PELLETED DIETS FOR LACTATING SOWS

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Summary

A total of 76 sows (parities one to four) were used to determine the effects of pelleted diets on sow and litter performance. In the 21-d lactation experiment, the sows were given a corn-soybean meal-based diet in meal (corn ground to a particle size of 500 to 600 µm) or a pelleted (3/16 inch pellet diameter) form. Diet form did not affect ADFI or lactation BW loss (P=0.15 or greater). Also, pigs weaned per litter, piglet survivability, litter weight gain, and days to estrus were not affected by treatment (P=0.15 or greater). However, sows fed pelleted feed lost less backfat (0.05 inches, P<0.02). Also, when the diet was pelleted, the sows had 6, 9, and 9% greater digestibilities of DM, N and GE and excretion of DM and N were decreased by 90 g/d and 2 g/d, respectively (P<0.001). In conclusion, use of pelleted feed in mixed-parity sows did not affect litter performance, but increased digestibility of nutrients and reduced nutrient excretion in sows.

(Key Words: Sow, Pellets, Lactation, Digestibility)

Introduction

Previous research from our lab indicated improved rate and especially efficiency of growth in nursery and finishing pigs when diets were fed in pelleted rather than meal form. These marked improvements in growth performance seemed to be at least partly explained by consistent improvements in digestibility of nutrients. In modern sow units, good feed intake and nutrient digestibility are critical for maintaining sow body condition and milk production. However, data concerning the potential benefits of pelleting sow diets are rare. Therefore, we designed an experiment to determine the effects of pelleting lactation diets on performance of sows and their litters.

Procedures

A total of 76 sows (parities one to four) were used in the 21-d lactation experiment. The sows were fed 4 lb/d of a sorghum-based gestation diet until d 110 of pregnancy. The sows were then moved into farrowing crates, randomly assigned to treatment, and given 6 lb/d of the corn-based experimental diets (Table 1) until farrowing. After farrowing they were allowed ad libitum consumption of food and water. The diets were formulated to 1% lysine with all other nutrients in excess of the sow's requirements. Chromium oxide (0.25%) was added as an indigestible marker to allow calculation of nutrient digestibilities. Treatments were the same lactation diet, fed in mash (corn ground to 500 to 600 µm) and a pelleted (3/16" pellet diameter) form. All ingredients were the same for both diets with the only difference being the physical form of the diets.

Within 48 hours after farrowing, the piglets were cross-fostered to equalize litter size among all sows. The sows were weighed and scanned for backfat thickness at farrowing and weaning, and feed and water intakes were recorded. Also, litter size and weight were recorded after cross fostering and at weaning, and duration from weaning to estrus was recorded for each sow.

Each time the diets were processed, a sample of ground corn was collected for determination of particle size. Also, samples of the diets and feces were collected prior to weaning to allow determination of digestibilities of DM, N, and GE. Finally, the Proc Mixed Procedure of SAS was used for statistical analyses of all data.

Table 1. Diet Composition[a]

Ingredient	%
Corn	68.25
Soybean meal	27.25
Monocalcium phosphate	2.00
Limestone	1.10
Salt	0.50
Vitamin premix	0.25
Mineral premix	0.15
Sow add pack	0.25
Chromic oxide	0.25

[a]Formulated to 1% lysine, 0.9% Ca, and 0.8% P.

Results and Discussion

Laboratory analyses indicated that the mean particle size of the corn samples was 503 µm, and the mean particle size of the complete diet before pelleting was 642 µm. Thus, particle size of the ground corn was in the range initially targeted. As for the effects of the diets on sows, diet form did not affect ADFI (P=0.15 or greater) with the average for both treatments near 13 lb/d (Table 2). Lactation BW loss and days to estrus following weaning were not affected by diet form (P=0.15 or greater). However, loss of backfat was reduced by 0.05 in. for the sows fed pelleted diets (P<0.02) while water usage was increased by 1.5 gal/d (P<0.04) among sows fed the pelleted feed.

After cross-fostering, litter size averaged 11 pigs and litter weight averaged 35.7 lb. At weaning the litter averaged 10.2 pigs each with an average weight of 149.5 lb. Diet form did not affect these results, piglet survivability, or litter weight gain during the 21-d experiment (P = 0.15 or greater).

Fecal moisture (Table 3) was not affected by treatments (P=0.15 or greater), but sows fed pelleted feed had 6, 9, and 9% greater digestibilities of DM, N and GE and excretion of DM and N were decreased by 90 g/d and 2 g/d, respectively (P<0.001) compared to sows fed the diet in meal form. Thus, manure volume and nitrogen production would be less problematic for sows fed pelleted feed. Digestibility of GE was increased by 3% (P<0.001) for the sows fed pellets. Therefore those sows would have a better energy balance, thus helping explain the reduced backfat loss for sows fed pelleted feed. However, a better energy balance might also be expected to decrease loss of BW by the sows during lactation, and we did not observe that effect. So, it seems likely nutrient digestibility was a more sensitive measure of nutrient utilization in our experiment.

In conclusion, an important benefit of using pelleted feed is increased digestibility of DM, N and GE. As a result, total output of DM and N as manure are decreased and the potential impact of a swine operation on the environment is reduced. Nonetheless, the primary justification for a producer to use pelleted sow feed is to improve sow and litter performance during lactation and to give a better energy balance that would result in fewer difficulties with thin sows. The pelleting process does increase the cost of processing feed, so this investment must be offset by better litter performance and or body condition of the sow herd. If this cannot be achieved, the use of feed in a mash form is more appropriate.

Table 2. Effects of Pelleted Diets on Sow and Litter Performance

	Diet form			
Item	Mash (600µm)	Pellets (3/16 inch)	SE	P value
Number of sows	38	38		
Sow BW postfarrowing, lb	523	536	8	- [a]
Lactation BW loss, lb	16.2	15.3	4.6	-
Lactation fat loss, in	0.09	0.04	0.02	0.02
ADFI, lb	13.2	13.7	0.4	-
Water disappearance, gal/d	9.2	10.7	0.5	0.04
Initial pigs/litter	10.9	11.0	0.4	-
Pigs weaned/litter	10.3	10.2	0.4	-
Survivability, %	94.1	92.9	1.3	-
Litter weaning wt, lb	150.1	148.8	9.9	-
Litter wt gain, lb	114.3	113.1	9.9	-
Days to estrus	4.6	5.3	0.6	-

Dashes indicate P = 0.15 or greater.

Table 3. Effects of Pelleted Diets on Apparent Digestibility, Intake, and Excretion of Nutrients in Sows

	Diet form			
Item	Mash (600µm)	Pellets (3/16 inch)	SE	P value
Number of sows	38	37		
Fecal moisture, %	70.3	69.2	1.1	0.09
DM intake, kg/d	5.2	5.4	0.1	0.001
N intake, g/d	174	186	1	0.001
GE intake, Mcal/d	23.4	24.7	0.1	0.001
Apparent digestibility,%				
DM	88.2	90.3	0.3	0.001
N	89.5	91.4	0.3	0.001
GE	89.9	92.4	0.3	0.001
Fecal excretion of DM, g/d	617	527	16	0.001
Fecal excretion of N, g/d	18	16	1	0.001