

**Title:** Critical review of literature on feeding bio-fuels co-products to pigs. – NPB #07-173

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## Scientific Abstract:

Distillers dried grains with solubles (DDGS) and other co-products from the bio-fuels industry may be included in diets fed to pigs in all phases of production. The concentration of DE and ME in DDGS and in corn germ is similar to corn, but high protein distillers dried grains (HP-DDG) contains more energy than corn. In contrast, if the oil is removed from DDGS, the product will have a lower energy concentration than corn or conventional DDGS. Glycerin, a co-product from the biodiesel industry also contains more energy than corn. Phosphorus in DDGS and HP DDG is highly digestible to pigs and apparent total tract digestibility values of approximately 60% have been reported for these ingredients. In contrast the digestibility of phosphorus in corn germ is similar to corn. The concentration of starch in DDGS is low (i.e., between 3 and 11%), but the concentration of fat in DDGS is approximately 10% and the concentration of ADF, NDF, and total dietary fiber in DDGS is approximately 3 times greater than in corn (9.9, 25.3, and 42.1%, respectively). The apparent total tract digestibility of dietary fiber is less than 50%, which results in low digestibility values for DM and energy in DDGS. The concentration of most AA in DDGS is approximately 3 times greater than in corn, but the standardized ileal digestibility of most AA is approximately 10 percentage units less than in corn. The same is the case for corn germ and HP DDG. Nursery pigs from 2 to 3 wk post-weaning, and growing and finishing pigs may be fed diets containing up to 30% DDGS without any negative impact on pig growth performance. However, the carcass fat in pigs fed DDGS-containing diets has a higher iodine value than in pigs fed no DDGS. It may, therefore, be necessary to withdraw DDGS from the diet of finishing pigs during the final 3 to 4 wk prior to harvest to achieve desired pork fat quality. HP DDG may be used in diets fed to growing finishing pigs in quantities sufficient to replace all the soybean meal in these diets and at least 10% of corn germ may be included in these diets. Up to 30% de-oiled DDGS can be included in diets fed to weanling pigs, but only 10% should be used in diets fed to growing-finishing pigs. Glycerin can be included in diets fed to weanling and growing-finishing pigs in quantities of up to 6 and 15%, respectively. Lactating sows can be fed diets containing up to 30% DDGS, and DDGS can replace all of the soybean meal in diets fed to gestating sows without negatively impacting sow or litter performance. Inclusion of DDGS in diets fed to pigs may improve intestinal health and the immune system activation, but more research is needed to elucidate the mechanism responsible for these effects. Manure volume will increase if DDGS is included in the diets because of the reduced digestibility of DM in DDGS. Nitrogen excretion may also increase, but this can be prevented by the use of crystalline AA in diets containing DDGS. In contrast, P excretion can be reduced in diets containing DDGS if the total dietary concentration of P is reduced to compensate for the greater digestibility of P in DDGS.

These research results were submitted in fulfillment of the Nutritional Efficiency Consortium research projects.

Contributing organizations for 2007 include: Arizona Pork Council, DPI Global, Eli Lilly/Elanco, Iowa Corn Growers Association, Iowa Pork Producers Association, Illinois Corn Marketing Board, Illinois Pork Producers Association, Kansas Corn Commission, Kansas Pork Association, Lucta USA, Minnesota Pork Board, Missouri Pork Producers Association, Monsanto,

Mississippi Pork Producers Association, Montana Pork Producers Council, National Corn Growers Association, North Carolina Pork Council, Inc., National Pork Board, Nebraska Pork Producers Association, Inc., Ohio Pork Producers Council, Pioneer Hi-Bred International, Inc., Utah Pork Producers Association and the Wisconsin Pork Association.

This report is published directly as submitted by the projects principal investigator. This report has not been peer reviewed.

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