



Quantification of heavy metals in wild gravid female mud crab (*Scylla olivacea*) collected from different rivers of Sundarbans mangrove region

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ABSTRACT

Heavy metals pollution is one of our major problems in Sundarbans mangrove zone as we all their surrounding rivers. The presence of industrial development in the nearby areas of coastal and marine aquacultures sites are the cause of heavy metals pollution. The aim of the research was to quantify heavy metals in gravid female mud crabs (*Scylla olivacea*) in three different rivers of Sundarbans region. Mud crabs and their surrounding water and soil sediments were collected from Mongla, Kholpetua, and Kopotakkho rivers. Analysis of river water was conducted in the laboratory of Shiva Analyticals (India) Private Limited, India, whereas live mud crabs and sediment samples were analyzed from Quality Control Laboratory (QCL), Khulna, Bangladesh for the quantification of heavy metals. The results showed that the heavy metals As, Cr, Cd, Hg and Pb were detected in mud crabs and their surrounding river water and sediments, but the concentration of heavy metals in mud crabs remains below the limit of human's consumptions except the heavy metal Chromium (Cr). Maximum concentration of heavy metals was detected Kopotakkho river followed by Mongla and Kholpetua river. The concentration of heavy metals was highest in soil sediments followed by mud crabs and river waters. Mud crabs were contaminated by heavy metals that bioaccumulated from their surrounding sediments and water sources. The hierarchy of mean concentrations (mg/kg) of the heavy metals were Pb > As > Cr > Pb > Hg. Heavy metals are carcinogenic for human consumption when exceeded their permissible levels. It is urgent to stop pollution in Sundarbans mangrove zone and led to serve healthy foods for the nations.

1. Introduction

Mud crab is one of the potential and high value crustaceans that are abundant in the muddy bottoms of brackish water near the coast, mangrove areas, and river mouths [3]. The mud crab (*Scylla* spp.) is commercially important species in Asian countries such as Indonesia, Malaysia, Thailand, the Philippines, Taiwan, India, and Bangladesh [4], [27], [5] because of its deliciousness, exportation, and huge amount of foreign currency earnings. The female mud crabs with mature ovaries are considered as a rare and expensive delicacy food item in several countries of the world [6]. But it is worrying to note that, Mangrove wetlands are becoming vulnerable because of increasing pollution like

hazardous human activities, rapid industrialization, urbanization of coastal regions, uses of chemicals in farms etc. Among the pollutants, heavy metals are most noteworthy due to its hazardous effects on human health [3]. Nowadays, Heavy metals contamination and bioaccumulation of it in edible species has gained a great deal of attention worldwide. Bioaccumulation of heavy metals in mud crab is a raising concern in recent times for food animals specially shellfishes. Heavy metals are bioaccumulated in different parts of crab and transferred to human health through consumption. It was reported that three species of crabs i.e., *Sesarma dehaani*, *Sesarma plicata*, *Macrophthalmus japonicus* are associated to bioaccumulation and dietary exposure of heavy metals including Copper (Cu), zinc (Zn), manganese (Mn), cadmium (Cd) and

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