Biolife 3(4):897-899
AN INTERNATIONAL QUARTERLY JOURNAL OF BIOLOGY & LIFE SCIENCES
ISSN (online): 2320-4257
www.biolifejournals.com
BIOLIFE RESEARCH ARTICLE

Concentration of metals in soft organs of *Lamellidens marginalis* from Krishna river at Ankali, Maharashtra (India)

S. A. Manjare

[1,5] *Department of Zoology, Jaysingpur College, Jaysingpur*

*Email: manjaresir@rediffmail.com

ABSTRACT

The present study deals with the heavy metal concentration in soft tissue of freshwater lamellibranch mollusks inhabiting in the Krishna river at Ankali. The bivalve, *L. marginalis* (Lamarck) *was* selected in the present study. This species of mollusks was subjected for detection of heavy metals such as Nickel, Zinc, Lead and Aluminium from various soft tissues such as mantle, gill, siphon, foot, hepatopancreas and gonads. The work was carried out seasonally for the period from January 2013 to December 2013 and values were recorded in ppm. Accumulation of Zn was maximum in gills, while minimum in foot in different seasons. Similarly accumulation of Ni, Pb and Al was maximum in gonads whereas, it was minimum in siphon in different seasons

Keywords: Heavy metals, Soft organs, *L. Marginalis,* Krishna River

INTRODUCTION

The effect of heavy metals on aquatic organisms is currently attracting widespread attention, particularly in studies related to pollution. Heavy metals are being introduced in aquatic environments through industrial and urban effluents, soil leaching and rain fall. Though many metals play an important role in the physiological processes of plants, animals and human, yet excess concentrations of metals is harmful from the days of Aristotle, the great Greek genius about 2000 years ago, toxicological tests of some sort have been conducted. He studied fresh water animals in marine conditions and observed their responses. The question of the effect of a material on an organism was regulated to the curiosity of physiologists until a formed discipline known as Toxicology arose in the early 1800's in response ti the development of organic chemistry (Zapp, 1980).

How to cite this article:
S.A. Manjare (2015). Concentration of metals in soft organs of *Lamellidens marginalis* from Krishna river at Ankali, Maharashtra (India). Biolife, 3(4), pp 897-899.
DOI: https://dx.doi.org/10.5281/zenodo.7307221

Received: 4 October 2015;
Accepted; 25 November 2015;
Available online : 8 December 2015

The present study deals with the bioaccumulation of heavy metals in the freshwater lamellibranch mollusks inhabiting in the Krishna river at Ankali. The bivalve, *Lamellidens marginalis* was selected in the present study. This species of mollusks was subjected for detection of heavy metals such as Nickel, Zinc, Lead and Aluminium from various soft tissues such as mantle, gill, siphon, foot, hepatopancreas and gonads.

Materials and Methods

The present investigation was carried out during the year January 2013 to December 2013. The bivalve species inhabiting along the bank of Krishna river at Ankali stations was selected for present studies. The shell length of bivalve L. *marginalis* ranged from 5cm to 8 cm. The species was collected and brought to laboratory to remove the fauling algal mass and mud. The bivalves were then stocked in tap water for few hours. The Shells were removed and the soft animals were taken in a tray. Various tissues of bivalve mollusks such as mantle, gill, siphon, foot, hepatopancreas and gonads were removed separately. These tissues were oven dried at 60^0 C for 48 hours. Dried tissues were pulverized in mortar and kept in polythene bags and stored in the refrigerator. The powdered samples were analyzed for detection of heavy metals.

The powdered tissues were digested in 10 ml. Perchloric acid and Nitric acid in 1:1 ratio (Lithnor,

1975). The digested tissue solution was filtered and these samples were analyzed for detection of heavy metals by using atomic absorption/ emission spectrophotometer (Chemito, 201) and the values were expressed in ppm.

Results and Discussion

Winter :

The metal content during winter season (January) from the bivalve tissue (*L. marginalis*) was estimated as under. The zinc content in different tissues was in the order of gill > gonads > siphon > foot > hepatopancreas > mantle (0.60, 0.37, 0.12, 0.10, 0.08, 0.07 ppm respectively). The Nickel content in different tissues was in the order of gonads > hepatopancreas > gill > mantle > foot > siphon (0.592, 0.482, 0.462, 0.382, 0.072, 0.0072 ppm respectively). The Lead concentration in different tissues was in the order of gonads > foot > mantle > hepatopancreas > gill > siphon (0.088, 0.076, 0.072, 0.058, 0.0005 ppm respectively). The Aluminium content in different tissues was in the order of gonads > hepatopancreas > gill > foot > siphon > mantle (0.182, 0.100, 0.068, 0.056, 0.052 ppm respectively).

Comparatively metal content during winter season (January) from bivalve tissue (*L.marginalis*) showed that, zinc content was maximum (0.60 ppm) in gill and minimum (0.08 ppm) in hepatopancreas. Whereas nickel content was maximum (0.592 ppm) in gonads and minimum (0.0072 ppm) in siphon, lead content was maximum (0.088 ppm) in gonad and minimum (0.005 ppm) in siphon, while Aluminium content was maximum (0.221 ppm) in gonad and minimum (0.052 ppm) in mantle

Summer :

The metal content during summer season (May) from bivalve tissue (*L.marginalis*) was estimated as under. The zinc content in different tissues was in the order of gill > gonads > mantle > siphon > foot > hepatopancreas (0.525, 0.189, 0.102, 0.071, 0.053, 0.048 ppm respectively). The Nickel content in different tissues was in the order of gonads > hepatopancreas > gill > mantle > foot > siphon (0.589, 0.471, 0.41, 0.36, 0.071, 0.0042, ppm respectively). The Lead concentration in different tissues was in the order of gonads > foot > hepatopancreas > mantle > gill > siphon (0.085, 0.079, 0.075, 0.053, 0.058, 0.051 ppm respectively). The Aluminium content in different tissues was in the order of gonads > gill > hepatopancreas > foot > mantle > siphon (0.188, 0.101, 0.100, 0.064, 0.038, 0.005 ppm respectively).

The metal content during summer season (May) from bivalve tissue (*L. marginalis*) was studied. The zinc content was maximum (0.525 ppm) in gill and minimum (0.048 ppm) in hepatopancreas. Whereas nickel content was maximum (0.589 ppm) in gonads and minimum (0.0042 ppm) in siphon, lead content was maximum (0.085 ppm) in gonad and minimum (0.0051 ppm) in siphon. Aluminium content was

Table-1. Heavy metal concentrations in Bivalve tissues (in ppm) from Krishna river at Station Ankali (From January 2013 to December 2013)

Winter					
Species	Tissues	Zinc	Nickel	Lead	Aluminium
Lm	Mantle	0.07	0.382	0.076	0.052
	Gill	0.060	0.462	0.058	0.100
	Siphon	0.12	0.007	0.005	0.056
	Foot	0.10	0.072	0.076	0.068
	Heaptopancreas	0.08	0.482	0.072	0.100
	Gonads	0.37	0.592	0.088	0.182
Summer					
Lm	Mantle	0.120	0.36	0.073	0.038
	Gill	0.525	0.418	0.058	0.101
	Siphon	0.071	0.004	0.005	0.005
	Foot	0.053	0.071	0.079	0.064
	Heaptopancreas	0.048	0.471	0.075	0.100
	Gonads	0.189	0.589	0.085	0.188
Monsoon					
Lm	Mantle	0.135	0.378	0.070	0.040
	Gill	0.455	0.455	0.059	0.104
	Siphon	0.022	0.006	0.004	0.005
	Foot	0.007	0.072	0.080	0.620
	Heaptopancreas	0.017	0.469	0.079	0.098
	Gonads	0.009	0.580	0.090	0.193

Lm – *Lamellidens marginalis*

maximum (0.188 ppm) in gonad and minimum (0.005 ppm) in siphon.

Monsoon:

The metal content during monsoon season (July) from bivalve tissue (*L. marginalis*) was estimated as under. The zinc content in different tissues was in the order of gill > mantle > siphon > hepatopancreas > foot > gonads (0.455, 0.135, 0.0225, 0.017, 0.009, 0.007 ppm respectively). The Nickel content in different tissues was in the order of gonads > hepatopancreas > gill > mantle > foot > siphon (0.580, 0.469, 0.455, 0.378, 0.072, 0.0062 ppm respectively). The Lead concentration in different tissues was in the order of gonads > foot > hepatopancreas > mantle > gill > siphon (0.090, 0.080, 0.079, 0.070, 0.069, 0.0049 ppm respectively). The Aluminium content in different tissues was in the order of gonads > gill > hepatopancreas > foot > mantle > siphon (0.193, 0.104, 0.098, 0.062, 0.040, 0.0056 ppm respectively).

The metal content during monsoon season (July) from bivalve tissue (*L. marginalis*) was studied. The zinc content was maximum (0.455 ppm) in gill and minimum (0.007 ppm) in foot. Whereas nickel content was maximum (0.580 ppm) in gonads and minimum (0.00622 ppm) in siphon, lead content was maximum (0.090 ppm) in gonad and minimum (0.0049 ppm) in siphon. Aluminium content was maximum (0.193 ppm) in gonad and minimum (0.0056 ppm) in siphon.

The gills of *L. marginalis* to be instrumental in accumulation and possible sequestration of excess Cd, Ni and Pb. The gill in bivalves is a very important organ, as it is not only involved in exchange of gases, but also in the capture of food particles by entangling them in mucous and directing them via the labial palps to the mouth. Similar importance of gills in metal bioaccumulation has also been shown in the shrimp, *M. lamarrei* where they incorporate metals through chelation by mucous or surface adsorption; or both (Murti and Shukla, 1984).

Concentrations of Cd, Ni and Pb in the sediments and in the different body tissue of a snail, *Brotia costula* (Gastropoda), a mussel, *L. marginalis* (Bivalvia: Unionidae) collected from four freshwater ecosystems in Barak vally Assam, India were studied comparatively. Among the soft tissues, the digestive gland in *Brotia costula*; gill in *L. marginalis* appear to be important sites for metals accumulation. Among the four taxa, *L. marginalis* accumulated maximum Ni and Pb (Gupta, 1998).

Conclusion

The bivalve tissues like mantle, gill, foot, siphon, hepatopancereas and gonads of *Lamelliden marginalis* bivalve species showed typical pattern of accumulation. In general, accumulation of Zn was maximum in gills, while minimum in foot in different seasons. Similarly accumulation of Ni, Pb and Al was maximum in gonads whereas, it was minimum in siphon in different seasons

Conflict of Interests:

Authors declare that there is no conflict of interests regarding the publication of this paper.

References

1. Ayyavoo, M. (1989): studies on the metal concentration on Cauvary River and Poompuhar East-coast Tamil Nadu. National Young Scientist Seminar on Environmental pollution. March 30-31, Page 10
2. Ganesan, V. C. (1991). Trace metal concentration in water and sediment of the river Khan and Kshipra (Ujjain, India). Inter. J. Ecol. And Environ. Sci. 17: 225-236.
3. Kataria, H. C. (1994): Heavy metals contamination and pollution in Betwa River. JEP, 15 (1): 34-38.
4. Lind, O. T (1974): Hand book of common methods in limnology. The C. V. Mosby Co., Saint Louis (USA).
5. Lithnor, G. (1975): Methods for detection, measurement and monitoring of water pollution, FAO, Rome, PP 41.
6. Mani, S. S., Sweth Aranyam and S. S. Daevi (1989): An increased level of trace metals in Pazhan Cauvery river water due to domestic sewage pollution. Seminar on Environmental pollution, 30 March, Bangalore.
7. Moriarty, F. and H. M. Hanson (1989): Heavy metals in sediments of the river Ecchesbourne, Darbishire. Water resources, 22: 475-480.
8. Trivedy and Goal (1987): Practical methods I Ecology and Environmental Science.

