

Effects of higher doses of microbial phytase on performance, bone ash, and incidence of woody breast in broilers fed non-phytate phosphorus markedly deficient corn-soybean meal-based diets

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Abstract

A 44d floor pen experiment was conducted to evaluate the effects of supplementing higher doses (up to 4 times the standard dose of 500 U/kg) of phytase (CIBENZA® PHYTAVERSE® enzyme feed additive) 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 (Negative Control, NC); T2 to T5 with 500, 1000, 1500 and 2000U of phytase/kg diet added to T1, respectively; T6 with industry levels of npp (Positive Control, PC). For starter, grower and finisher diets, the PC npp levels (analyzed) were maintained at 0.48 (0.48)%, 0.45 (0.39)% and 0.42 (0.34)%, respectively, and PC Ca levels at 0.78%, 0.86% and 0.80%, respectively. The NC npp for all three phases was reduced by 0.24% from the PC. The NC Ca for the starter phase was maintained at the same level as the PC. For grower and finisher phases, the NC Ca levels were reduced by 0.15% from the PC. All treatments diets within each phase were isocaloric and isonitrogenous. The analyzed starter, grower, and finisher npp (phytate P) values for T1-T5 (basal) were 0.25 (0.25)%, 0.15 (0.27)%, and 0.15 (0.25) %, respectively. The study was carried out as RCBD and the data were analyzed using 1-way ANOVA. Significance was tested at $P \leq 0.05$. Birds in NC were terminated at day 22 due to welfare. At d 40, significant treatment effects were observed for cumulative gain, feed intake (FI), mortality, grams of ash/tibia and woody breast incidence (d 44). T2 had reduced ($P \leq 0.05$) gain (2.88 vs. 3.05 kg/bird), FI (4.28 vs. 4.5 kg/bird) and g of ash/tibia (3.02 vs. 3.47%) compared to T6. The responses for gain, FI and ash were similar ($P \geq 0.05$) for all other doses including PC, and higher ($P \leq 0.05$) compared to T2 suggesting 500U/kg diet could not compensate for the deficiency caused by the npp reduction. The mortality was higher for T2 (7.7%), T3 (8.0%) and T4 (6.8%) compared to T6 (2.7%) ($P \leq 0.05$), while T5 (4.2%) was not different ($P \geq 0.05$) from T6 or other treatments. On d 44, T5 had a 15-percentage point improvement in incidence of WB (score 0+1; less severe) compared to T6 (PC) ($P \leq 0.05$) while the response was not different for all other doses (T2 to T4) compared to T6 ($P \geq 0.05$). The response for gain, FI and ash plateaued after 1000 U/kg (Quadratic, $P \leq 0.05$). In conclusion, supplementing 1000 and 1500U/kg diet from d 0 alleviated the effects resulting from the 0.24% npp reduction as seen by improved performance and ash that were similar to the PC but supplementing 2000 U/kg further added value by reducing severity of WB incidences compared to the PC.

KEYWORDS

Phytase, Broiler, Woody Breast