

**Title:** Applying Enzyme Technology to Optimize the Utilization of Fibrous Feed Ingredients in Swine Diets - Nutrient Digestibility – NPB #13-191 **revised**

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### Scientific Abstract:

The objective of this study was to determine the effect of endo-1,4- $\beta$ -xylanase supplementation (Xyl; with or without) and feeding method (dry or liquid) on apparent total tract digestibility (ATTD) and apparent ileal digestibility (AID) of nutrients in growing pigs fed diets containing 30% corn DDGS or 30% wheat middlings. Sixty-four pigs (BW 25.9 $\pm$ 0.38 kg) were blocked by BW and sex, placed in individual pens, and randomly assigned to 8 dietary treatments. Within each feedstuff (DDGS or Midds), diets were fed either liquid or dry, without or with Xyl (24,000 BXU/kg feed). Diets contained 3.25 Mcal/kg ME and 1.05% SID lysine. Pigs were fed restricted at 3 times maintenance energy requirements (197 kcal ME/kg BW<sup>0.60</sup>) in 2 equal meals. Liquid diets were prepared by steeping DDGS or Midds with water (1:3 w:v) with or without Xyl for 24 h, followed by mixing with the respective basal diet and water to achieve a final DM concentration of 25%. Following a 13 d adaptation, fecal samples were collected for 3 d. When DDGS was included, Xyl increased AID of NDF in liquid diets (48.4% vs. 31.6%), but not in dry diets (interaction, P=0.03). Pigs fed liquid diets with DDGS had decreased (P<0.05) ATTD of GE (81.1% vs. 83.0%) and NDF (64.8% vs. 72.1%) compared to pigs fed dry diets. When Midds were included, Xyl increased AID of GE (64.5 vs. 54.7) and NDF (52.9% vs 31.7%) in pigs fed dry diets but not in pigs fed liquid diets (interaction, P=0.09). Pigs fed liquid diets with Midds had greater AID of N (P=0.01) than pigs fed dry diets with Midds (77.7% vs. 72.0%). Pigs fed dry diets with Midds and Xyl had increased ATTD of NDF; however it was reduced when pigs were fed liquid diets with Xyl (interaction, P<0.01). The ATTD of GE (80.4% vs. 78.1%) and N (80.2% vs. 78.0%) was improved (P<0.05) in pigs fed Midds with Xyl compared to diets without Xyl. Pigs fed DDGS based diets had greater concentrations of butyrate in the cecum (P = 0.001) as compared to pigs fed Midds diets (27.55 vs. 20.44 mmol/L). Pigs fed DDGS-based diets with Xyl had deeper crypts in the jejunum than pigs fed DDGS diets without Xyl (98.20 vs. 86.16  $\mu$ m), however, there was no effect of Xyl in pigs fed Midds-based diets. This study indicates that Midds based diets with Xyl in liquid feeding did not improve nutrient digestibility. However, addition of Xyl improved ATTD of GE, N and NDF in dry diets with Midds. Furthermore, DDGS based diets with Xyl in liquid feeding improved only AID of NDF. Results suggest that the addition of Xyl appears to be more beneficial in Midds than DDGS based diets.

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