RESEARCH ABSTRACT

ANIMAL SCIENCE

Title: Impact of DDGS Particle Size on DM, Energy, Nitrogen, and Phosphorus Digestibility in Diets for Growing Pigs - **NPB#09-037**

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Scientific Abstract:

A study was conducted to determine DE and ME content, and evaluate the effect of different particle sizes of distillers dried grains with solubles (DDGS) at a 30% dietary inclusion rate in corn diets on DM, energy, nitrogen, and phosphorus digestibility and flowability in growing pigs. One source DDGS was processed through a hammer mill to achieve of mean particle sizes of 818, 595, and 308 µm, respectively. The control diet was based on corn (96.8%), with supplemental minerals and vitamins. Three additional diets were formulated by replacing 30% of corn from the control diet with DDGS of different particle sizes. Thirty six growing pigs (initial BW of 40 ± 1.13 kg) were assigned to 1 of 4 treatments by RCB design according to their BW and housed in individual metabolic crates for a 9 d adaptation period followed by a 4 d total collection of feces and urine. Pigs were provided free access to water and fed an amount of experimental diets equivalent to 3% BW. Samples were analyzed for DM, GE, N, and P, and diet ATTD as well as DE and ME of corn and DDGS particle sizes were calculated. Diet drained and poured angles of repose were measured using a modified Hele-Shaw cell method to evaluate the diet flowability. Inclusion of 30% DDGS with 308 µm improved ($P < 0.05$) dietary ATTD of DM and GE, as well as DE (4006 vs. 3783, kcal/kg DM) and ME (3861 vs. 3583, kcal/kg DM) compared to 818 µm DDGS. No differences were found in N and P digestibility among 3 DDGS particle size diets. The DDGS particle size of 595 µm had higher ($P < 0.05$) DE, but not ME compared to 818 µm DDGS, and DE and ME were not different between 308 and 595µm. Compared with a 595 µm or 818 µm DDGS, grinding DDGS to 308 µm reduced diet flowability indicated by a higher ($P < 0.05$) drained angle of repose. These results suggested that for each 25 micron decreased in DDGS particle size from 818 microns to 308 microns, the ME contribution of DDGS to the diet is 13.6 kcal/kg DM, but diet flowability will be reduced.

These research results were submitted in fulfillment of the Nutritional Efficiency Consortium research projects.
Contributing organizations for 2009 include: AgriSolutions, Inc., DPI Global, Iowa Pork Producers Association, Illinois Corn Marketing Board, Illinois Pork Producers Association, Kansas Pork Association, Missouri Pork Producers Association, Mississippi Pork Producers Association, National Pork Board, Nebraska Corn Board and the Utah Pork Producers Association.