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STAFAC® (VIRGINIAMYCIN) Improves Phosphorus and Other Mineral Digestibility in Pigs [1]

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Introduction and Objective

Antibiotics have been an integral part of animal production for 5-6 decades. A recent survey (1) stated that 88% of production units surveyed used in-feed antimicrobials. Evaluations of the nutritional impact of antibiotics have primarily centered on effects related to digestibility of protein and energy because these items constitute the greatest physical and economic portion of diets. Given that more total dietary expense exists for P than any other mineral in grow/finish diets and that P is an issue in waste management, we evaluated the impact of 10 grams/ton Stafac® on the digestibility of P and other minerals in pigs.

Materials and Methods

Barrows (Y x L) were selected, fed a common diet to standardize gut conditions, then fed a corn-soybean meal basal diet for at least 10 days that met all requirement estimates (2) with the exception of P. Ten pigs were then selected, blocked by sire, allotted to diet (basal diet plus 0 or 10 g/ton Stafac®), and placed in metabolism crates for a 7-d adaptation and 5-d collection period. While in the crates, pigs were fed at 3% of BW. Diets were fed in a gruel form in two daily meals. Water was supplied ad libitum at non-feeding times. The beginning and end of the collection phase was marked by the addition of indigo blue dye to the diet. Following the initial collection phase, pigs were switched to the alternate diet and moved to group pens for a 3-d respite from the metabolism crates. Pigs were then moved back into the metabolism crates for a repeat of the adaptation/collection procedure.

Results and Discussion

Animal condition and feed intake was good. Orts were obtained only during the initial 2-3 days of the adaptation periods but did not occur during the collection periods. During the collection period, growth (1.03 vs 1.14 kg/d) and feed/gain (F/G; 2.34 vs 2.01) were excellent for pigs fed the control and Stafac® diets, respectively.

Stafac® supplementation clearly improved digestibility (Table 1). Both energy and DM digestibility were increased, confirming the gross improvement in F/G observed during the collection period. While digestibility values only represent net disappearance of a nutrient from the gut and not its utilization, the numerical improvement in growth (which was responsible for the numerical improvement in F/G) would suggest an actual improvement in utilization of absorbed nutrients. There was no statistical improvement in N digestibility even though the magnitude of increase was similar to that for energy.

An improvement in P digestibility ($P < 0.01$, Table 1) from 30.37% to 38.81% - an absolute improvement of 8.44% (or 28% on a relative basis) with Stafac® supplementation was observed. Stafac® is known to have excellent antimicrobial activity against gram-positive bacteria. Because there was no supplemental P source, the improvements noted herein represent an increase in the utilization of phytate P that is presumably associated with alterations in gut microflora, their collective metabolism, and, consequently, nutrient availability to the host animal. Also associated with this improvement in P digestibility were improvements in Ca, Mg, and Zn digestibility.

Table 1. Effect of Stafac® on digestibility (%) and mineral excretion during the collection [a]

Response	Control	Stafac®	Change in Fecal Excretion, %
Dry matter	88.99	89.93*	
Energy	88.28	89.12†	
Nitrogen	88.69	89.35	-5.8
Calcium	51.51	57.32**	-12.0
Phosphorus	30.37	38.81**	-12.1
Magnesium	55.09	58.15*	-6.8
Potassium	85.48	85.38	0.7
Zinc	23.62	27.54**	-5.1
Iron	23.22	23.38	-0.2
Copper	16.27	17.87	-1.9
Manganese	47.79	46.24	3.0

[a] Statistical difference is denoted by: †, $P \leq 0.10$; *, $P \leq 0.05$; **, $P \leq 0.01$.

An absolute improvement of 8% in P digestibility would save 840 lbs of dicalcium phosphate in a single turn of a 1000 head finishing barn when diets are formulated on an available P basis. The displaced P supplement would pay a

[1] Stafac is a registered trademark of Phibro Animal Health for virginiamycin.

portion of the cost of the Stafac®. Finally, there would be a reduction in P excretion. Based on this example, there would be 155 lbs of P not going into the diet and not being excreted in the waste with each turn of the building.

References

1. NAHMS (National Animal Health Monitoring System). 2002. USDA:APHIS Pp. 51-54.
2. NRC. 1998. Nutrient Requirements of Swine (10th Ed.).