171 Standardized total tract digestible phosphorus requirement of 6- to 13-kg pigs fed diets with or without phytase. Fangzhou Wu[1], Jason C. Woodworth[1], Mike D. Tokach[1], Steve S. Dritz[1], Joel M. DeRouchey[1], Robert D. Goodband[1], Jon R. Bergstrom[2], [1]*Kansas State University,* [2]*DSM Nutritional Products North America*

A total of 1,080 pigs (initially 5.9 kg) were used to determine the standardized-total-tract-digestible (STTD) P requirements in diets without and with 2,000 units of phytase. Pens (10 pigs/pen, 9 pens/treatment) were balanced for weights and allotted to 12 treatments in two 6-level dose-titrations.The STTD P levels were expressed as percentage of the NRC (2012) requirement (0.45 and 0.40% for phases 1 [d 0–11] and 2 [d 11–25], respectively) and were: 80, 90, 100, 110, 125, and 140% of NRC in diets without phytase and 100, 110, 125, 140, 155, and 170% of NRC in diets with 2,000 units of phytase (assuming 0.158% STTD P released). On d 25, radius samples from 1 gilt/pen were collected for bone ash analysis. Linear and quadratic responses to increasing STTD P were tested using GLIMMIX procedure of SAS and modeled separately for each dose-titration. Increasing STTD P increased ADG (quadratic, $P < 0.05$), G:F (linear, $P < 0.01$), and percentage bone ash (linear, $P < 0.01$) regardless of phytase addition (Table 1). Estimated STTD P requirement in diets without phytase was 117 and 91% of NRC for maximum ADG according to quadratic polynomial (QP) and broken-line linear (BLL) models, respectively, and ranged from 102 to > 140% of NRC for G:F using BLL, broken-line quadratic, and linear models. Estimated P requirement in diets containing phytase was 138% for ADG (QP) and was 147% (QP) and 116% (BLL) of NRC for G:F. Comparing diets containing the same STTD P levels, phytase increased ($P < 0.01$) ADG and G:F. In conclusion, estimated P requirements varied depending on the response criteria and statistical models. Phytase promoted pig growth and improved the P dose responses for ADG and G:F.

Table 1. Effects of standardized total tract digestible (STTD) P and phytase on growth performance and percentage bone ash

	ADG, g	G:F, g/kg	Bone ash, %
STTD P, no phytase[1]			
80%	239	704	43.3
90%	263	727	44.8
100%	267	752	45.3
110%	270	746	47.2
125%	263	755	48.9
140%	265	769	48.7
STTD P, with 2,000 phytase units[1]			
100%	286	762	45.5
110%	297	777	45.9
125%	296	785	48.5
140%	305	796	49.3
155%	301	786	50.2
170%	291	786	50.6
SEM	14	11.6	0.84

[1] The STTD P levels were expressed as percentage of the NRC (2012) requirement estimates (0.45 and 0.40% for phases 1 and 2, respectively)

Key words: nursery pigs, phosphorus, phytase