

**Title:** Correlation between physical characteristics of diets and absorption of energy by pigs – NPB # 15-115

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**Date Submitted:** May 12, 2016

revised

### Scientific Abstract

Disappearance of nutrients and energy in the stomach and small intestine, cecum, and colon of pigs fed diets containing distillers dried grains with solubles (DDGS), wheat middlings, or soybean hulls was determined. A second objective was to test the hypothesis that physical characteristics of dietary fiber in diets are correlated with the digestibility of nutrients and energy by pigs fed experimental diets. Eight barrows (initial BW = 37.3 ± 1.0 kg) were surgically equipped with a T-cannula in the distal ileum and a T-cannula in the colon approximately 10 cm distal to the cecocolic junction. Pigs were randomly allotted to a replicated 4 × 4 Latin square design with 4 diets and 4 periods in each square. The basal diet was a corn-soybean meal diet and 3 additional diets were formulated by substituting 30% of the nutrients and energy from corn, soybean meal, and L-Lys HCl with DDGS, wheat middlings, or soybean hulls. Titanium dioxide was included as an indigestible marker. Each period lasted 14 d. The initial 8 d were considered an adaptation to the diet. On d 9 and 10, fecal samples were collected. Colon digesta were collected for 8 h on d 11 and 12, whereas ileal digesta were collected for 8 h on d 13 and 14. Values for apparent ileal digestibility (AID), apparent cecal digestibility (ACD), and apparent total tract digestibility (ATTD) of nutrients and energy by pigs fed experimental diets were calculated. Nutrient and energy flow along the gastrointestinal tract was calculated, and disappearance of nutrients and energy was calculated using digestibility values and flow. Results indicated that ACD and ATTD of soluble dietary fiber by pigs fed experimental diets was not different. Pigs fed basal or wheat middlings diets had greater ( $P \leq 0.05$ ) ACD of insoluble dietary fiber compared with pigs fed diets containing DDGS or soybean hulls. Insoluble dietary fiber disappearance in the colon of pigs fed the soybean hulls diet was greater ( $P \leq 0.05$ ) compared with other diets. Wheat middlings had greater ( $P \leq 0.05$ ) disappearance of dietary fiber fractions compared with DDGS and soybean hulls. Water binding capacity, bulk density, and viscosity of dietary fiber in experimental diets were not correlated with digestibility of nutrients and energy by pigs. In conclusion, disappearance in the colon of most dietary fiber fractions and energy was greater in diets containing soybean hulls or DDGS compared with basal or wheat middlings diets.

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These research results were submitted in fulfillment of checkoff-funded research projects. This report is published directly as submitted by the project's principal investigator. This report has not been peer-reviewed.

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