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Influence of Copper-Methionine on Hematological and Biochemical Changes and Ascites Incidence in Cold-Stressed Broilers

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Abstract : The present study aimed to investigate the effects of copper-methionine on ascites incidence and hematological, morphological and enzymatic responses in broiler chickens. A total of 480 one-day-old Ross 308 broiler chicks were used in a completely randomized design in a 2×3 factorial arrangement of treatments including two ambient temperatures (thermoneutral and cold stress) and three copper levels (0, 100, and 200 mg/kg as copper-methionine) with 4 replicates (20 birds in each replicate). Broilers were kept in an environmentally-controlled room from 1 to 28 days; then, half of them exposed to cold temperature from 28 to 45 days of age. The birds were sacrificed at days 38 and 45 of age. Heparinized blood samples were collected to measure hematocrit, hemoglobin concentration, red blood cell (RBC) count, alanine aminotransferase (ALT) and aspartate aminotransferase (AST). Heart, lungs, liver, and spleen were collected and weighed separately on a sensitive digital scale. At d 38 of age, none of hematological variables, enzymatic parameters, and relative weights of organs were affected by treatments. Ascitic broilers were observed in group subjected to cold temperature and control diet (without supplemental copper) at d 45 of age. Relative weight of lungs and relative weight of heart in broilers fed on copper-methionine supplemented diets in cold temperature were lower compared with other groups. Relative liver weight, ALT, AST activities, and hematological parameters such as hematocrit, hemoglobin concentration, red blood cell count in ascitic broilers were significantly increased. In contrast, a significant decrease of the relative weight of spleen was shown in these chickens. The results showed that dietary supplementation with copper–methionine can decrease probability of ascites incidence in broilers chicks, especially under cold condition.

Keywords : ascites, cold temperature, copper-methionine, cold-stressed broiler
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