

Title: Digestibility of dietary fiber from distillers co-products fed to growing pigs – NPB #07-170

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Scientific Abstract:

The objective of these experiments was to measure the apparent ileal (AID) and apparent total tract digestibility (ATTD) of fiber in different sources of distillers dried grains with solubles (DDGS) and to calculate the fermentation capacity of those feed ingredients. The diets, ileal digesta, and fecal samples from 3 experiments were analyzed for fiber and chromium to calculate AID and ATTD of fiber. In total there were 27 sources of DDGS from corn (C-DDGS), 1 source of DDGS from sorghum (S-DDGS), 1 source of DDGS that blended corn and sorghum (CS-DDGS), 1 source of DDGS from beverage (DDGS_{beverage}), and 1 source of corn distillers dried grains (DDG). The fermentation was calculated in all 3 experiments by subtracting values for AID from values for ATTD. Dietary fiber was analyzed in all experiments using the total dietary fiber (TDF) procedure. In 1 of the 3 experiments, fiber was also analyzed using the crude fiber, ADF, NDF, insoluble dietary fiber (IDF), and soluble dietary fiber (SDF) procedures. Samples from 2 experiments were analyzed for ether extract, DM, CP, and ash. The organic residue (OR) was calculated by subtracting CP, ether extract, ash, and water in diets, ileal and fecal samples from 100%. The results of 3 experiments showed that the AID (12.6 to 38.2%), the ATTD (23.4 to 57.0%), and fermentation (10.5 to 38.6%) of TDF differ ($P < 0.05$) among sources of DDGS. Those differences might be a result of differences in the processing of the DDGS or be caused by differences in the composition of the fiber among corn sources. The AID and ATTD of DM and OR in DDGS was lower ($P < 0.05$) than the AID of DM (75.2%) and OR (77.0%) and the ATTD of DM (87.5%) and OR (89.4%) in corn; these results agree with the lower digestibility of energy that has been reported for DDGS compared with corn. The AID of crude fiber, NDF, IDF, SDF, and TDF in C-DDGS was not different than in S-DDGS. The AID of ADF was greater ($P < 0.01$) in S-DDGS than in C-DDGS. The AID of NDF, IDF, TDF, and OR was lower ($P < 0.01$) in CS-DDGS than in C-DDGS. The ATTD of OR in S-DDGS (72.5%) and in CS-DDGS (68.4%) were lower than the ATTD of OR in C-DDGS. The AID, ATTD, and fermentation of TDF in DDGS_{ethanol} were not different than in DDGS_{beverage}. It is concluded that the AID and ATTD of fiber differ among DDGS sources and that those differences can account for differences in digestibility of energy. The reasons for the differences in digestibility of fiber among DDGS sources should be the focus of future research.

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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