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www.elsevier.com/locate/jtherbio

PII: S0306-4565(17)30096-7
DOI: https://doi.org/10.1016/j.jtherbio.2017.10.003
Reference: TB1993

To appear in: *Journal of Thermal Biology*

Received date: 14 March 2017
Revised date: 16 August 2017
Accepted date: 18 October 2017

Cite this article as: Neeraj Kumar, K.K. Krishnani, Paritosh Kumar and Narendra Pratap Singh, Zinc nanoparticles potentiates thermal tolerance and cellular stress protection of *Pangasius hypophthalmus* reared under multiple stressors, *Journal of Thermal Biology,* https://doi.org/10.1016/j.jtherbio.2017.10.003

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Abstract

A preliminary study was conducted to delineate the ameliorating effect of dietary zinc nanoparticles (Zn-NPs) against thermal stress in *Pangasius hypophthalmus* reared under concurrent exposure to lead (Pb) and elevated temperature (34 ^{0}C). Three diets were formulated such as control (no Zn-NPs), Zn-NPs 10 mg/kg and Zn-NPs 20 mg/kg diet. Two hundred and thirty four fish were randomly distributed in to six treatments groups in triplicates; such as control group (no Zn-NPs in diet and unexposed to Pb and temperature, Ctr/Ctr), control diet with concurrent exposure to Pb and temperature (Pb-T/Ctr), Zn-NPs 10 and 20 mg/kg without stressors (Zn-NPs 10 mg/kg, Zn-NPs 20 mg/kg), Zn-NPs 10 and 20 mg/kg diet with concurrent exposure to Pb and temperature (Pb-T/Zn-NPs 10 mg/kg, Pb-T/Zn-NPs 20 mg/kg). The Pb in treated water was maintained at the level of 1/21th of LC_{50} (4 ppm) at 34 ^{0}C temperature in stressors groups. Post 60 days feeding trial, critical thermal minimum (CTmin), lethal thermal minimum (LTmin), and critical thermal maximum (CTmax), lethal thermal maximum (LTmax) and biochemical attributes on *P. hypophthalmus* were evaluated. The results indicated that, dietary supplementation of Zn-NPs increased the CTmin, LTmin and CTmax, LTmax in *P. hypophthalmus*. Positive correlations were observed between CTmin LTmin (Y= -0.495+10.08x, R^2, 0.896) and CTmax LTmax (Y= -0.872+4.43x, R^2, 0.940). At the end of the thermal tolerance study, oxidative stress and lipid peroxidation (LPO) were significantly reduced and neurotransmitter enzyme was significantly increased in the groups fed with Zn-NPs @ 10 mg and 20 mg/kg diet. Overall results indicated that dietary Zn-NPs can confer protection against thermal stress in *P. hypophthalmus*.