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ORIGINAL PAPER

Health risk assessment of heavy metal accumulation in the Buriganga and Turag River systems for *Puntius ticto*, *Heteropneustes fossilis*, and *Channa punctatus*

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Abstract This study aimed to assess the effects of major ecotoxic heavy metals accumulated in the Buriganga and Turag River systems on the liver, kidney, intestine, and muscle of common edible fish species *Puntius ticto*, *Heteropneustes fossilis*, and *Channa punctatus* and determine the associated health risks. K was the predominant and reported as a major element. A large concentration of Zn was detected in diverse organs of the three edible fishes compared with other metals. Overall, trace metal analysis indicated that all organs (especially the liver and kidney) were under extreme threat because the maximum permissible limit set by different international health organizations was exceeded. The target hazard quotient and target cancer risk due to the trace metal content were the largest for *P. ticto*. Thus, excessive intake of *P. ticto* from the rivers Buriganga and Turag could result in chronic risks associated with long-term exposure to contaminants. Histopathological investigations revealed the first detectable indicators of infection and findings of long-term injury in cells, tissues, and organs. Histopathological changes in various tissue structures of fish functioned as key pointers of connection to pollutants, and definite infections and lesion types were established based on biotic pointers of toxic/carcinogenic effects. The analysis of histopathological alterations is a controlling integrative device used to assess pollutants in the environment.

Keywords Fish tissue · Water pollution · Bioaccumulation · Histopathology · Health risk

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