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International Journal of Current Research
Vol. 4, Issue, 03, pp.104-106, March, 2012

INTERNATIONAL JOURNAL OF CURRENT RESEARCH

ISSN: 0975-833X

RESEARCH ARTICLE

HEAVY METAL ANALYSIS OF THREE GASTROPOD SPECIES IN PONDICHERRY SOUTH EASTCOAST OF INDIA

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ARTICLE INFO

Article History:
Received 15th December, 2011
Received in revised form
13th January, 2011
Accepted 29th February, 2011
Published online 31st March, 2012

Key words:
Gastropod,
Heavymetals,
Pondicherry,
Rapana rapiformis,
AAS.

ABSTRACT

This study was aimed to analyze six heavy metals such as Cu, Zn, Mg, Lb, Cd, Cr. Were estimated in sediments, shells, tissues of three gastropod *Rapana rapiformis, Chicoreus virgineus,* and *Hemifusus pugilinus*, and analyzed in AAS, We ensure that the heavy metals present in sediment is high concentration in this study area fallowed by tissue and shell of gastropod, tissue and shell has the homogeneity, samples Cr not present. But tissue samples having the diverge the concentration as well as order, the high concentration of heavy metals present in the sediment is due to the anthropogenic inputs and fishing activity, this study conclude that Evan though the accumulation of heavy metals is in low concentration we should take some measurements to safe the our marine system in the form of reducing the pollution loads in to the marine environments.

INTRODUCTION

Toxic metals, including "heavy metals," are individual metals and metal compounds that negatively affect people's health. Some toxic, semi-metallic elements, including arsenic and selenium, are discussed in this page. In very small amounts, many of these metals are necessary to support life. However, in larger amounts, they become toxic. The heavy metals generally, enter the aquatic environment through atmospheric deposition, erosion of geological matrix or due to anthropogenic activities caused by industrial effluents, domestic sewage and mining wastes (Solai 2010). They may build up in biological systems and become a significant health hazard. The bioaccumulation in organisms may enhance the persistence of industrial chemicals in the ecosystem as a whole, since, they can be fixed in the tissues of organisms, stored chemicals are not exposed to direct physical, chemical or biochemical degradation and they directly affect the individual's health (Streit, 1992).The natural concentrations of these metals in sea water are very low and hence the risk of contamination in living tissue is high. Industrial effluent is one of the prime sources of metal contamination in coastal waters and the Bay of Bengal is no exception (Mitra and Choudhury, 1993). Monitoring heavy metal pollution in aquatic environments has drawn great concern and various biological species are widely utilized for this reason. It is well known that molluscs accumulate organic and metallic pollutants at concentrations several orders of magnitude above those observed in the field environment (Bryan *et al*., 1983).

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Heavy metals analysis in aquatic organisms can provide important information on the degree of environmental contamination and its impacts [Ip *et al .,* 2005]. Gastropods are one example of aquatic organisms that have demonstrated the ability as potential bio indicator and accumulate metals to high concentrations [Zhou *et al.,* 2008.].The efficiency of some coastal and marine organisms to accumulate potentially toxic trace metals in their tissues far above the ambient level is well established and has become the focus of a number of studies from the Indian coastal waters has done however there is limited study were conducted in Pondicherry in particular reference with gastropod . This study was aimed to analyze six heavy metals in three gastropod, shells and sediments,

MATERIALS AND METHODS

Fresh gastropods of *Rapana rapiformis*, *Chicoreus virgineus,* and *Hemifusus pugilinus* were collected from fish landing center at cinakalapet, opposite to the research laboratory (Pondicherry University) located on the south East Coast of India(12º01'05.49"N, 79º51'48.60" E). The egg capsule were immediately transferred to laboratory and rinsed thoroughly with filtered sea water and then in sterile distilled water. These capsules were identified at Marine Biological Station at Porto Nova Annamalai university, After identifying the species, samples were immediately kept in pre cleaned polythene bags, The snails were dissected immediately, and portions of shell from4–5 specimens of uniform size (4–5 mm long) were pooled together and dried at 70 _C to constant weight. Sediment samples were similarly dried and passed through a

Table 1. The concentration of Heavy metals in gastropod tissue, shell and sediment

Metals (µg/g)	Gastropod tissue			Gastropod shell			Sediment
	R.rapiformis	*C.virgineus*	*H.pugilnus*	*R.rapiformis*	*C.virgineus*	*H.pugilnus*	
Cu	1.358	2.162	0.000	0.984	0.692	0.213	2.623
Zn	1.389	0.926	1.085	0.786	0.628	0.568`	1.581
Lb	0.259	0.254	0.275	0.187	0.145	0.132	0.692
Mg	0.284	0.393	0393	0.165	0.278	0.213	0.573
Cd	0.435	0.166	0.152	0.235	0.132	0.095	0.637
Cr	0.000	0.000	0.000	0.000	0.000	0.000	0.000

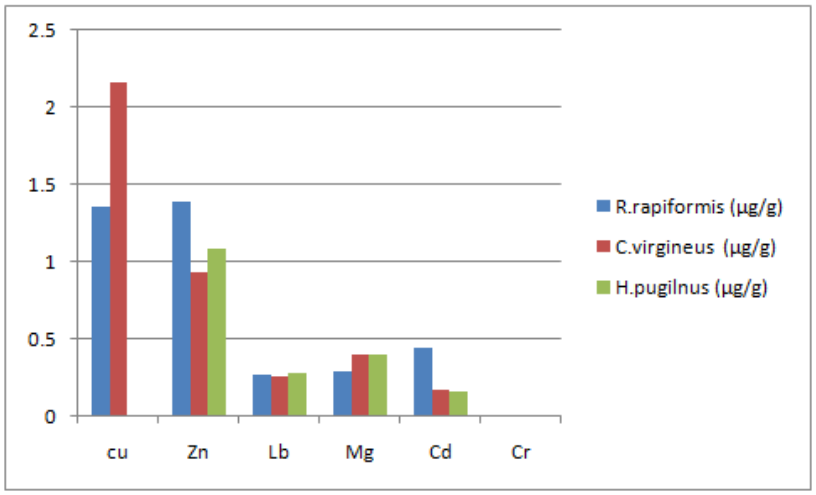

Fig.1. Concentration of Heavy metals in the Gastropod tissue

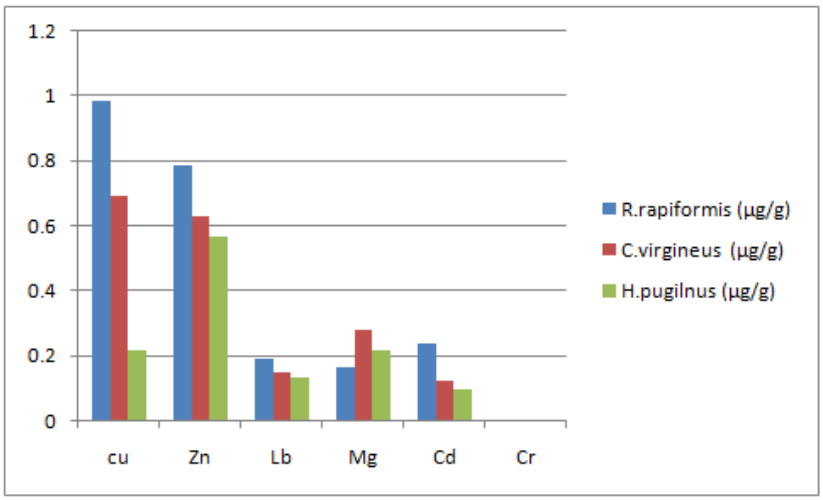

Fig.2. Concentration of Heavy metals in the Gastropod shell

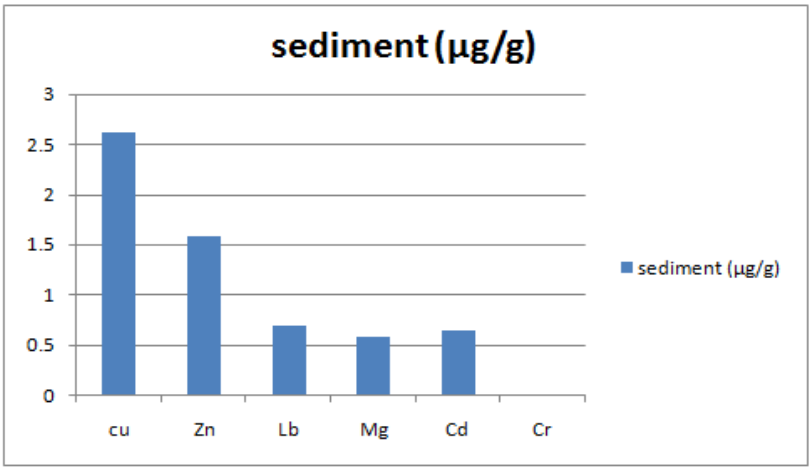

Fig.3. Concentration of Heavy metals in sediment

2 mm mesh sieve. All the powdered tissue, shell, and sediment were kept in desiccators prior to further chemical analysis. Six replicate samples of snail tissues and sediment samples were weighed accurately to approximately 0.5 g into 100 ml beaker and digested with 5 ml of concentrated HNO and 5 ml of $H_2 O_2$ (30%). The beaker was covered with a watch glass and left aside until the initial vigorous reaction subsided. Then, the samples were heated on a hot plate for about two hours to reduce the volume to 3-4 ml. After that, the samples were allowed to cool, filtered and diluted to 25 ml in volumetric flask with deionized water (Daziel *et al.,* 1983). The mean, slandered deviation was calculated and the correlation, Analysis of covariance (ANOVA) was performed between the species

RESULT AND DISCUSSION

The concentration of heavy metal present in gastropod tissue, shell and sediment are given in table.1, and the heavy metals present in sediment is high concentration in this study area fallowed by tissue and shell of gastropod, the result also reveals that the accumulation of heavy metals in order all three gastropod tissue and shell has the homogeneity, and the accumulation of heavy metals in tissue and shell has the following order Cu>Zn>Mg> Lb> Cd>Cr in two gastropod namely *R. rapiformis, and C. virgineus* in *H.pugilnus* Zn> Mg > Cd> Lb> Cu>Cr, and all the samples Cr not present. The concentrations of heavy metals in the soft tissues of *R. rapiformis* has the following order Cu>Zn>Cd>Mg>Lb>Cr., and shell Cu>Zn>Cd>Lb>Mg, and *C. virgineus* soft tissue Cu>Zn> Mg >Lb> Cd>Cr in shell Cu>Zn> Mg >Lb> Cd>Cr , but in *H.pugilnus* Zn> Mg > Cd> Lb> Cu>Cr, and shells Zn> Cu>Mg > Lb> Cd> Cr,. The previous studies in pondicherry coastal region also spectacles that the same consequences in the order heavy metal pollution (Soli,. 2010), and the high concentration of heavy metals present in the sediment is due to the anthropogenic inputs (Jonathan and Ram Mohan, 2003) due to the fishing activity and industrial effluents input in this region, the absences of chromium is due to no sources like chromium-containing rocks, also there is no reservoir for chromium in this region , and the concentration of metals increases with the size of the organism (Yogamoorthi, 1997), age and growth. Finally this study conclude that Evan though the accumaltion of heavy metals is in low concentration we should take some measurements to safe the marine system in the form of reducing the pollution loads in to the marine environments.

Acknowledgements

We are thankful to the director, CAS Marine Biology and Prof. Ajmal Khan for their expertise and permission to refer the museum specimen required for the confirmation of the species selected in this study, we are also profusely thank the fisherman from chinnakalapet (opposite to Pondicherry university) for their help and cooperation in catching the gastropods,

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