FATS AND PROTEINS RESEARCH FOUNDATION, INC.

Director's Digest

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UTILIZATION OF FAT IN PIG AND SOW DIETS

Below is the Summary of the work conducted by Stahly, Cromwell and Schoenherr at the University of Kentucky. This is taken from last progress report. Read carefully and note their conclusion on the value of fat versus corn in growing pigs and sows. This is information that you can use today in selling fat to small/medium size feed mills and large swine producers. No more 2.25 to 2.5 times the value of corn. We only want to address the value of fat versus corn on a net energy basis.

This work will be published in a paper within a few months.

SUMMARY

Three series of studies have been conducted during a three year project to evaluate the nutritional value of a high quality, animal fat for growing pigs (Objective A) and lactating sows (Objective B) as influenced by the thermal environment in which the animals are housed. The specific objectives in each study were to determine the influence of dietary fat additions on the animals:

- Voluntary intake of energy and nutrients.
- Digestibility of the dietary energy and nutrients.
- Efficiency of use of the digestive end-products for economically important production functions in the pig and sow (i.e. milk production, body muscle and fat growth, etc.).

OBJECTIVE A - Summary of Growing Pig Data.

Dietary additions of choice white grease (2.5, 5.0 or 7.5% added fat) to a fortified, corn-soybean meal diet did not consistently enhance the voluntary energy intake of growing pigs housed in either a warm (72 F) or hot (95 F) thermal environment. However, the energy in the supplemental fat source was digested efficiently by the pig and was efficiently utilized for body tissue synthesis. The digestible energy (DE) and net energy (NE) content of the choice white grease was determined to be 3.6 and 3.3 to 3.9 mcal/lb, respectively. From these data, the economic value of a pound of a

moderately unsaturated fat source as an energy source (based on NE) for pigs housed in a warm and hot environment is 3.8 and 3.0, respectively, times the value of a pound of corn (air dry basis). This energy value (based on NE) of fat is substantially higher than the ratio of 2.25 times (based on DE) that has been historically used to determine the economic value of fat as a dietary energy source.

A proportion of the improved efficiency of using fat vs carbohydrate calories for growth appears to be due to the direct deposition of dietary fat as body fat. Thus, the lean-fat ratio in the pig's body is altered by dietary fat supplementation.

Under commercial feeding conditions, the response of growing pigs to dietary fat additions (2, 4 or 6% choice white grease) was influenced by the seasonal environment in which the pigs were fed and the level of essential amino acids included in the diet. Dietary fat additions resulted in improved daily gains and feed:gain and ME:gain ratios in the winter (moderately cold, 38 to 45°F) and summer (moderately hot, 86 to 92°F) seasons in pigs fed a high lysine diet. Dietary fat additions did not alter daily gain or ME:gain ratios in pigs fed a low lysine diet. The influence of dietary fat additions on the composition of growth was dependent on the season in which the pigs were fed. In the colder months (winter), dietary fat additions depressed carcass backfat. In contrast, dietary fat additions increased carcass backfat in the summer months.

OBJECTIVE B - Summary of Lactating Sow Data

Dietary additions of fat (10.6% of choice white grease) to a fortified, corn-soybean meal diet increased the voluntary energy intake of lactating sows housed in a warm (68°F) or hot (90°F) thermal environment. The magnitude of the increase was greatest in the heat-stressed sows.

The digestible energy content of the supplemental fat source was 3.81 and 3.71 mcal/pound in sows housed in the warm and hot environments, respectively. These data indicated that the amount of digestible energy derived from fat is similar in sows housed in the two environments. It also indicates that the ability of the adult, lactating female to digest a moderately unsaturated fat source is the same as that of the growing pig.

The data pertaining to efficiency of utilizing the end-products of fat digestion in the sow for milk production, litter gain, tissue storage and subsequent reproduction is included in the digests of the two Stahly, Cromwell and Schoenherr papers.