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Toxicological Assessment of Copper by Using Histopathological Changes in Kidney and Micronuclei Induction in Blood cells in Freshwater Fish *Channa punctatus* (Bloch 1793) †

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Abstract: The present experiment was conducted to estimate the adverse effect of Copper in terms of genotoxicological and histopathological indices in freshwater fish *Channa punctatus* exposed to different sub-lethal concentrations of copper sulphate. Fish were segregated into four experimental groups, G1 served as control while G2 0.4 mg/L, G3 0.2 mg/L, G4 0.1mg/L, 96 h exposure; each group comprises 24 fish in triplicate. The genotoxicological and histolopathogical changes were assessed in each group (24 h, 48 h, 72 h, 96 h). Severe genotoxicological changes as Micronuclei induction in Blood cells were observed in the 96 h, moderate changes in the 48 h, and mild changes in the 24 h exposure groups, respectively, compared with the control group. The frequency of MN was increased when increased the concentration of Copper. The histopathologic lesions such as vacuolation, blood conjunctions, and necrosis in the kidney were observed. These structural alterations of the kidney could affect osmotic and ionic regulation, absorption, and absorption of nutrients, which in turn could adversely affect the growth and survival of freshwater fish *Channa punctatus*. This study serves as a biomonitoring tool for the adverse effects of copper sulfate on the aquatic biota.

Keywords: *Channa punctatus;* histopathology; genotoxicity.

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Conflicts of Interest

The authors declare no conflict of interest.