Effects of Dietary Supplementation with Copper Sulfate or Tribasic Copper Chloride on Broiler Performance, Relative Copper Bioavailability, and Oxidation Stability of Vitamin E in Feed


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ABSTRACT An experiment was conducted using a total of 420, 1-d-old, Arbor Acres commercial male chicks to compare copper sulfate and tribasic copper chloride (TBCC) as sources of supplemental copper for broilers. Chicks were randomly allotted to 1 of 7 treatments for 6 replicates of 10 birds each and were fed a basal corn-soybean meal diet (11.45 mg/kg copper) supplemented with 0, 150, 300, or 450 mg/kg copper from copper sulfate or TBCC for 21 d. Chicks fed 450 mg/kg copper as copper sulfate had lower (P < 0.01) average daily feed intake and average daily gain than those consuming other diets. Feeding supplemental copper increased linearly (P < 0.0001) liver copper concentrations regardless of copper source. The slopes of regressions of log_{10} liver copper concentration on added copper intake resulted in a slope ratio estimate of 109.0 ± 3.4% (with a 95% confidence interval from 102.2 to 115.8) for bioavailability of copper from TBCC compared with 100 for that in copper sulfate. When the feeds were stored at room temperature for 10 or 21 d, the vitamin E content in the feed fortified with 300 mg/kg copper as TBCC was higher (P < 0.01) than that in the feed added with 300 mg/kg copper as CuSO_{4}. The vitamin E contents in liver and plasma of broilers given TBCC were also higher (P < 0.01) than those of birds fed copper sulfate. The results from this study indicate that TBCC is a safer product and more available to broilers than copper sulfate, and it is chemically less active than copper sulfate in promoting the oxidation of vitamin E in feed.

(Key words: copper, bioavailability, oxidation of vitamin E, liver, performance)

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