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Phytase supplementation to sorghum-soybean meal-based diets for growing pigs

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Introduction

The phosphorus content in the cereals is almost all in the form of phytate, but phytase supplementation can release the P and to diminish the inorganic supplementation of this element . Since proteins in cereals also interact with phytates, the supplementation of phytase would be expected to enhance protein digestibility and animal behavior as well. Thus, two experiments were conducted to assess the efficacy of supplementing a phytase to sorghum-based diets on the apparent ileal digestibility (AID) of crude protein (CP) and amino acids (AA) and performance of growing pigs.

Experiment 1. Protein and Amino Acid Digestibility

- Ten pigs (av. BW 40.6 kg) adapted with a simple T-cannula at the distal ileum
- Five sorghum-soybean diets
  1: Positive control (PC) sorghum-soybean meal, plus inorganic P
  2: Negative control (NC) sorghum-soybean meal, no inorganic P.
  3, 4, and 5: NC diet plus 250, 500, and 1000 FTU/kg diet, respectively.
- All diets added with vitamins and trace minerals
- Chromic oxide added as a digestibility marker
- Repeated 5x5 Latin square design:

Apparent Ileal Digestibility values (%) for Crude Protein and Amino Acids

	Positive Control	Negative Control	Phytase Suplementation (FTU/kg)		
			250	500	1000
Crude protein	80.9	80.7	81.5	80.5	81.3
Arginine	89.5	88.8	88.9	89.1	89.1
Histidine	83.6	82.8	83.0	82.6	83.0
Isoleucine	82.6	82.2	82.2	81.4	82.6
Leucine	82.6	82.5	82.6	81.9	82.7
Lysine	85.4	85.2	86.0	85.3	85.8
Methionine	76.5	75.8	76.7	76.9	80.0
Phenylalanine	82.6	82.6	82.8	82.2	83.2
Threonine	76.2	75.8	76.2	75.4	76.7
Valine	78.9	78.4	78.5	77.3	78.6

- There was no effect of phytase supplementation on the apparent ileal digestibility of protein and amino acids

Experiment 2. Performance of growing pigs

- 30 pigs (av. BW 22.9kg) fed with same five diets from experiment 1
- Randomized complete block design.
- Daily gain (ADG), feed intake (FI) and feed/gain (FC) were evaluated.

Performance of growing pigs

	Positive Control	Negative Control	Phytase Suplementation (FTU/kg)		
			250	500	1000
Weight gain, g/d [a]	870	460	840	820	860
Feed intake, kg/d [a]	1.78	1.39	1.75	1.71	1.78
Feed /gain [a]	2.05	3.01	2.09	2.13	2.12

[a] PC vs. NC: P<0.05
[b] Phytase vs. PC: P<0.05

- Feed intake was higher, and FC was better in pigs fed the PC diet, as compared with the NC diet.
- Pigs supplemented with the phytase, at any level, had higher ADG, FI, and better FC than pigs fed the NC diet.
- There was no difference between pigs fed the PC or the phytase supplemented diets.

Conclusion

Phytase supplementation to sorghum-based diets did not affect the digestibility of crude protein and amino acids, but improved the performance of growing pigs with no dietary supplemental inorganic phosphorus.