

**Table 1.** Effect of CM on ATTD or nutrients and NSP in fibrous diets fed to gestating sows in comparison to grower pigs.

Item	CM Inclusion, %				Animal Category		
	0	0.08	0.1	SEM	Grower	Sow	SEM
ATTD, %							
GE	79.7 <sup>b</sup>	82.6 <sup>ab</sup>	83.9 <sup>a</sup>	0.95	82.9	81.2	0.75
C. Fiber	56.8 <sup>b</sup>	66.6 <sup>a</sup>	66.5 <sup>a</sup>	2.30	62.2	64.4	1.82
NDF	63.7	67.2	68.0	1.71	63.8 <sup>b</sup>	68.8 <sup>a</sup>	1.35
ADF	64.6 <sup>b</sup>	69.5 <sup>ab</sup>	71.4 <sup>a</sup>	1.81	66.5 <sup>y</sup>	70.5 <sup>x</sup>	1.43
Ca	42.0 <sup>b</sup>	48.8 <sup>ab</sup>	52.1 <sup>a</sup>	2.22	52.2 <sup>a</sup>	43.1 <sup>b</sup>	1.76
P <sup>1</sup>	39.9 <sup>b</sup>	48.8 <sup>a</sup>	53.2 <sup>a</sup>	1.87	51.7 <sup>a</sup>	42.9 <sup>b</sup>	1.48
NSP							
Arabinose	66.9 <sup>y</sup>		73.1 <sup>x</sup>	2.25	67.2 <sup>y</sup>	72.7 <sup>x</sup>	2.18
Xylose	46.9 <sup>b</sup>		55.3	3.55	46.6 <sup>b</sup>	57.8 <sup>a</sup>	3.44
Galactose	72.1 <sup>b</sup>		78.7 <sup>a</sup>	1.98	75.3	75.5	1.93
Glucose	60.6 <sup>y</sup>		67.9 <sup>x</sup>	2.80	54.9 <sup>b</sup>	73.5 <sup>a</sup>	2.71
Uronic acids	78.3 <sup>b</sup>		83.2 <sup>a</sup>	1.60	79.5	82.1	1.56
Total NSP	62.3 <sup>b</sup>		69.7 <sup>a</sup>	2.51	60.5 <sup>b</sup>	71.5 <sup>a</sup>	2.43

<sup>a,b</sup> Means within a row with different superscripts are significantly different ( $P \leq 0.05$ )<sup>x,y</sup> Means within a row with different superscripts differ ( $P \leq 0.10$ )<sup>1</sup> Interactions CM\*Category= Grower - 0%: 40.32<sup>a</sup>; Grower - 0.08%: 56.11<sup>a</sup>; Grower - 0.1%: 58.59<sup>a</sup>; Sow - 0%: 39.40<sup>b</sup>; Sow - 0.08%: 41.52<sup>b</sup>; Sow - 0.1%: 47.70<sup>b</sup>.

**Keywords:** ATTA, carbohydrase, fiber, grower pig, sow

## 88 Effect of Increasing Levels of a Novel Consensus Bacterial 6-Phytase Variant on Ileal and Total Tract Digestibility of Nutrients in Diets Fed to Young Pigs.

Charmaine D. Espinosa<sup>1</sup>, Deepak Velayudhan<sup>2</sup>, Yueming Dersjant-Li<sup>2</sup>, Hans H. Stein<sup>1</sup>, <sup>1</sup>University of Illinois at Urbana-Champaign, <sup>2</sup>Danisco Animal Nutrition (IFF)

**Abstract:** An experiment was conducted to test the hypothesis that increasing levels of phytase increases apparent ileal digestibility (AID) and apparent total tract digestibility (ATTD) of nutrients in diets fed to young pigs. A negative control (NC) diet that was deficient (compared with NRC recommendation) in total Ca (-0.15%), standardized total tract digestible P (-0.16%), net energy (-33 kcal/kg), and standardized ileal digestible amino acids (average -0.02% unit) was formulated. Five additional diets were formulated by adding 250, 500, 1,000, 2,000 or 4,000 phytase units per kg of a novel consensus bacterial 6-phytase variant (PhyG) to the NC diet. All diets were based on corn, soybean meal, and canola meal. Eighteen ileal-cannulated pigs (17.81 ± 1.71 kg) were allotted to a 6 × 3 incomplete Latin square design with 6 diets and 3 periods. There were 3 pigs per diet in each period; therefore, there were nine replicate pigs per diet. Data were analyzed using the Mixed Procedure of SAS with diet as the fixed effect whereas pig and period were considered random effects. Linear and quadratic effects of PhyG on nutrient digestibility were determined using polynomial contrast statements. Linear ( $P < 0.01$ ) and quadratic ( $P < 0.05$ ) increases in AID of all individual amino acids (except Arg) were observed as dietary concentrations of PhyG increased (Table 1). Likewise, an increase (linear,  $P < 0.01$ ; quadratic,  $P < 0.05$ ) in ATTD of minerals in diets was observed as the concentration of PhyG increased in diets. Increasing levels of PhyG in diets also increased (linear,  $P < 0.05$ ) ATTD of gross energy. In conclusion, increasing levels of the novel phytase (PhyG) effectively increased ileal and total tract digestibility of nutrients by pigs.

**Table 1.** Digestibility of nutrients in experimental diets<sup>1</sup>

Item	PhyG, FTU/kg						SEM
	0	250	500	1,000	2,000	4,000	
Apparent ileal digestibility <sup>2</sup> , %							
Arg	85.9	85.4	86.3	88.4	88.1	88.5	1.16
His	77.9	77.7	78.5	82.7	81.8	82.3	1.87
Ile	76.8	77.1	77.8	82.6	81.8	82.8	2.10
Leu	79.4	79.6	80.2	84.4	83.5	84.4	1.89
Lys	81.5	81.7	82.8	86.1	85.8	86.1	1.85
Met	84.8	85.3	84.9	88.6	87.7	88.3	1.34
Phe	79.0	79.2	80.2	84.3	83.5	84.5	1.93
Thr	70.9	71.4	72.4	77.5	76.7	77.6	2.54
Trp	77.7	78.0	79.4	84.5	83.4	85.1	2.04
Val	74.2	74.2	75.3	80.0	78.9	79.8	2.28
Apparent total tract digestibility <sup>3</sup> , %							
Ca	60.7	71.3	75.9	81.4	81.3	83.3	2.15
P	28.8	42.1	51.5	65.0	69.2	78.0	2.65
Gross energy	86.9	87.3	87.9	88.1	87.8	88.2	0.44

<sup>1</sup>Data are least squares means of 9 observations per treatment.<sup>2</sup>Linear ( $P < 0.01$ ) and quadratic ( $P < 0.05$ ) increase for all amino acids (except Arg); linear ( $P < 0.01$ ) increase for Arg.<sup>3</sup>Linear ( $P < 0.01$ ) and quadratic ( $P < 0.05$ ) increase for minerals; linear ( $P < 0.05$ ) increase for gross energy.**Keywords:** digestibility, phytase, pigs**89 Practical Screening of Enzymes in Pigs Fed Diets Containing High Dried Distillers' Grain (DDG).**Steve J. Kitt<sup>1</sup>, Mark J. Bertram<sup>1</sup>, Niall Higgins<sup>2</sup>, Tri Duong<sup>2</sup>, Sara Llamas Moya<sup>2</sup>, <sup>1</sup>First Choice Livestock LLC, <sup>2</sup>Kerry

**Abstract:** After two decades of using corn dried distillers' grains (DDG) in swine diets, there is still a general perception that although exogenous enzymes may increase digestibility of various nutrients, it is often difficult to translate these benefits into performance improvements. This study aimed at evaluating the effect of 3 enzyme blends on the performance of pigs fed a high DDG grower-finisher diet. Pigs ( $n = 2,048$ ; average start weight  $10.5 \pm 0.01$  kg) were allotted to 64 pens with 32 pigs/pen, split by sex equally within each replicate. Pens were assigned randomly to 1 of 4 treatment groups and fed a corn-soybean meal-DDG diet formulated to meet or exceed NRC (2012) requirements. Dietary concentration of DDG varied according to BW as follows: 15% (9-16kg), 25% (16-24kg), 38% (24-45kg), 50% (45-69kg), 35% (69-90kg) and 26% (90kg to market). Treatments 2, 3 and 4 contained enzyme preparations based on cellulase, xylanase and a combination of cellulase/xylanase, respectively, dosed at 200 g/MT. Pigs were followed to market, with key performance indicators measured throughout. Data were analyzed as a RCBD, using pen as the experimental unit and treatment as the main effect. Treatment had no effect on BW or ADG through 113 d from study start ( $P > 0.10$ ). Significant differences in ADFI indicated that all enzyme treatments (T2-T4) reduced feed consumption ( $P < 0.05$ ). Feed efficiency (G:F) was significantly improved by enzyme supplementation, with the largest improvements observed in T4 ( $P < 0.001$ ). These results suggest that enzyme supplementation, particularly a cellulase/xylanase preparation (T4), may improve feed efficiency of growing-finishing pigs fed high DDG diets. Therefore, this enzyme mixture may represent a feasible strategy to increase the value of DDG in swine diets.

**Table 1.** Effect of different enzymes on the performance of 10 to 113 kg pigs fed a high-DDG feeding program.

	T1: Control	T2: Cellulase	T3: Xylanase	T4: Cell/Xyl	SEM	P Value
Pens	16	16	16	16		
Pigs	512	512	512	512		
Avg Start BW, kg	10.5	10.6	10.5	10.6	0.01	0.54
Avg 113D BW, kg	109.4	108.8	109.4	108.8	0.46	0.56
ADG, g/d	870	861	867	863	3.9	0.42
ADFI, g/d	2032 <sup>a</sup>	1994 <sup>b</sup>	1992 <sup>b</sup>	1978 <sup>b</sup>	11.3	0.01
G:F, kg/kg	0.428 <sup>a</sup>	0.432 <sup>b</sup>	0.435 <sup>bc</sup>	0.437 <sup>c</sup>	0.001	0.0001
Mortality, %	3.57	4.53	4.50	3.72	0.90	0.81

<sup>a,b</sup> Means in the same row with different superscripts differ ( $p < 0.05$ )**Keywords:** dried distillers' grain, enzyme, pig