126 Porcine in vitro digestion and fermentation characteristics of heat and multi-enzyme pretreated whole stillage. Kevin S. Jerez Bogota[1], Tofuko A. Woyengo[2], *[1]SOUTH DAKOTA STATE UNIV, ANIMAL & RANGE SCIENCES, [2]South Dakota State University*

Effects of heat pretreatment (HT) and multi-enzyme predigestion (MP) of whole stillage on porcine in vitro digestibility of DM (IVDDM) and fermentation characteristics of WS were investigated. Four WS samples were obtained from 4 different sources. Half amount of WS from each source was pretreated at 70psi and 160°C for 20 min. Untreated and pretreated WS samples from each source were divided into 4 sub-samples (4 sub-samples of untreated WS per source and 4 sub-samples of pretreated WS per source) to give 32 sub-samples. Four treatments were applied to 32 sub-samples WS (1 untreated or 1 pretreated sub-sample per treatment per sample source). The treatments were WS undigested or pre-digested with 1 of 3 multi-enzymes (MTE1, MTE2, and MTE3). The MTE1 contained xylanase, β-glucanase, cellulase, mannanase, protease, and amylase; MTE2 contained xylanase, α-galactosidase, and celullase; and MTE3 contained xylanase, cellulase, β-glucanase, and mannanase. The 32 sub-samples were subjected to porcine in vitro digestion in 3 cycles of 2 batches (16 sub-samples/batch). Subsequently, residues were subjected to porcine in vitro fermentation for 72 hours, during which accumulated gas production was recorded and modeled to estimate kinetics of gas production. The IVDDM of untreated WS was 73.4%. HT improved (P< 0.05) of WS IVDMM by 8.2 percentage points. MP improved IVDDM of untreated WS and heat-pretreated WS by a means 9.1 and 6.8 percentage points, respectively. However, the magnitude of improvement in IVDDM of pretreated WS due to predigestion was lower (P< 0.05) for MTE3 than that for MTE2 (4.8 vs. 9.0 percentage points), but similar to that for MTE1 (6.7 percentage points). Similar interactions were observed for total gas production. In conclusion, the digestibility of WS was improved by the HT and MP. Combination of HT and MTE2 predigestion was the most effective in improving digestibility of WS.

Keywords: pig, pretreatment, whole stillage, heat, carbohydrase

128 Determining the effects of high phytase levels and feeding duration on growth performance and carcass characteristics of growing-finishing pigs. Carine Vier[5], Steve S. Dritz[2], Mike D. Tokach[1], Jon Bergstrom[3], Jason C. Woodworth[4], Robert D. Goodband[1], Joel M. DeRouchey[1], *[1]Kansas State University, [2]Department of Diagnostic Medicine & Pathobiology, College of Veterinary Medicine, Manhattan, KS 66506, [3]DSM Nutritional Products, [4]Department of Animal Sciences & Industry, College of Agriculture, Manhattan, KS 66506, [5]Genus PIC*

Our objective was to determine the effects of high phytase levels and feeding duration on performance of growing finishing pigs. A total of 1,215 barrows and gilts (PIC 359×Camborough, initially 28.0±0.47 kg) were used in a 126-d growth trial with 27 pigs per pen and 15 pens per treatment in a randomized complete block design. Diets were corn-soybean meal-dried distillers grains with solubles-based.Treatments were: 1) Control (no added phytase); 2) Grower phytase (1,500 FYT/kg added phytase fed from d 0 to 57, then no phytase from d 57 to market); and 3) Grow-finish phytase (1,500 FYT/kg added phytase fed throughout the study). Phytase (Ronozyme Hiphos GT 2500, heat-stable; DSM Nutritional Products, Inc., Parsippany, NJ) was assumed to release 0.146% digestible phosphorus (P), 0.166% available P, 0.102% STTD calcium, 53 kcal/kg of metabolizable energy, 42 kcal/kg of net energy (NE), and 0.0217, 0.0003, 0.00886, 0.0224, 0.0056, 0.0122, and 0.0163% standardized ileal digestible lysine, methionine, methionine+cysteine, threonine, tryptophan, isoleucine, and valine, respectively. Beef tallow and feed grade amino acids (AA) were added to the diets without phytase to balance NE and AA across treatments. Data were analyzed using generalized linear mixed models with pen as the experimental unit. Overall, pigs fed diets with no phytase and pigs that were only fed phytase in the grower period had greater (P< 0.05) average daily gain (ADG) and feed efficiency (G:F) than pigs fed the phytase-containing diets until market. Pigs fed the control and grower phytase treatments had greater (P< 0.10) hot carcass weight (HCW) than the phytase throughout treatment. No evidence of differences (P >0.10) were observed for other carcass characteristics. In summary, adding 1,500 FYT/kg of phytase and using full matrix values for minerals, AA, and energy had detrimental effects on ADG, G:F, and HCW in this study when applied to the entire grow-finish period.

Table 1. Effects of feeding 1,500 FYT/kg of phytase on growth performance and carcass characteristics of growing-finishing pigs

	Treatment				
Item[1]	Control	Grower phytase	Grow-finish phytase	SEM	Probability, *P*=
Growth performance					
Initial BW, kg	28.0	28.0	28.0	0.47	0.780
ADG, kg	0.88[a]	0.88[a]	0.85[b]	0.008	0.016
ADFI, kg	2.25	2.26	2.24	0.021	0.651
G:F, kg/kg	0.391[a]	0.389[a]	0.379[b]	0.0526	0.001
Carcass characteristics					
HCW, kg	100.4[a]	100.7[a]	98.4[b]	0.93	0.097
Yield, %	72.63	72.82	72.27	0.337	0.406
Backfat, mm	15.98	16.66	16.46	-[2]	0.509
Loin depth, mm	70.98	71.9	71.22	-[2]	0.797
Fat-free lean, %	58.63	57.30	57.36	-[2]	0.717

[1]ADG = average daily gain. ADFI = average daily feed intake. G:F = gain-to-feed ratio. BW= body weight. HCW = hot carcass weight.
[2]SEM for backfat were 0.392, 0.479, and 0.385; SEM for fat-free lean were 0.287, 0.352 and 0.283; and SEM for loin depth were 0.668, 0.813, 0.652 for control, grower phytase, and grow-finish phytase, respectively.

Keywords: finishing pigs, growth performance, phytase

129 Effect of phytase on growth performance and carcass classification in growing-finishing pigs.

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The objective of this experiment was to evaluate the optimal dosage of phytase fed to growing-finishing pigs. One hundred and twenty barrows, 71 d old and initial body weight 25.16 ± 2.80kg, were distributed in 40 pens according to a randomized complete block design and assigned to 5 treatments: 1. Positive control: diet formulated to meet or exceed the nutrient requirement of pigs (PC); 2. Negative control: PC diets formulated with 0,11% lower Ca and 0,13% lower available P (NC); 3. NC + 1,500 FYT of phytase; 4. NC + 3,000 FYT of phytase; 5. NC +4,500 FYT of phytase. The corn-soybean meal-based diets were formulated to be isonutrient and isoenergetic, except for Ca and av. P. The 4 diets were formulated according to a growing I (71-94 days of age), growing II (95-115d), finishing I (116-143 d) and finishing II (144-156 d) phases. Carcass traits were measured and submitted to the European Carcass Classification (SEUROP). Performance and carcass data were submitted to ANOVA, and regression analysis. There was a quadratic effect on FCR (P< 0.05) in growing I phase,; better FCR (quadratic, P< 0.05) on finishing II to 1,500 and 3,000 FYT (5.56 and 0.35%, respectively); an increase of 5.43 and 1.52% DWG in finishing II (quadratic, P< 0.05) and a reduced 6.60% to 4,500FYT; an improvement the total DWG and final weight (quadratic, P< 0.05) in 6.19 and 4.52%, and 5.27 and 3.57%, for 1,500 and 3,000 FYT, respectively. Phytase supplementation did not improve Carcass weight (P >0.05). The animals fed with 4,500 FYT diet had more carcasses classified as E (between 55–60% lean meat-SEUROP) compared other groups. Doses between 1,500 and 3,000 FYT improve FCR, DWG and final LW of growing and finishing pigs.

Keywords: Phytase, swine, growing, finishing.