

Effect of Phytase Supplementation on Growth Performance, Bone Mineralization, and Fecal Phosphorus Excretion in broilers fed Phosphorus Deficient Diet

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Corn-soybean based broiler diets are rich in phytic acid (Py). The presence of Py is known to lower the phosphorus (P) availability in animal feed. As a result, P is released to the environment with birds' excreta. Microbial phytase (MP) supplementation in broiler diets enhances the P availability. This study was conducted to investigate the effect of MP (Natuphos® E) extracted from *Aspergillus* on growth performance, bone mineralization and P excretion of broilers. A total of 810 day-old (Indian River) male chicks were randomly allotted into 3 dietary treatments; (1) control group (CON) fed with P sufficient diet without MP, (2) P deficient diet with 0.01% MP and (3) P deficient diet with 0.02% MP in a completely randomized design. Diets were formulated based on nutrition specifications for Indian River. Each dietary group consisted of six replicates. On day 35, final body weights were measured and excreta were collected. Tibia bone samples were collected and analyzed. Broilers fed a diet with 0.02% MP showed the highest daily weight gain (54.22 g), daily feed intake (86.43 g) and 0.01% showed the highest feed conversion efficiency (1.51) compared to the CON ($p < 0.05$). Broilers fed a diet with MP showed the highest (0.01%-4.91%; 0.02%-4.39%) tibia P level compared to the CON (3.55%) ($p < 0.05$). Fecal P excretion was lower in broilers fed a diet with MP compared with CON (72.44%) ($p < 0.05$). The lowest (14.09%) P excretion was observed in broilers fed the diet with 0.02% MP compared to those fed a diet with 0.01% MP (38.22%) ($p < 0.05$). Tibia P level showed a strong negative correlation ($r = 0.829$; $p < 0.01$) with P excretion. In conclusion, broilers fed a diet with MP enhanced the P retention that supported the growth performance, and tibia bone development. The results of this study suggested that the supplementation of 0.02% MP in P deficient broiler diets could replace Dicalcium phosphate usage for improved growth performance and P retention of broilers.

Keywords: Dicalcium phosphorus, Fecal phosphorus, Microbial phytase, Phosphorus excretion, Tibia phosphorus