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Effects of dried distillers grain with solubles on nursery pig performance

Abstract

A total of 482 pigs (initial BW of 21.9 lb) were used in a 22-d study to determine the effects of dried distillers grains with solubles (DDGS) on growth performance of nursery pigs reared in a commercial environment. Pigs were allotted to one of two dietary treatments based on corn-soybean meal and containing either 0 or 10% DDGS. There was a tendency for pigs fed the diet containing 10% DDGS to have decreased ($P < 0.13$) ADG, compared with pigs not fed DDGS (0.95 vs. 0.88 lb/d). Overall (d 0 to 22), there were no differences in ADFI, F/G, or final weight ($P > 0.21$). For economic analysis, the DDGS price was compared at \$109, \$93, or \$80/ton. There were no differences in feed cost per pound of gain in diets containing DDGS at the three price levels ($P > 0.29$). Pigs fed the diets containing 10% DDGS had a tendency for reduced ($P < 0.12$) margin over feed cost (\$0.52, \$0.54, and \$0.56), regardless of DDGS price (\$106, \$93, or \$80/ton, respectively). Although only a trend for decreased ADG was observed, feeding diets containing DDGS was less economical, as measured by margin over feed costs.; Swine Day, 2006, Kansas State University, Manhattan, KS, 2006

Keywords

Kansas Agricultural Experiment Station contribution; no. 08-83-S; Swine day, 2006; Report of progress (Kansas State University. Agricultural Experiment Station and Cooperative Extension Service); 966; Dried distillers grain with solubles; Nursery pigs; Growth; Swine

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EFFECTS OF DRIED DISTILLERS GRAIN WITH SOLUBLES ON NURSERY PIG PERFORMANCE

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Summary

A total of 482 pigs (initial BW of 21.9 lb) were used in a 22-d study to determine the effects of dried distillers grains with solubles (DDGS) on growth performance of nursery pigs reared in a commercial environment. Pigs were allotted to one of two dietary treatments based on corn-soybean meal and containing either 0 or 10% DDGS. There was a tendency for pigs fed the diet containing 10% DDGS to have decreased ($P < 0.13$) ADG, compared with pigs not fed DDGS (0.95 vs. 0.88 lb/d). Overall (d 0 to 22), there were no differences in ADFI, F/G, or final weight ($P > 0.21$). For economic analysis, the DDGS price was compared at \$109, \$93, or \$80/ton. There were no differences in feed cost per pound of gain in diets containing DDGS at the three price levels ($P > 0.29$). Pigs fed the diets containing 10% DDGS had a tendency for reduced ($P < 0.12$) margin over feed cost (\$0.52, \$0.54, and \$0.56), regardless of DDGS price (\$106, \$93, or \$80/ton, respectively). Although only a trend for decreased ADG was observed, feeding diets containing DDGS was less economical, as measured by margin over feed costs.

(Key Words: Dried Distillers Grain with Solubles, Nursery Pigs, Growth.)

Introduction

The availability of DDGS for use in swine diets has increased due to increases in the number of ethanol manufacturing plants. Research evaluating DDGS in university and commercial facilities has shown variable results, leading to a wide variety of recommended feeding levels. This has been partly attributed to variation in facilities (university vs. commercial) and between manufacturing processes at different plants. Potential sources of plant variation may include drying method, particle size, regional grain quality variation, and contents of residual sugars. To help overcome this variation, producers need to verify the quality of DDGS from individual plants. Therefore, the objective of this experiment was to determine the effects of DDGS on the growth performance of nursery pigs in a commercial research environment.

Procedures

A total of 482 pigs (initial BW of 21.9 lb) were used in a 22 d-growth assay evaluating the effects of DDGS on growth performance of nursery pigs in a commercial facility in Illinois. Pigs were randomly blocked and allotted to one of two experimental dietary treat-

¹Appreciation is extended to Swine Nutrition Services, Inc. and M.U. Steidinger for providing data collection and facilities.

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ments. There were 12 pens per treatment and 18 to 21 pigs per pen.

Diets were based on corn-soybean meal and were fed in meal form (Table 1). The two dietary treatments were 0 or 10% DDGS. All pigs were fed commercial starter diets from d 0 to 10 after weaning and then switched to treatment diets. The DDGS was provided by Adkins Energy, LLC, in Lena, Illinois. Diets were formulated to an equal true ileal digestible (TID) lysine of 1.19% by using values from 1998 NRC. Economic analysis of feed cost per pound of gain and margin over feed cost were determined by multiplying ADG by market price (\$0.45), then subtracting feed cost per pig. Calculations were made with DDGS priced at \$106, \$93, or \$80/ton. Pigs and feeders were weighed on d 0 and 22 of the treatment period to determine the response criteria of ADG, ADFI, and F/G.

Data were analyzed by using the PROC MIXED procedure of SAS (SAS Institute Inc., Cary, NC), with pen as the experimental unit. Least squares means were used to determine differences between treatments.

Results and Discussion

There was a tendency for decreased ADG (0.95 vs. 0.88 lb/d, $P = 0.13$) for pigs fed 10% DDGS. There was no difference in ADFI, F/G, or final weight ($P > 0.21$), but pigs fed the control diet without DDGS were 1.60 lb lighter at the end of the experiment.

For economic analysis, there was no difference in feed cost per pound of gain ($P = 0.29$) with DDGS at \$106, \$93, or \$80/ton. Pigs fed the diets containing 10% DDGS had a tendency for reduced ($P < 0.12$) margin over feed cost of \$0.52, \$0.54, and \$0.56 when DDGS was priced at \$106, \$93, or \$80/ton, respectively. Although not statistically significant, the numerical reduction in ADG, coupled with the lack of an advantage in feed cost per pound of gain, reduced profitability

(margin over feed costs) by approximately \$0.50 per pig in this study.

Table 1. Composition of Diets (As-fed Basis)^a

Ingredient, %	DDGS, %	
	0	10
Corn	64.50	56.05
Soybean meal (46.5%)	30.40	29.05
DDGS	-	10.00
Choice white grease	2.00	2.00
Monocalcium P (21% P)	1.00	0.76
Limestone	0.95	1.05
Salt	0.35	0.35
Vitamin premix with phytase	0.25	0.25
Trace mineral		
Copper sulfate	0.08	0.08
L-lysine HCl	0.30	0.30
DL-methionine	0.09	0.07
L-threonine	0.08	0.05
Total	100.00	100.00
Calculated Values		
Total lysine, %	1.32	1.32
True ileal digestible amino acids ^b		
Lysine, %	1.19	1.19
Methionine:lysine ratio, %	31.0	31.0
Met & cys:lysine ratio, %	57	59
Threonine:lysine ratio, %	60	61
Tryptophan:lysine ratio, %	18	18
ME, kcal/lb	1,548	1,523
Calcium, %	0.67	0.68
Phosphorus, %	0.60	0.59
Available phosphorus equiv, % ^c	0.38	0.39
Lysine:calorie ratio, g/mcal	1.30	1.28

^aDiets fed in meal form from d 0 to 32.

^bDDGS nutrient values for formulation derived from 1998 NRC.

^cIncludes expected phytase phosphorus release from added phytase.

Table 2. Growth Performance of Nursery Pigs Fed DDGS^a

Item	DDGS, %		Probability, P <	SE
	0	10	Treatment	
d 0 to 22				
ADG, lb	0.95	0.88	0.13	0.042
ADFI, lb	1.43	1.37	0.39	0.069
F/G	1.50	1.55	0.21	0.034
d 0 weight, lb	22.0	21.9	0.91	0.953
d 22 weight, lb	42.9	41.3	0.40	1.862
Feed cost/lb gain, \$ ^b				
DDGS at \$106/ton	0.094	0.096	0.29	0.002
DDGS at \$ 93/ton	0.094	0.095	0.55	0.001
DDGS at \$80/ton	0.094	0.094	0.89	0.094
Margin over feed, \$ ^c				
DDGS at \$106/ton	7.44	6.88	0.10	0.356
DDGS at \$ 93/ton	7.44	6.90	0.11	0.355
DDGS at \$80/ton	7.44	6.92	0.12	0.356

^aTotal of 482 pigs (17 to 21 per pen with 24 pens), initially 21.9 lb, were used in this study, with 12 replications per treatment.

^bDiet cost of 0% DDGS = \$124.97. Diet cost of 10% DDGS = \$124.30. Ingredient pricing included: corn, \$78.60/ton; soybean meal, \$174.00/ton; DDGS, \$106.00/ton; monocalcium phosphate, \$340.00/ton; and limestone, \$20.00/ton.

^cBased on market price of \$0.45/lb. Calculated as gain × \$0.45/lb minus feed cost per pig.