INFLUENCE OF TRACE MINERAL SOURCE ON INFLAMMATORY RESPONSE IN CHICKENS

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Abstract:

In Experiment 1, 216 hens with or without Salmonella typhymurium lipopolysaccharide (LPS) challenge were fed one of three diets: basal containing 32 mg Zn/kg (CON); basal plus 60 mg Zn/kg from ZnSO4 (ZnSO4); basal plus 60 mg Zn/kg from Zn amino acid complex (ZnAA). In Experiment 2, 450 one-d-old broilers were fed one of nine diets supplemented with: 40 mg Zn/kg as ZnSO4 or ZnO and inorganic Zn source replaced with 25, 50, 75 or 100% Zn from Zn amino acid complex. In Experiment 1, fever response of hens fed ZnAA peaked and subsided earlier than in hens fed ZnSO4 or CON. Serum IL-1β was 81.07 vs. 72.60 pg/100 μl (p<0.01) at 3 h and 50.83 vs. 64.03 pg/100 μl (p<0.001) at 12 h post-challenge in hens fed ZnAA vs ZnSO4, respectively. Birds challenged with LPS had more Zn sequestered in liver and spleen (p<0.001). Metallothionein concentration of LPS-challenged birds fed ZnAA was greater (p<0.001) than for birds fed ZnSO4 (140.65 vs 83.52, hepatic; 38.66 vs 26.03 nmol/g, splenic). In Experiment 2, broilers fed ZnAA diets had increased (p<0.05) lymphocyte counts and decreased heterophil:lymphocyte. Broilers fed ZnAA diets had increased (p<0.01) Newcastle antibody titers d 19, infectious bronchitis vaccine antibody titers d 6 and 12, and infectious bursal disease vaccine antibody titers d 12 post-administration. Broilers fed ZnAA diets had greater (p<0.0002) secondary reaction responses of both total antibody and immunoglobulin Y titers. Results suggest dietary supplementation with Zn amino acid complex improved immune response and Zn retention.

Key Word:

Minerals