

Biosynthesized Selenium Nanoparticles to Rescue Coccidiosis-mediated Oxidative Stress, Apoptosis and Inflammation in the Jejunum Of Mice

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Abstract : One of the most crucial approaches for treating human diseases, particularly parasite infections, is nanomedicine. One of the most significant protozoan diseases that impact farm and domestic animals is coccidiosis. While, amprolium is one of the traditional anticoccidial medication, the advent of drug-resistant strains of *Eimeria* necessitates the development of novel treatments. The goal of the current investigation was to determine whether biosynthesized selenium nanoparticles (Bio-SeNPs) using *Azadirachta indica* leaves extract might treat mice with *Eimeria papillata* infection in the jejunal tissue. Five groups of seven mice each were used, as follows: Group 1: Non-infected-non-treated (negative control). Group 2: Non-infected treated group with Bio-SeNPs (0.5 mg/kg of body weight). Groups 3-5 were orally inoculated with 1×10^3 sporulated oocysts of *E. papillata*. Group 3: Infected-non-treated (positive control). Group 4: Infected and treated group with Bio-SeNPs (0.5 mg/kg). Group 5: Infected and treated group with the Amprolium. Groups 4 and 5 daily received oral administration (for 5 days) of Bio-SeNPs and anticoccidial medication, respectively, after infection. Bio-SeNPs caused a considerable reduction in oocyst output in mice feces (97.21%). This was also accompanied by a significant reduction in the number of developmental parasitic stages in the jejunal tissues. Glutathione reduced (GSH), glutathione peroxidase (GPx), and superoxide dismutase (SOD) levels were dramatically reduced by the *Eimeria* parasite, whereas, nitric oxide (NO) and malonaldehyde (MDA) levels were markedly elevated. The amount of goblet cells and MUC2 gene expression were used as apoptotic indicators, and both were considerably downregulated by infection. However, infection markedly increased the expression of inflammatory cytokines (IL-6 and TNF- α) and the apoptotic genes (Caspase-3 and BCL2). Bio-SeNPs were administrated to mice to drastically lower body weight, oxidative stress, and inflammatory and apoptotic indicators in the jejunal tissue. Our research thus showed the involvement of Bio-SeNPs in protecting mice with *E. papillata* infections against jejunal damage.

Keywords : coccidiosis, nanoparticles, *azadirachta indica*, oxidative stress

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