THE INFLUENCE OF ADDED LYSINE DURING LACTATION ON SOW AND LITTER PERFORMANCE

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Summary

An on-farm field study utilizing 287 crossbred sows was conducted to investigate the influence of additional dietary lysine during lactation on sow and litter performance. At farrowing, sows were randomly assigned to one of two milo-soybean meal diets containing either .65% (13.5 % CP) or .85% lysine (16.3% CP). Average sow parity was 3.75, and sows on both treatments had a similar number of pigs born alive and similar pig and litter birth weights. All litters were equalized to approximately 9.5 pigs within 24 hours following farrowing, and average lactation length was 21 d. No treatment × parity interactions were observed for any response criteria. Pig and litter weaning weights were increased from 13.10 and 114.7 to 13.65 and 120.9 lb for sows fed the .65% and .85% lysine diets, respectively. Pig survival was excellent for both groups of sows; however, survivability tended to be improved for 2nd and 4th parity sows fed the .85% lysine diet. Increased dietary lysine during lactation resulted in no difference for number days from weaning to estrus; however, the subsequent farrowing rate for the sows fed the .85% lactation diet was 75.7% as compared to 70.4% for the sows fed the .65% lysine diet. These results indicate that increased dietary lysine during lactation improved pig and litter weaning weights.

(Key Words: Sow, Performance, Lactation, Lysine.)

Introduction

In recent years, the development of a highly prolific white line sow has forced researchers and producers to re-examine current feeding strategies for the breeding herd. At present, there is little information identifying the nutritional requirements of these high producing individuals. During lactation, the primary objectives are to maximize milk production and prepare the sow for rebreeding. However, when dietary nutrients do not meet the sow's requirements, body tissues will be mobilized to meet these demands. Research at the University of Kentucky has recently evaluated the response of sows nursing 11 to 13 pigs to several dietary lysine levels. Increased pig and litter weaning weights were observed for these large litters from sows fed increasing dietary lysine protein (i.e., lysine). Based on the level of milk production, high producing sows have very high nutritional requirements. Calculation of nutrient requirements for these sows involves knowledge of daily feed intake and litter weight gain. The following example outlines the calculations used to determine daily protein intake necessary to maximize milk production and litter weight gain:

1. A 400 lb sow weans nine, 15 lb pigs after a 21 d lactation. Subtracting litter birth weight indicates that the litter gained 108 lb, or 5.1 lb per d (108/21d).

2. Each lb of litter weight gain requires 4 lb of milk; therefore, this sow is producing

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approximately 20.4 lb (5.1 lb × 4 lb) of milk per d during lactation.

3. Sow's milk is 5.25% protein, resulting in 1 lb (20.4 × 5.25%) of milk protein produced daily.

4. Conversion of dietary protein into milk protein is approximately 56%; therefore, to produce 1 lb of milk protein, this sow requires 1.8 lb (1 lb/56%) of dietary protein per d for milk production.

5. Protein requirement for maintenance of .2 lb is added to the 1.8 lb for milk production, for a total dietary protein requirement of 2.0 lbs per day.

6. Knowing feed intake will allow determination of percentage of dietary protein. If the sow is consuming an average of 14 lb per day, then the diet must contain 14% protein (2 lb/14 lb). However, if the sow is only consuming 12 lb of feed per day or less, then the diet must contain at least 16.5% protein.

Our objective in conducting this field study was to determine if high producing sows nursing 9 to 10 pigs would be able to utilize a higher level of dietary lysine for increased milk production (measured through weaning weights) and improved rebreeding performance.

Procedures

On the day of farrowing, sows were randomly assigned to one of two milo-soybean meal diets (Table 1). Dietary lysine levels were .65% in the control diet and .85% in the experimental diet. The milo-soybean meal ratio was adjusted to achieve the desired level of dietary lysine and each diet contained 1.5 lb L-lysine-HCL. All litters were equalized and weighed within 24 hours following farrowing. The number of pigs and litter weights were also recorded at weaning. Individual feed intake was recorded daily. At weaning, sows were moved to an environmentally controlled breeding facility for estrus detection and breeding. Days from weaning to estrus and subsequent farrowing performance were recorded. All first parity sows were allowed to skip their first post-weaning estrus (vacationed) and, thus, were not included in the rebreeding data.

Results and Discussion

The number of pigs born alive, pig and litter birth weight, and number of pigs equalized/litter were similar ($P > .10$) at the start of the experiment. No treatment × parity interactions ($P > .10$) were observed for the response criteria. Additional lysine resulted in improved pig and litter weaning weights ($P < .05$) for sows fed .85% lysine during lactation. Numbers of pigs weaned for the sows fed the control and high-lysine diets were 8.71 and 8.90, respectively. However, sows fed the high lysine diet had numerically higher survivability than sows fed the control diet (94.2 and 92.9%, respectively). Pig survival tended ($P < .10$) to be improved for 2nd and 4th parity sows fed the .85% lysine diet. There were no differences in daily feed intake between treatments; however, sows fed the .85% lysine diet tended ($P < .10$) to have higher feed intake. Daily lysine intakes were calculated at 38.1 and 52.2 g, respectively, for sows fed the .65% and .85% lysine diets. Days from weaning to estrus were not affected by dietary treatment. Subsequent farrowing rates were 75% for the sows fed the high lysine diet as compared to 70% for the sows fed the control diet. In conclusion, these results indicate that high producing sows, nursing 9 to 10 pigs, are able to utilize higher quantities of dietary lysine for improved milk production, as reflected in the heavier pig and litter weaning weights.

Table 1. Composition of Lactation Diets

Ingredients	Lysine Level, % .65	.85
Sorghum	79.05	72.31
Soybean meal (48%)	13.37	20.25
Soy oil	3.00	3.00
Lysine-HCL	.075	.075
Monocalcium phosphate	2.34	2.22
Limestone	1.02	0.99
Vitamin premix	0.50	0.50
Sow add pack	0.50	0.50
Trace mineral premix	0.10	0.10
	100.00	100.00

Table 2. Influence of Dietary Lysine Level during Lactation on Sow and Litter Performance

Criteria	Lysine Level, % .65	.85	CV
No. of litters/treatment	131	156	
No. of pigs equalized, d 1	9.42	9.48	13.9
No. pigs weaned	8.71	8.90	14.6
Pig survival, %[b]	92.89	94.17	9.9
Pig weaning weight, lb[a]	13.10	13.65	14.2
Litter weaning weight, lb[a]	114.65	120.90	20.4
Daily feed intake, lb[b]	12.9	13.5	39.7
Daily lysine intake, g	38.1	52.2	39.7
Days from weaning to estrus	6.5	7.3	78.7
Subsequent farrowing rate, %	70.4	75.7	60.6

[a]Effect of dietary lysine ($P < .05$).
[b]Effect of dietary lysine ($P < .10$).