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Influence of Elevated Zn on the Hematology, Serum Biochemistry and Productive Indicators in Laying Hens

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Abstract: Zinc is a common trace element and it plays a key role in living organisms. However, high zinc dose can be toxic. The aim of this study was to investigate the effect of high zinc doses on productive and biochemical parameters of laying hens and zinc accumulation patterns in various organs and tissues. The control group (group 1, n=30) and four experimental groups (10 animals each) were formed according to the random sample principle. For 30 days, the chickens of the experimental groups were administered 5 ml of an aqueous solution of zinc sulfate once a day. The total zinc dose to chickens with food and water was 250 mg $kg^{-1}$of feed (group 2), 500 mg kg^{-1} (group 3), 1000 mg kg^{-1} (group 4), and 1500 mg kg^{-1} (group 5). The living mass of chickens, egg production, hematologic and biochemical parameters of blood, zinc content in muscles, bones, feathers, liver, kidneys were determined. A dose of 1000 mg kg^{-1} and 1500 mg kg^{-1} zinc resulted in increased chick mortality, reduced body weight and egg production, as well as numerous pathological changes in organs and tissues. It was shown that zinc accumulation in the liver and kidneys was expressed to significantly greater degree than in muscle, bone and feather. In conclusion, a critical threshold zinc dose was set (1000 mg kg^{-1}) at which there is a sharp increase in its accumulation (10 times) in the poultry liver. The intake of elevated zinc doses decreased the total protein, bilirubin, creatinine as well as increased the concentration of hemoglobin and serum AST.

Keywords: Poultry, Zinc, Productivity, Blood biochemistry, Survivability, RODONIT cross