

Combined Effect of Zinc Supplementation and *Ascaridia galli* Infection on Oxidative Status in Broiler Chicks

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Abstract : Ascariidiasis in chicks is one of the major causes for the reduction in body weights, higher mortality, and reduction in egg production, worse meat quantity, pathological lesions, blood losses, and secondary infections. It is responsible for economic losses to the poultry. Despite being economically important parasite, little work has been carried out on the role of antioxidants in the pathogenesis of ascariidiasis. Zinc is a trace elements with multiple functions and one of them is its antioxidant ability. The aim of this study was to investigate the combined effect of organic zinc compound (2Gly.ZnCl₂·2H₂O) and *Ascaridia galli* infection on the antioxidant status of broiler chicks. The activity of antioxidant enzymes superoxide dismutase, glutathione peroxidase, the level of lipid peroxidation, expressed by malonyl dialdehyde and plasma zinc in chicks experimentally infected with *Ascaridia galli* was investigated. Parasite burden was studied as well. The study was performed on 80 broiler chicks, Cobb 500 hybrids. They were divided into four groups - 1st group - control (non-treated and non-infected, 2nd group - infected with embryonated eggs of *A. galli* and without treatment, 3rd group- only treated with 2Gly.ZnCl₂·2H₂O compound and gr. 4 - infected and supplemented with Zn-compound. The chicks in gr. 2 and 4 were infected orally with 450 embryonated eggs of *A.galli* on day 14 post infection. The chicks from gr. 3 and 4 received 40 mg Zn compound /kg of feed after the 1st week of age during 10 days. All chicks were similarly fed, managed and killed at 60 day p.i. Helminthological, biochemical and statistical methods were applied. Reduced plasma Zn content was observed in the infected chicks compared to controls. Zinc supplementation did not restored the lower Zn content. Cu, Zn-SOD was decreased significantly in the infected chicks compared to controls. The GPx - activity was significantly increased in the infected chicks than the controls. Increased GPx activity together with decreased Cu/ZnSOD activity revealed unbalanced antioxidant defense capacity. The increased MDA level in chicks and changes in the activity of the enzymes showed a development of oxidative stress during the infection with *A.galli*. Zn compound supplementation has been shown to influence the activity of both antioxidant enzymes (SOD, GPx) and reduced MDA in the infected chicks. Organic zinc supplementation improved the antioxidant defense and protect hosts from oxidant destruction, but without any effect on the parasite burden. The number of helminths was similar in both groups. Zn supplementation did not changed the number of parasites. Administration of oral 2Gly.ZnCl₂·2H₂O compound has been shown to be useful in chicks infected with *A. galli* by its improvement of their antioxidant potential.

Keywords : *Ascaridia galli*, antioxidants, broiler chicks, zinc supplementation

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