

Title: Bioavailability and toxicity of heavy metals and microplastics in shellfish (*Meretrix lyrata*): A preliminary study in the Bay of Bengal

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Abstract: [Microplastics](#) (MPs) and [heavy metals](#) (HMs) pollution pose significant environmental threats by accumulating in marine species, leading to potential health risks for marine life and humans consuming contaminated seafood. However, limited research has been conducted on the bioavailability and toxicity of MPs and HMs in the [marine biota](#) of the Bay of Bengal, Bangladesh. In this study, the bioavailability of some HMs (i.e., Ni, Pb, Cd, and Cr) and MPs in a common marine shellfish ([Meretrix lyrata](#)) of the Bay of Bengal having nutritional and economic importance, and their human health risks due to the consumption of *M. lyrata* mussels has been evaluated. The mean concentrations of Ni, Pb, Cd, and Cr in the samples were determined spectrophotometrically and found as 5.54, 45.65, 0.51, and 33.51 mg/kg, respectively, which are higher than the maximum permissible limit set by different national and international entities. This study revealed that the hazard index values for all samples were greater than unity, which indicated that the [cumulative effect](#) of all selected [heavy metals](#) may pose substantial health hazards. The target cancer risk for Pb and Ni was also significant (i.e., $TR > 1.0E-04$). On the other hand, MPs (mainly [polyvinyl chloride](#) and polyethylene) of different colors (7–8) and shapes (6.53–330 μm) were detected in 50 % of the total studied samples, which is alarming and will result in a potential health risk due to the consumption of the mussels. Therefore, the consumer should be careful to eat this selected mussel (*M. lyrata*) in their regular meal and the concerned authority should take proper steps to protect this natural species from heavy metal and MPs contamination.

Keywords: Microplastics (MPs) Heavy metals (HMs) Meretrix lyrata Bay of Bengal Bioavailability Human health risk assessment Marine pollution Spectrophotometric analysis

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