the diet had no effect on growth performance (ADG, ADFI, F:G) of pigs for d 0 to 75 of the study (Figure 1).

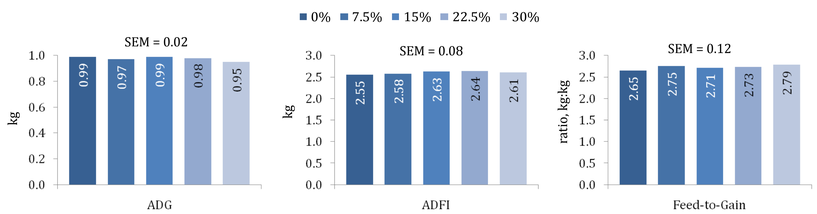

Figure 1. Effect of increasing levels of wheat DDGS on growth performance (ADG, ADFI and F:G ratio) of pigs for d0 to 75

2. Carcass Traits

For hogs slaughtered at Lacombe and Britco combined, dressing percentage and backfat depth decreased linearly with increasing dietary wheat DDGS inclusion. Conversely, estimated lean yield tended to linearly increase with increasing wheat DDGS inclusion level (Figure 2).

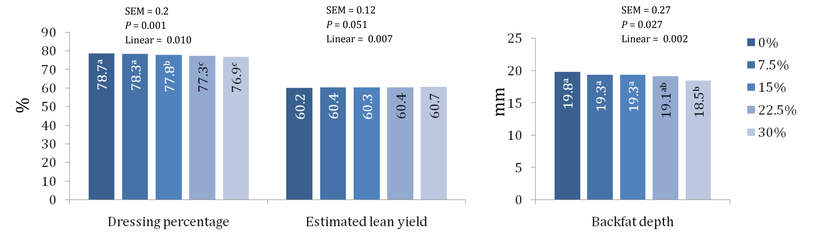

Figure 2. Effect of increasing levels of wheat DDGS on dressing percentage, estimated lean yield and backfat depth for all pigs slaughtered

3. Pork Yield

Yield of rough primal cuts, as well as total lean and total fat in carcasses did not differ among dietary levels of wheat DDGS. Intermuscular fat content in the carcass, specifically loins and picnics, decreased linearly with increasing wheat DDGS inclusion (Figure 3).

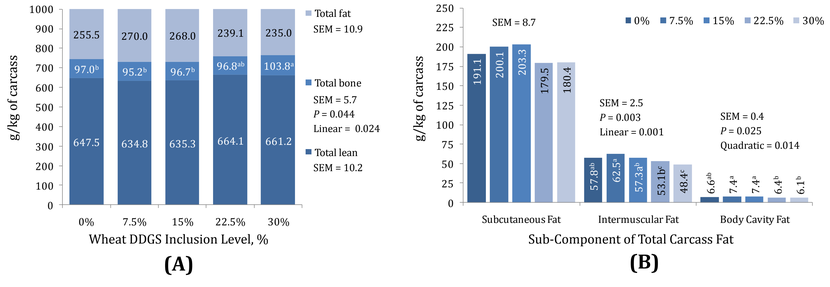

Figure 3. Effect of increasing levels of wheat DDGS on (A) carcass tissue composition, and (B) total fat partitioned into subcutaneous, intermuscular and body cavity components

4. Loin and Belly Quality

In loins, a linear reduction in fat content and a linear increase in moisture content were observed with increasing dietary wheat DDGS inclusion. Other measures of loin quality were largely unaffected by wheat DDGS inclusion level.

Fatty acid profiles in both loins and bellies were influenced by wheat DDGS level in the diet. Increasing dietary inclusion of wheat DDGS linearly increased the content of polyunsaturated fatty acids (**PUFA**) in bellies and loins and monounsaturated fatty acids (**MUFA**) in loins.

Iodine Value (**IV**) of in both loins and bellies increased linearly with increasing wheat DDGS inclusion. At 30% inclusion however, the highest IV value observed was 67.2 in bellies, which is still below the maximum acceptable range (72-74).

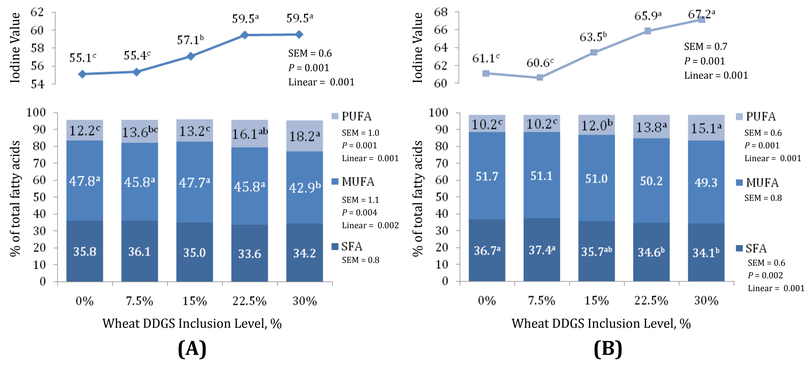

Figure 4. Effect of dietary wheat DDGS inclusion on Iodine Value and proportions of saturated (SFA), monounsaturated (MUFA) and polyunsaturated fatty acids (PUFA) in loins (A) and bellies (B)

Take Home Message

Diets containing up to 30% wheat DDGS did not affect pig growth performance or carcass traits. We believe that the observed differences between dietary wheat DDGS inclusion level, in particular for fat deposition patterns can be attributed to a slight overestimation of the NE value for wheat DDGS.

Our results underscore the need for using the NE system when high protein, high fibre feedstuffs are fed at high dietary inclusions. This study also highlights the need to further refine NE estimates for wheat DDGS to increase the precision of diet formulation.

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