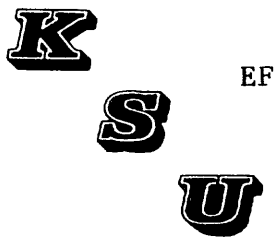

ADDING FAT TO SOW LACTATION DIETS: EFFECT ON SOW AND LITTER PERFORMANCE[1]

M. Tokach, J.L. Nelssen,

D. Keesecker, and B. Wolf

Summary

An on-farm experiment was conducted utilizing 189 sows to evaluate the effect of adding 3% soybean oil to the lactational diet on subsequent pig performance and sow weight loss. Feeding sows a diet containing 3% soybean oil during lactation did not significantly decrease sow weight loss or improve litter performance. However, the oil addition tended to increase individual pig weaning weight (.5 lb), litter weaning weight (3 lb), and sow feed intake (.5 lb/day) compared to feeding a 14% crude protein milo-soybean meal diet. Also, sow lactational weight loss was slightly reduced with the diet containing oil. Calculated metabolizable energy intake was increased ($P<.01$) for sows fed the diet with soybean oil compared to sows fed the control diet. We postulate that the increased calorie intake from adding soybean oil to sow lactation diets during the summer months may increase litter weaning weight.

Introduction

One of the major factors involved in improving production efficiency in the swine industry is improving sow productivity. The nutritional goals during lactation are to maximize sow milk production and to prepare the sow for rebreeding. Problems of sows losing large quantities of body fat and weight during lactation have resulted in failure of sows to return to estrus following weaning. Previous studies have shown that the interval from weaning to estrus was reduced when energy or feed intake was increased. Research reports have shown an increase in metabolizable energy intake from supplementing sow diets with fat.

Feeding fat may be especially beneficial during the summer months, when high farrowing-house temperature results in decreased feed consumption. Perhaps this is one reason why reduced sow reproductive performance is noted by producers especially during the summer months when lactating sows have poor appetites. In addition, research at the University of Nebraska has shown that adding 5% fat to swine diets can reduce aerial dust levels by 50 percent, thus improving the swine housing environment.

---

[1]We gratefully acknowledge Keesecker Enterprises, Washington, KS for allowing this study to be conducted on their farm and for assistance in data collection by Mr. Steve Probst.

Several studies have been conducted utilizing high levels of fat addition to sow lactational diets. The objective of this experiment was to determine the effects of adding a low level of fat during lactation on sow energy intake, sow lactational weight change, and litter performance.

Experimental Procedures

A total of 189 Landrace x Yorkshire sows, which were housed outside during gestation, were fed 4.5 lb per day of a 13% crude protein milo-soybean meal diet until day 100 of gestation. From day 100 to farrowing, all sows received 6 lb per day of the lactational diet containing 3% soybean oil.

On the day of farrowing, sows were randomly assigned to one of two dietary treatments. Milo-soybean meal diets with either no fat (control) or 3% soybean oil added as the fat source were balanced on an equal lysine, calcium, and phosphorus basis (Table 1). At farrowing, number of pigs born alive, litter birthweights, and individual sow weights were recorded. Litter size was equalized by transferring pigs among sows within 24 hr after farrowing. During lactation, sows were fed twice daily ad libitum. Litter weight, ending sow weight, lactation length and survival rate were recorded at weaning. Creep feed was not available to pigs during lactation.

Sows were moved to open lots at weaning and received the same gestation diets. Estrus was checked for a 5-day period and breeding dates were recorded. Upon the next farrowing, the farrowing interval, number of pigs born alive, number of stillborns and litterweights will be recorded.

Results and Discussion

The effect of fat addition on litter performance is shown in Table 2. No differences were observed in the number of pigs per litter on day 1 of lactation or at weaning. No differences in survival rate were found between the two lactational treatments. This can be expected, since most research shows no improvement in pig survival from feeding fat to lactating sows. Late gestation, fat-supplemented diets have caused an increase in survival rates; however, all the sows in this study were fed the same gestation diets. There were also no significant differences in pig weaning weights; however, soybean oil added to sow's diet during lactation tended to improve individual pig weaning weight (.5 lb) and litter weaning weight (3 lb). This tends to agree with Michigan and Minnesota research, which showed that sows fed supplemental fat during lactation weaned heavier litters.

The effect of fat addition on sow performance is shown in Table 3. No significant differences were shown in feed intake or lactation weight loss. Metabolizable energy intake was higher ($P<.01$) because of a slightly higher feed intake (.5 lb/day) and an increased calorie density for sows fed the soybean oil diet. This agrees with Minnesota and North Carolina studies, which show an increase in metabolizable energy intake for lactating sows fed fat-supplemented diets. However, sows fed the 3% soybean oil diet tended to lose less weight during lactation, which contradicts previous studies.

The effect of parity on litter and sow performance is shown in Tables 4 and 5. First parity sows and sows that were fifth parity or older weaned lighter ($P<.05$)

litters as compared to second-fourth parity sows. This may be explained by slightly lower average pig weaning weights. Sow's beginning and ending weights increased ($P<.01$) as sows grew older. No differences were found in lactational weight loss; however, second parity sows tended to lose more weight during lactation. Week 1 and week 2 average feed intake was higher ($P<.05$) in second, third, and fourth parity sows as compared to first parity or fifth parity and older sows. First parity sows also had lower ($P<.01$) overall average feed intake and metabolizable energy intake than older sows.

The economics of feeding fat and further reproductive performance may be the determining factors of fat utilization for lactating sows. Previous research has shown the greatest benefit from adding fat to lactation diets during summer months when feed intake is depressed. The Michigan and North Carolina research shows that sows fed fat supplemented diets during lactation return to estrus at a faster rate during the summer months. Data on reproductive performance from this trial are still being collected and will be available at a later date.

Table 1. Sow Lactation Diet Composition and Calculated Nutrient Analysis.

Item	Control	3% Soybean Oil
Ingredients, %		
Sorghum (milo)	80.65	77.10
Soybean meal (47% CP)	15.25	15.75
Soybean oil		3.00
Monocalcium phosphate	2.20	2.25
Limestone	1.05	1.05
Salt	.50	.50
Vitamin Premix	.25	.25
Trace Mineral Premix	.1	.1
TOTAL	100.00	100.00
Calculated Analysis		
Metabolizable energy, Kcal/lb	1422	1497
Crude protein %	14.3	14.3
Lysine %	.65	.66
Calcium %	.90	.90
Phosphorus %	.80	.80

Table 2. Effect of Fat Addition on Litter Performance.

Item	Control	3% Soybean Oil
No. of litters	96	93
No. of pigs born alive	9.74	10.01
No. of pigs equalized, day 1	10.05	9.98
No. of pigs weaned	8.92	8.82
Pig survival, %	88.64	89.18
Pig performance (lb)		
Avg pig birth wt	3.42	3.38
Avg litter birthwt	33.34	33.83
Avg pig weaning wt	11.33	11.82
Avg litter weaning wt	101.15	104.18

Table 3. Effect of Fat Addition on Sow Performance.

Item	Control	3% Soybean Oil
No. of litters	96	93
Lactation length (day)	21.70	21.55
Lactational wt loss (lb)	34.47	30.50
Avg feed intake (lb)		
Week 1	9.18	9.65
Week 2	12.19	12.57
Overall	11.34	11.83
Metabolizable energy intake (Mcal/day)[a]	16.1	17.7

[a]Treatment difference ($P<.01$).

Table 4. Effect of Parity on Litter Performance.

Item	Parity				
	1	2	3	4	5+
No. of sows	13	19	51	43	63
No. of pigs born alive	9.6	9.3	10.3	10.1	9.6
No. of pigs equalized, day 1	9.7	10.0	10.1	10.2	9.9
No. of pigs weaned	8.8	9.2	9.0	8.9	8.7
Pig survival, %	88.3	92.6	89.9	89.2	87.5
Pig performance					
Avg pig birth wt	3.5	3.6	3.4	3.4	3.4
Avg litter birth wt	33.7	33.4	35.0	34.0	32.2
Avg pig weaning wt	11.3	12.0	11.9	11.8	11.1
Avg litter weaning wt[a]	99.9	111.2	106.3	104.8	96.6

[a]Parity difference (P<.05).

Table 5. Effect of Parity on Sow Performance.

Item	Parity				
	1	2	3	4	5+
No. of sows	13	19	51	43	63
Lactation length (day)	21.3	21.6	21.5	22.0	21.5
Beginning sow weight (lb)[b]	362.6	455.9	470.6	495.8	540.4
Ending sow weight (lb)[b]	336.5	413.7	441.3	467.0	503.4
Lactation wt loss (lb)	26.1	42.1	29.3	28.8	36.9
Avg feed intake (lb)					
Week 1[a]	8.49	9.91	9.97	9.77	8.89
Week 2[b]	10.74	13.37	12.78	12.80	11.88
Overall[b]	10.18	12.26	12.05	11.69	11.25
Metabolizable energy intake (Mcal/day)[b]	14.9	17.9	17.6	17.1	16.4

[a]Parity difference (P<.05).
[b]Parity difference (P<.01).