

**NEW VISION CO-OP  
"PIG'S EAR"**

**"Alternate Feed Ingredients and Research on CLA for Grow-Finish Pigs"**

Complete feed (a package of nutrients) represents the major cost in swine production. Typically corn and soybean meal have been the major contributors of energy and protein (amino acids) in the complete feed. However, in recent years alternative feed ingredients, thanks to the ethanol and biofuels industry, are available that provide energy and protein (amino acids) to the diet and in many instances lower diet cost.

In this newsletter we reviewed the recent research on Corn Distillers Dried Grains w/solubles (DDGS) and glycerol, plus a new area of research on the use of CLA in swine diets.

**CORN DISTILLERS DRIED GRAINS w/SOLUBLES FOR GROW-FINISH PIGS**

At the recent Midwest Section of Animal Science meeting over 20 reports were presented on research that has been conducted on feeding DDGS during various phases of swine production. One report involved 9 research stations and 560 pigs to assess the effects of feeding up to 45% DDGS on pig performance and firmness of carcass fat from 33 to 121 kg body weight. Following is a summary of the data from this study.

| Criteria                              | DDGS, % in Diet |      |      |      |
|---------------------------------------|-----------------|------|------|------|
|                                       | 0               | 15   | 30   | 45   |
| Avg. Daily Gain, lb                   | 2.08            | 2.10 | 2.04 | 2.03 |
| Avg Daily Feed Intake, lb             | 6.04            | 6.10 | 5.93 | 5.98 |
| Feed/Gain                             | 2.90            | 2.91 | 2.92 | 2.96 |
| Backfat, mm                           | 22.5            | 22.7 | 21.4 | 21.6 |
| Loin Eye Area, cm <sup>2</sup>        | 47.4            | 47.4 | 46.1 | 45.4 |
| Carcass Fat Free Lean, %              | 51.9            | 52.2 | 52.4 | 52.1 |
| Calculated Iodine Values (3 stations) | 61.6            | 65.7 | 75.7 | 80.9 |

In this study feeding diets with up to 45% DDGS did not have major effects on pig performances, but resulted in softer bellies. This data is in agreement with several previous studies that evaluated performance and carcass quality when using DDGS up to 30% of the diet. This data provides the needed confidence for swine producers to consider the incorporation of DDGS into their swine diets.

**COMBINING DDGS AND GLYCEROL IN SWINE GROWER-FINISHER DIETS**

Biofuel production generates two major co-products. Distillers Dried Grains w/solubles (DDGS) from ethanol and crude glycerol from biodiesel. Previous research has shown that crude glycerol has an energy value similar to corn in swine diets.

Iowa State swine researchers conducted a study to evaluate feeding crude glycerol and DDGS in combination to 144 pigs, with approximately starting weight of 85 lb, for 84 days at which time the pigs weighed approximately 275 lb.

Six fortified corn-soybean meal diets were fed with the following crude glycerol and DDGS levels.

| Diet | Crude Glycerol (%) | DDGS (%) | Diet | Crude Glycerol (%) | DDGS (%) |
|------|--------------------|----------|------|--------------------|----------|
| 1    | 0                  | 0        | 4    | 10                 | 0        |
| 2    | 0                  | 15       | 5    | 10                 | 15       |
| 3    | 0                  | 25       | 6    | 10                 | 25       |

A summary of the results showed:

- Pig performance and carcass traits did not differ between diets.
- Fatty acid profile was affected by dietary treatment. Increasing DDGS levels resulted in less saturated fat. Diets combining 10% glycerol with 15 and 25% DDGS were not different from each other for saturated fatty acid content.
- Adding crude glycerol may partially offset the effects of DDGS on the fatty acid profile. Using 10% glycerol and 25% DDGS would replace approximately 25% corn and approximately 10% soybean meal in the diet.

## **CLA (CONJUGATED LINOLEIC ACID) FOR SWINE DIETS**

A group of polyunsaturated fatty acids, termed conjugated linoleic acids (CLA), have been examined closely over the past decade as a dietary constituent and nutrient that can provide additional benefits when included in the diets of people as well as animals.

CLAs include a number of different isomers of linoleic acid (C18:2) where hydrogenation has occurred. CLAs occur naturally in ruminant meat and milk products. Bacterial fermentation of linoleic acid in the rumen produces the different CLA isomers.

Initial research in laboratory animals has indicated positive effects of dietary CLA on reducing the effects of obesity, diabetes, atherosclerosis, and certain cancers, and thus has received considerable attention as a nutritional component to improve health in people. It is believed that CLA influences lipid metabolism in the body, and thus affects a number of metabolic modifiers that have their origination from lipid bases and result in the health improvements.

Inclusion of CLA in swine diets has been evaluated, both from the viewpoint of enhancing the nutritional "value" of pork to consumers as well as enhancing production and efficiency parameters. One of the most interesting findings has been the ability of dietary CLA addition to prevent lipid accumulation, resulting in leaner pigs. Additionally, the ratio of saturated to unsaturated fatty acids in pork fat increases, which results in an increase in fat firmness, also viewed as a positive effect on pork quality.

The increased use of high levels of DDGS in swine diets has resulted in softer carcasses due to a reduction in the saturated:unsaturated fatty acid ratio, but CLA may provide a means to at least partially minimize the "soft fat" effect of feeding increased levels of DDGS to pigs.

CLA has also been shown to reduce the inflammatory process of the immune system when challenged with an antigen. Reduced prostaglandin and histamine release when pigs are under a disease challenge may result in a reduction in energy and nutrients partitioned to maintain health and thus being diverted away from growth. Thus, it may very well be that CLA provides additional benefit during disease challenges in commercial pork production situations by minimizing the reduction in growth and performance that is otherwise observed.

Recently, the FDA approved the use of CLA in growing and finishing swine diets. More research is needed to further understand the impact of CLA on pig performance, health, and pork quality given different inclusion levels and environmental conditions. However, depending on price and further understanding, we could see future diets being formulated on the basis of CLA level in addition to other nutrients such as energy, amino acids, vitamins, and minerals.

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For additional information on the **Co-op Swine Nutrition Program** contact your local  
**Co-op** feed department or the swine nutritionist.

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|--------------------|----------------------------|----------------|
| Worthington        | Neil Cuperus, Chris Luther | 1-800-657-3200 |
|                    | Kevin Doppenberg           |                |
| Swine Nutritionist | John Goihl                 | 1-800-322-0437 |