FATS AND PROTEINS RESEARCH FOUNDATION, INC.

Director's Digest

LARRY E. DAVIS
Director - Technical Services

2250 E. DEVON AVENUE
DES PLAINES, ILLINOIS 60018
AREA CODE 312—827-0139

SEPTEMBER, 1985 No. 161

These authors do an excellent job of covering the pro's and con's of adding fat to sow rations. While I don't agree with the energy value used for fat, the thrust of the article is positive for the utilization of fat in sow rations.

Adding FAT To Sow Diets

By Jim L. Nelssen and Gary L. Allee

After a decade of intensive research, the topic of supplemental fat in sow diets still generates spirited debate.

Fat is often used as an energy source in sow diets because it has a great caloric density – 2.25 times that of the cereal grains.

Researchers have studied supplemental fat in sow diets because of the opportunity to increase sow energy intake during late gestation and lactation.

Late gestation

Increasing sow energy intake with supplemental fat during late gestation slightly improves baby pig survival. Researchers found that adding fat to sows' diets improves the survival rate of pigs by:

- increasing the energy density of colostrum and milk;
- greater milk yield;
- improved baby pig energy reserves.

Incorporating fat into sows' diets during late gestation increased pig survival. This resulted in an increase in litter size at weaning of .3 pigs.

Researchers found improvement in survival is greatest in herds with a low (less than 80 percent) preweaning survival rate. Pigs that weigh less than 2.2 pounds at birth responded best to added fat in their dam's diet.

Will simply increasing feed intake during late gestation improve pig survival? Since fetal growth increases rapidly during late gestation, giving sows extra nutrients could improve birth weights. This would mean more pigs weaned per litter.

Will the most economical response occur with supplemental corn or supplemental fat? The authors studied the influence of feeding either additional fat or additional corn to sows during late gestation. They then measured subsequent pig performance. From day 100 of gestation until farrowing, sows were fed six pounds daily of a corn-soybean meal diet top dressed with either one pound of fat or 2.25 pounds of corn.

Feeding fat to sows during late gestation increased the number of pigs weaned per litter by .4 pigs compared to feeding corn.

Feeding fat during late gestation increased pig survival more than when those same calories were provided through corn.

Table 1. Effect of Feeding Fat During Late Gestation on Sow and Letter Performance.[a,b]

Criteria	Control	+ Fat	Difference
Pigs born alive/litter	10.0	9.9	– 0.1
Pigs weaned/litter	8.1	8.4	+ 0.3
Survival (%)			
All pigs	82.0	84.6	+ 2.6
Low birth wt. pigs[c]	42.1	59.2	+ 17.1

[a] Moser et al., 1978.
[b] Moser and Lewis, 1980.
[c] Pigs weighing less than 2.2 lb. at birth.

Table 2. Effect of Increasing Feed Intake During Late Gestation on Sow and Litter Performance.[a]

Criteria	Control[b]	Added Feed[c]	Difference
No. sows	423	425	
No. born alive/litter	9.9	10.1	+ 0.2
Pig birth wt., lb.	3.1	3.2	+ 0.1
Pigs weaned/litter	8.4	8.7	+ 0.3
Survival (%)	85.4	87.8	+ 2.4

[a] Cromwell et al., 1982.
[b] Fed 4 lb. daily of a corn-soybean meal diet; During winter (Dec., Jan., Feb.) increased by 1 lb. daily.
[c] Increased 3 lb. daily at day 90 of gestation.

Lactation

The importance of feeding fat during lactation is not as well established. Providing supplemental fat during lactation will increase the grain-soybean meal diet. The opportunity to increase the energy intake by lactating sows is most important during the following situations:

- during hot weather when sows may have poor appetites;
- when highly productive sows eat limited amounts of feed (less than 8.5 to 9.0 pounds per day) despite unlimited access to cereal grain diets.

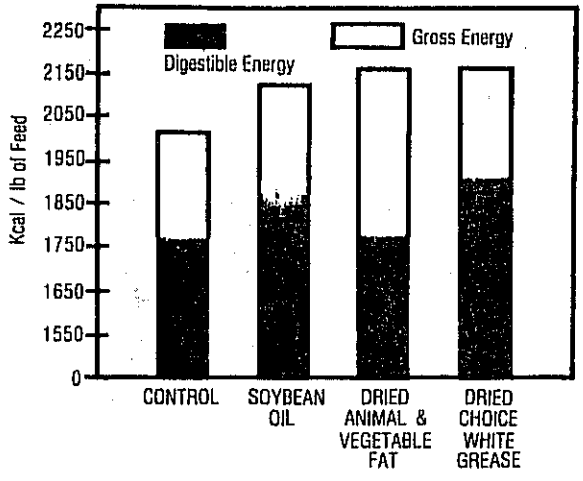

Figure 1. Energy content of feed supplemented with various fat sources.

Recent studies at Kansas State University show that an inexpensive drip-cooling system in the farrowing house will increase lactation feed intake by 16 to 18 percent. Producers are encouraged to remedy energy consumption problems during lactation by relieving heat stress. If lactation feed intake is still a problem, consider adding fat to the sows' diet.

Fat source

For several years the source of fat used in sow diets appeared to be relatively unimportant. Producers often use expensive dried fat products on the farm for convenience. Recent research shows there is some variation in how well sows use these products. In fact, the digestion of some dried fat products is so inferior that actual energy intake is not increased by adding the material to a sow diet (Figure 1). This poor utilization may be related to the processing method used to improve flowability of a dried fat. Since there are excellent dried fat products available, scrutiny of these products is essential.

There is an interest in the possibility of utilizing unextracted soybeans as a method of supplementing sow diets with fat. Soybeans (raw or roasted) contain approximately 32-37 percent crude protein and 16-18 percent fat. Diets formulated with unextracted soybeans will contain 3-4 percent more fat than those with soybean meal. A producer should remember that the primary reason for adding raw or roasted soybean is to provide supplemental protein. The added fat should receive secondary attention in an economic evaluation.

Whole soybeans are more easily incorporated into diets. They pose fewer handling problems associated with the addition of processed fats and oils.

Feed Handling Problems

It's no secret that adding fat to sow diets can create numerous problems. More economical fat sources normally must be melted before mixing into diets, requiring additional equipment at the feed mill. There are physical problems in mixing. Diets containing more than 5 percent fat are difficult to handle in bulk bins. Rancidity can occur if the product isn't stabilized. This can be a problem in summer months when unextracted soybeans are added to sow diets. The result is reduced feed intake.

Economics

The slight improvement in pig survival (.3 pigs per litter) is small enough that it is hard to prove or disprove with a single experiment. Nevertheless, an increase of .3 pigs is of appreciable economic significance to a pork producer. To realize the improvement in pigs weaned per litter, a producer should feed a minimum of 2.5 lb. of fat, spread over a minimum of five days during late gestation. But, is it economical to add fat to a sow diet? In order to answer this question, each producer must evaluate costs and returns.

Two cost comparisons may be helpful in deciding the potential economic return of adding fat to late gestation sow diets.

Example One

In this example, the following calculations were made:

- a producer could feed a sow diet containing 5 percent added fat;
- the added fat is fed the last 10 days of gestation at a rate of 6 pounds per day;

• the cost of fat is 25 cents per pound;
• the value of saving one extra pig per litter is $25.

Calculations:

1) Total fat intake in 10 days + cost/lb fat
= added feed cost/sow
3.0 lb × 25 cents/lb
= 75 cents additional feed cost
2) Gross Return = $25/pig × .3 extra pigs per litter
= $7.50
3) Net Return minus extra feed cost:
— .75
= $6.75 extra return/litter from fat

Example Two

In this example, the following assumptions were made:

• a producer could top-dress sow diets with .3 pounds actual fat per day from a dried fat product;
• the additional fat would be provided during the last 10 days of gestation;
• the cost of the dried fat product is 55 cents per pound
• the value of saving one pig per litter is $25.

Calculations:

1) Fat intake in 10 days × cost/lb fat
= added feed cost/sow
3.0 lb × 55 cents/lb
= $1.65 additional feed cost
2) Gross Return = Extra .3 pig/litter return
= $7.50
3) Net Return minus
$1.65
= $5.85 extra return/litter from dried fat

Table 3. Effect of Source of Sow Energy Intake During Late Gestation on Subsequent Pig Performance.[a]

Criteria	Corn[c]	Fat[d]	Difference
No. of litters	70	70	
No. pigs equalized, day	9.9	10.0	+ 0.1
Pigs weaned/litter	8.3	8.7	+ 0.4
Survival (%)	84.3	87.0	+ 2.7
Pig performance (lb.)			
Pig birth wt.	2.9	2.9	
Pig 21 day wt.	10.9	11.1	+ 0.2
Litter 21 day wt.	92.9	95.4	+2.5

[a] Nelssen et al., 1984.
[b] All sows fed 6 lb. daily of a corn-soybean meal basal diet.
[c] Corn was top dressed on the sows' feed at 2.25 lb. for 14 days prior to farrowing.
[d] Fat was top dressed on the sows' feed at 1.0 lb. actual fat per day for 14 days prior to farrowing.

Recommendations

Based on research on adding fat to sow diets, the following management tips can be given:

If preweaning survival is less than 85%, consider supplementing with fat during late gestation.

When using fat in late gestation sow diets, a producer should feed a minimum of 2.5 pounds of total fat, spread over at least five days to improve piglet survival.

During lactation, individually top dress sow diets with .5 pound of fat daily if feed intake is less than 9.0 pounds daily or lactation body weight is severe.

Consider using a dried fat product to alleviate mixing and handling problems. Feed cost will be increased slightly.

Although the debate on additional fat in sow diets will obviously continue, there are situations when the practice is cost-effective.

Nelssen and Allee are animal scientists at Kansas State University.

*** END OF REPORT ***