

## Abstract

Zinc oxide nanoparticles (ZnO-NPs) supplementation to Tilapia fish as feed can be effective toward health improvement, the enhancement of immune response and hematology in fish as it has emerged as a potential replacement for conventional (inorganic) zinc sources for fish. This study analyzed the response of Nile Tilapia, *Oreochromis niloticus* fingerlings after its diet supplementation with chemically synthesized ZnO-NPs and zinc acetate under standards conditions. ZnO-NPs characterization was done by UV visible spectroscopy and FTIR. Fingerlings with an average body weight of  $06.15 \pm 1.24$  g were randomly distributed into five groups. An eight-week trial was set with a control and five experimental groups. Basal diet (D1) was utilized as control, while D2, D3, and D4 experimental diets were comprising of 20, 40, and 60 mg kg<sup>-1</sup> ZnO-NPs supplementation respectively. Furthermore, D5 consists of basal diet supplemented with 60 mgkg<sup>-1</sup> of zinc acetate. Significant improvement ( $P < 0.05$ ) was found for 40mgkg<sup>-1</sup> Zn-NPs supplemented diet (D3) as compared to the other diet groups in terms oxidative status (CAT, SOD, glutathione's transferase, and malondialdehyde), hematological indices (Hb, WBCs, RBCs, HCT MCV, MCH, and MCHC) and immunological and biochemical parameters (IgM, lysozyme activity, phagocytic activity, cholesterol level, glucose content, and total serum protein level). Hence, basal diet supplemented with 40 mg/kg ZnO-NP is proposed for enhanced health parameters, oxidative status, and immune response.