

Microbial Phytase Inclusion Improves Phosphorus Digestibility from Flaxseed Meal for Pigs

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Of all of the ingredients used in swine nutrition, flaxseed meal (FSM) contains one of the highest levels of phosphorus (P) at 0.875% of DM. As with many other oilseed meals and plant ingredients, much of the P (~70%) is unavailable to monogastric animals due to the presence of phytic acid. P is an expensive nutrient and it is thus important in terms of least cost formulation to improve the availability of P for intestinal absorption. Reducing P excretion by improving digestibility also reduces the environmental footprint of swine production.

This experiment was conducted with the objective of determining the effects of including microbial phytase (Phyzyme XP 5000G; EC 3.1.3.26, Danisco Animal Nutrition, Marlborough, UK) on P digestibility and excretion in FSM fed pigs. A total of 5 treatment groups, each with 8 barrows (45 kg initial weight) were randomly assigned to a semi-synthetic diet containing 30% FSM and increasing levels of exogenous phytase. Diets were composed of pea-starch, dextrose, powdered cellulose (Solka-Floc), canola oil, vitamin/mineral premix (0.09% P) and FSM. The 5 levels of phytase inclusion were 0, 575, 1185, 2400 and 2570 FTU/kg diet. Increasing exogenous phytase from 0 to 2570 FTU/kg improved apparent digestibility of P significantly from 21% to 61% ($P < 0.0001$) and P excretion decreased from 2940 to 1450 mg/kg DM intake ($P < 0.0001$). Inclusion of 575 FTU accounted for half of this increase in digestibility (20%), and reduced excretion by 850 mg/kg DM intake. Analysis of the basal diet containing no added exogenous phytase showed an endogenous phytase activity level of 127 FTU/kg diet, which indicates that FSM has a phytase activity of 423 FTU/kg.

Implications: Inclusion of microbial phytase in swine diets containing 30% flaxseed meal significantly improves the apparent digestibility of P and in turn reduces total P excretion into the environment. Inclusion of 575 FTU/kg diet phytase accounted for half of the improvement in P digestibility.