

# ABSTRACT

Zinc is a very vital trace mineral for better biochemical and physiological functions in the body of fish. This study evaluated the effect of zinc nanoparticles supplements on growth performance and health profile of GIFT Tilapia. An 8-week feeding experiment was designed to evaluate the effect of dietary zinc oxide nanoparticles (Zn NP) supplementation on growth performance, body indices, hematological parameters, antioxidant and digestive enzymes activity, of *Oreochromis niloticus*. For this purpose, zinc oxide nanoparticles were synthesized using a chemical method, and characterization was done with UV-Visible spectroscopy and FT-IR. There one was set as a control (Zinc free), one diet with 60 mg/kg Zinc acetate dihydrate, whereas three diets supplemented with zinc nanoparticles (ZnO NPs) at 20, 40 and 60 mg/kg levels respectively were prepared. A total of 225 fish (mean initial weight  $6.366 \pm 0.02$  g) specimens were fed with five dietary treatments in triplicates. The final weight (FW) and weight gain (WG) were significantly enhanced in fish fed on 60 mg/kg ZnO and 40 mg/kg ZnO NPs diet than the control ( $P < 0.05$ ). Further, the weight gain % (WG%) and specific growth rate % (SGR%) were meaningfully increased in fish treated with 40 mg/kg ZnO NPs compared to basal diet ( $P < 0.05$ ). The growth performance and digestive enzyme activities like amylase, protease and lipase were significantly elevated in the fish group fed with D4 (40 mg/kg Zn NP) compared to other groups ( $P < 0.05$ ). The body indices exhibited significantly lower values in the group fed on a 40 mg/kg Zn NP diet than in the control group ( $P < 0.05$ ). A significant increase was observed in the gills superoxide dismutase (SOD) and catalase (CAT) activity in the fish group fed with D4 (40 mg/kg Zn NP) compared to other groups ( $P < 0.05$ ). However, hematological parameters such as hemoglobin (Hb) concentration, white blood cells (WBCs) and red blood cells (RBCs) contents were significantly elevated in the fish group fed with D4 (40 mg/kg Zn NP) ( $P < 0.05$ ). The present study suggested that 40 mg/kg Zn NP supplementation exhibits a significant higher growth performance and health profile of *O. niloticus*.

**Keywords:** Body indices, growth performance, nanoparticles, oxidative stability, *Oreochromis*

*niloticus*.  (Ctrl) ▾