Effects of Copper Source on Phosphorus Retention in Broiler Chicks and Laying Hens


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ABSTRACT Copper sulfate is often added to broiler and laying hen diets at prophylactic dosages due to its antimicrobial and growth promoting effects despite reduced P digestibility, whereas P use from other Cu sources is unknown. Therefore, male broiler chicks were fed diets containing 0 or 250 ppm Cu from Cu sulfate (Cu SUL), Cu citrate (Cu CIT), Cu lysinate (Cu LYS), or CuCl from 9 to 22 d of age (8 cages/diet, 6 birds/cage) to determine the effect of each Cu source on performance characteristics, bone mineralization, and P retention. Body weight gain was not different among treatments ($P > 0.05$). Supplementation with 250 ppm Cu from Cu LYS resulted in chicks having greater toe and tibia ash weights as compared with chicks fed Cu SUL ($P \leq 0.05$) but was not significantly different from those of birds fed Cu CL, Cu CIT, and 0 ppm Cu diets. Supplementation with Cu LYS resulted in birds with greater toe ash percentage as compared with birds fed Cu CIT, Cu SUL, and the 0 ppm Cu diets ($P \leq 0.05$) but was not significantly different than those of birds fed the CuCl diet. Birds fed the Cu LYS diet had greater tibia ash percentage as compared with birds fed Cu SUL and 0 ppm Cu diets ($P \leq 0.05$) but were not significantly different than birds fed the Cu CL or Cu CIT diet. Supplementation with 250 ppm Cu SUL or Cu CIT reduced apparent P retention by 0.029 and 0.053 percentage-units of the diet, respectively ($P \leq 0.05$) as compared with the 0 ppm diet; whereas the apparent P retention when 250 ppm Cu LYS or Cu CL was fed was not different from the 0 ppm Cu diet ($P > 0.05$). Feeding of different Cu sources in a subsequent experiment had no influence on P retention in laying hens ($P > 0.05$). In conclusion, supplementation with 250 ppm Cu from Cu CIT or Cu SUL resulted in decreased apparent P retention. Supplementation with 250 ppm Cu CL or Cu LYS, however, improved apparent P retentions as compared with Cu CIT or Cu SUL.

(Key words: broiler, copper source, laying hen, phosphorus)

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