Long-Term Feeding of DDGS to Sows

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Use of distillers dried grains with solubles (DDGS) in diets for growing-finishing pigs has been the focus of much research in the last 10 years but little attention has been focused on DDGS use in diets for sows. Recently, a few research reports have indicated that DDGS could be used effectively in sow diets. However, these studies were relatively short-term, used a small number of animals, and included only one reproductive cycle. A more comprehensive, longer-term study is needed to determine the utility of DDGS in sow diets.

This experiment was conducted at the Southern Research and Outreach Center's Swine Unit in Waseca, MN. Four hundred one (n = 311 for parity 0; n = 90 for parity 1) sows (GAP Genetics, Manitoba, Canada) that farrowed 904 litters over three parities were used. Sows had an initial body weight of 163 kg. Only females with no signs of lameness at allotment were used in the study. At breeding, sows were assigned to one of four experimental treatments in a 2 x 2 factorial arrangement. Dietary treatments included a control diet composed of corn and soybean meal (CON) fed during gestation and lactation or similar diets containing 40% DDGS in gestation and 20% DDGS in lactation (DDGS). Within dietary treatment, sows were housed in either individual stalls or group pens (50 sows/pen) with an electronic sow feeder during gestation. Behavior of sows was recorded by video cameras for 24 hours using 40 focal sows in pens and 27 focal sows in stalls. Group-housed sows were recorded immediately after mixing in the pens. Mixing occurred 4 to 8 days after mating. Sows were mixed again 8 weeks later when a new breeding group of sows was introduced. Stalled sows were recorded 7 to 10 days after placement in stalls.

Sows fed DDGS or CON began the experiment with equal body weight. However, at the end of the first reproductive cycle, DDGS-fed sows were 4 kg lighter than CON-fed sows and at the end of the second reproductive cycle they were 8 kg lighter than CON-fed sows. This difference in body weight stabilized (7 kg) at the end of the third reproductive cycle. These differences in body weight suggest that young sows were less able to derive energy and nutrients for body growth from DDGS diets than older sows.

Live born litter size was 0.5 pigs less for DDGS-fed compared with CON-fed sows which translated into 0.4 fewer pigs per litter at weaning (Table 1). The smaller litters nursing DDGS-fed sows gained less weight than litters nursing CON-fed sows. The smaller weight gain of litters from DDGS sows was most evident during the first reproductive cycle lending support to the idea that young sows had more difficulty digesting diets containing DDGS. Sows housed in pens during gestation and fed DDGS supported the lowest litter weight gain compared with sows assigned to the remaining three treatments. Daily feed intake during lactation, preweaning mortality of piglets, and wean-to-estrus intervals were not influenced by diet.

Table 1. Effect of dietary DDGS and gestation housing on litter size

	Control		DDGS		P value		
Trait	Stall	Pen	Stall	Pen	Diet (D)	Housing (H)	D x H
Pigs born live/litter	11.9	11.2	11.1	10.9	0.03	0.07	0.41
Pigs weaned/litter	10.4	10.1	10.0	9.7	<0.01	<0.01	0.65
Litter wt. gain, kg	49.7	50.0	49.1	46.6	<0.01	0.09	0.03
Piglet mortality, %	9.8	8.9	8.3	9.7	0.67	0.78	0.19

The percentage of sows completing three parities in this experiment was not influenced by feeding DDGS (Table 2). However, housing sows in pens during gestation in this study significantly reduced the proportion of sows that completed three reproductive cycles.

Table 2. Effect of DDGS and gestation housing on proportion of sows completing 3 reproductive cycles

	Control		DDGS		P value	
Item	Stall	Pen	Stall	Pen	Diet	Housing
No. sows assigned	103	100	97	101	--	--
Percent completing:						
One cycle	86.4	90.0	90.7	89.1	0.56	0.32
Two cycles	80.6	67.0	79.4	69.3	0.54	0.06
Three cycles	71.8	56.0	66.0	55.5	0.94	0.03

Over the entire experiment, feeding DDGS reduced the total number of pigs weaned by 0.8 while housing sows in pens of 50 sows during gestation reduced total number of pigs weaned by 2.1 (Table 3).

Table 3. Effect of DDGS and gestation housing on pigs produced over 3 reproductive cycles

	Control		DDGS		P value		
Trait	Stall	Pen	Stall	Pen	Diet (D)	Housing (H)	D x H
Total no. of piglets							
Born	31.6	26.2	28.6	27.1	0.09	<0.01	<0.01
Born alive	30.0	24.7	26.7	25.6	0.03	<0.01	<0.01
Weaned	26.1	22.9	24.2	23.2	0.10	<0.01	0.03

Sows fed DDGS were more aggressive in pens as they were involved in longer and more aggressive fights with pen-mates compared with CON-fed sows. In contrast, DDGS-fed sows in stalls spent more time resting and less time engaged in stereotypic behaviors than sows assigned to CON which suggests sows were more satiated and content.

Feeding high levels of DDGS to reproducing sows may result in marginal depressions in production of weaned pigs. These reductions are more likely in young sows (parity 0 and 1) compared with older sows. In this study, gestation housing system had a larger effect on reproductive performance than did diet. Longevity of sows was not affected by inclusion of DDGS in the diet but was significantly reduced when housing sows in pens of 50 during gestation.

Acknowledgement: Significant funding for this project was provided by the National Pork Board through the Pork Checkoff.