# RESEARCH ABSTRACT

## ENVIRONMENT

**REVISED**

**Title:** Mass balance of nutrients for the finishing phase as affected by dietary manipulation
**NPB #07-134**

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**Scientific Abstract**

Eighty eight crossbred (D x (L x Y)) pigs (32 to 114 kg BW) were used to evaluate the effects of reducing dietary CP, Ca, and P with the additions of phytase and organic trace minerals on nutrient excretion during a 94-d finishing period. Pigs were stratified by sex, weight, ancestry and randomly allotted to 1 of 2 dietary treatments. Pigs were housed in an environmentally-controlled building with 4 identical rooms. Each room contained a shallow pit, pull plug system (22 pigs/room, 2 rooms/trt). Dietary treatments were fed in 4 dietary phases and consisted of a fortified corn-soybean meal diet and a Reduced Excretion (REx) diet. The REx diet had a 3% units decrease in CP with Lys, Thr, Met, and Trp added as needed and a reduction in available phosphorus of 0.10% with phytase inclusion. Also, in the REx diet, monocalcium P replaced dicalcium P and CaCl replaced 50% of the limestone in the control diet. Furthermore, organic sources of Fe, Zn, and Cu replaced inorganic sources of these minerals in the control diet. All diets within phase were formulated on a SID lysine basis (0.92, 0.79, 0.65, and 0.56% for Phases 1 to 4). Feed and slurry samples were collected weekly along with pig weights, feed intake, pit volume, and pH of slurry. Diet did not affect ($P < 0.10$) ADG (822 vs. 839 g), ADFI (2.27 vs. 2.28 kg), or F:G (2.74 vs. 2.73). Daily DM intakes were similar ($P > 0.10$), but N (57.8 vs. 47.4 g/d) and P (11.1 vs. 8.6 g/d) intakes were reduced ($P < 0.05$) for pigs fed REx. Initial and final whole body compositions were similar ($P > 0.05$) for both dietary treatments. Slurry volume and temperature were similar ($P > 0.05$) for pigs fed both dietary treatments; however, slurry pH was reduced (7.4 vs. 6.8; $P < 0.05$) for pigs fed REx. Slurry DM concentration was similar ($P > 0.05$), but slurry N, P, Ca, K, Mg, and Fe were reduced ($P < 0.08$) with REx. The daily excretion of DM, N, P, Ca, K, Mg, S, and Fe was reduced ($P < 0.08$) for pigs fed REx compared to those fed the control. Daily N and P excretion were reduced by 28 and 37%, respectively, for pigs fed REx. Furthermore, ammonia emissions were reduced ($P < 0.01$) 47% for pigs fed REx. Mass balance calculations revealed that a greater ($P < 0.05$) proportion of N, P, Ca, K, Mg, S, Fe, Zn, and Cu that entered the finisher exited via the market pig for those fed REx. These results suggest the dietary manipulations employed in this study markedly reduced nutrient excretion and shifted the proportion of nutrients exiting the finisher into the market pig. This project was funded by the National Pork Checkoff.