Title: Improving pig performance and economic return by the application of ultra-high doses of phytase in finishing pigs – NPB #17-106

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Revised

Scientific Abstract:
The objective of the current study was to determine the impact of fat and ultra-high inclusion levels of phytase on growth rate, carcass characteristics, and pig viability. A total of 2,150 gilts and barrows (31.4 ± 0.4 kg; Camborough derivative sows x TR-4 sire) were randomly allotted to 6 dietary treatments within sex and initial body weight blocks. Treatments included a control diet (500 FTU/kg of phytase) with no supplemental fat, the control diet with 3,000, 4,500, or 6,000 FTU/kg of additional phytase, the control diet with 4% choice white grease (CWG), and the 4% CWG diet with 3,000 FTU/kg of phytase. Diet phases were: 31 to 50, 50 to 73, 73 to 95, 95 to 113 kg, and 113 until all pigs had been marketed (4 marketing cuts; target market weight was 130 kg). Pigs fed supplemental fat were 2.3 kg heavier at the end of the study, had lower feed intake (4.4%) and improved feed efficiency (7.2%) compared to control pigs (P < 0.05). Similarly, hot carcass weight, carcass ADG, and carcass F:G were improved (P < 0.05) with the addition of fat to the diet. Supplementation of phytase (3,000 FTU/kg) to the fat-supplemented diet did not improve whole body or carcass performance parameters. Phytase mega-dosing improved whole body F:G (2.75, 2.72, 2.68, and 2.65 for 0, 3,000, 4,500, and 6,000 FTU/kg of phytase respectively; P < 0.001) and tended to improve carcass F:G (P = 0.076) in a linear manner. The largest improvement in F:G with phytase supplementation occurred during the 95 to 115 kg feeding period (3.76, 3.67, 3.48, and 3.41 for 0, 3,000, 4,500, and 6,000 FTU/kg of phytase respectively; P < 0.001) and this was also the case with fat supplementation (3.76 vs. 3.22 for control vs. fat-added). Fat supplementation increased backfat depth and decreased lean percent (P < 0.001). On the other hand, phytase supplementation linearly decreased backfat depth (P < 0.02) and increased (P < 0.03) lean percent. Phytase linearly decreased the percent of full value pigs (P < 0.03). The results of the present study suggest that a targeted application of phytase may be more cost-effective than continuous administration. The reduction in full value pigs (as a result of increased mortality and more light, cull pigs) with phytase supplementation needs to be further evaluated as this effect has not been observed in previous studies.