

Effects of higher doses of microbial phytase on performance and bone ash in broilers fed moderately deficient non-phytate phosphorus using corn-soybean meal-based diets

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A 41-d floor pen experiment was conducted to evaluate the effects of supplementing higher doses (up to 3 times the standard dose of 500U) of phytase (CIBENZA® PHYTAVERSE®, Novus International, Inc.) in broiler chicks fed non-phytate phosphorus (NPP) deficient corn-SBM based diets. A total of 1584 Ross 308 male broiler chicks were assigned to 6 treatments with 12 pens/treatment and 22 chicks/pen. Treatments consisted of T1 with reduced levels of NPP and no added phytase (Neg Ctrl, NC); T2 to T5 with 500, 750, 1000 and 1500U of phytase/kg diet added to T1, respectively; T6 with industry levels of NPP (Pos Ctrl, PC). For starter, grower and finisher diets, the PC NPP levels were maintained at 0.48, 0.45 and 0.42%, respectively, and PC Ca levels at 0.93, 0.86 and 0.80%, respectively. The NC NPP and Ca for all three phases was reduced by 0.20% and 0.15%, respectively, from the PC. The study was carried out as RCBD and the data were analyzed using 1-way ANOVA. Significance was tested at $P \leq 0.05$. D27 results indicated that NC had reduced ($P \leq 0.05$) gain (1.37 vs. 1.62 kg/bird), and FI (1.83 vs. 2.14 kg/bird) but not FCR (1.335 vs. 1.322; $P \geq 0.05$) compared to PC. Adding phytase at 500U or more improved gain and FCR over NC ($P < 0.05$) and comparable ($P > 0.05$) to or better ($P < 0.05$) than the PC. Only the group fed 1500U had higher ($P < 0.05$) gain (56g more) along with a 2.3-point improvement ($P < 0.05$) in FCR compared to PC. D41 results indicated that the NC had reduced ($P \leq 0.05$) gain (2.84 vs. 3.26 kg/bird), FI (4.30 vs. 4.87 kg/bird), FCR (1.513 vs. 1.495), mortality (4.93 vs. 1.44%) and % ash (44.84 vs. 46.61) compared to PC. The responses for gain, FI and FCR were similar ($P \geq 0.05$) for all other doses including PC, and higher ($P \leq 0.05$) compared to NC suggesting 500U/kg diet could compensate for the deficiency caused by the NPP reduction. For mortality and % ash, 750U and higher were different from NC ($P < 0.05$) suggesting the need for higher doses beyond 500U to compensate the deficiency of 0.2% NPP. In conclusion, a) up to 27 days, 1500U not only compensated 0.2% NPP reduction but also improved gain and FCR beyond PC; and b) up to 41 days, though 500U was enough to improve gain and FCR, 750U and above were needed for % ash and mortality improvements beyond NC and comparable to PC.

KEYWORDS

Phytase, Broiler, Bone ash