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Research Article

LIPID FLUCTUATION IN VARIOUS ORGANS OF FRESH WATER BIVALVE, *LAMELLIDENS COSOBRINUS* EXPOSED TO LEAD NITRATE

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ABSTRACT
To study evaluate the effect of heavy metal salts on the lipid contents in gonad, digestive gland and whole body tissues of freshwater bivalves, *Lamellidens cosobrinus.*The *Lamellidens cosobrinus* were exposed to lethal concentration ($LC_{50/10}$) dose of heavy metal salts, lead nitrate (6.661ppm) up to 12 days. The effects were studied and observed into two groups as control and experimental. The dry powders were used for lipid estimation. The results were reported in mg/100 mg dry weight of tissue. In present investigation, the lipid contents were found to be significantly decreased as compared to control. From the results it is also observed that, there was decrease in lipid contents with increase in period of exposure.

Keywords: *Lipid Content, Lead Nitrate, Lamellidens cosobrinus*

INTRODUCTION
Fresh water pollution may be caused by fecal wastes, chemicals, pesticides, prtrolium ,sediments or even heated discharges and there fore rivers and fresh water bodies unfit for aquatic life. Heavy meals are one of the more serious pollutants in our natural environment due to their toxicity, persistence and bioaccumulation problem (Tam and Wong, 2000).The biochemical changes in the organs of animal exposed to heavy metals have no definite pattern and the physiological state of metabolic activity of an organism reflects in the utilization of their biochemical energy to counteract toxic stress. The biochemical changes occurring in the body gives the important indication of stress (Peter, 1973). The most important heavy metals from the water pollution point of view are Zn, Cu, Pb, Cd, Hg, Ni and Cr and become toxic at higher concentrations (Agrahari, 2009).

Lead is a persistent metal, however, and is still present in the environment in water, brass plumbing fixtures, soil, dust, and imported products manufactured with lead. Lead is a highly toxic substance. There are many ways in which humans are exposed to lead: through deteriorating paint, household dust, bare soil, air, drinking water, food, ceramics, home remedies, hair dyes and other cosmetics. Lead is of microscopic size, invisible to the naked eye.Exposure to environmental stressors can induce oxidative stress in cells and result in a decrease in reducing potential and metabolic transformation to reactive intermediates (Simmons *et al.*, 2011).

Lipids are responsible for variety of functions in molluscs. The lipids represent an energetic reserve because of their high caloric value and are mainly used in chronic stress conditions. In general, lipid generates more heat and energy than carbohydrates. Phospholipids, also called structural lipids, are playing an important role in the cell membrane's formation (Martinez-Pita et al, 2011).Many workers studied the lipid alterations in various animals after exposure to toxicants (Zambare, 1991; Deshmukh, 1995; Deshmukh and Lomte, 1998; Waykar and Lomte, 2004; Shaikh, 2011). The present study investigates the effect of heavy metal salts, lead nitrate induced variation in lipid contents in the various organs of the fresh water bivalve, *Lamellidens cosobrinus* after chronic exposure lead nitrate.

MATERIALS AND METHODS

The bivalves, *Lamellidens cosobrinus* were collected from the Suki dam situated on Suki River near Garbardi nearly 31 kms away from Savda, Maharashtra, India. The bivalves were acclimatized to laboratory conditions for 2-3 days before to subjecting them to experiments. Only healthy and active bivalves were chosen for experiments. Two groups of healthy and active bivalves were formed. The bivalves group A were maintained as control. The bivalves from group B were kept as experimental gruop for expose chronic concentration .The experimental group B was exposed to chronic concentration of (LC_{50} value of 96 hr/10) heavy metal salt, lead nitrate (6.661 ppm) up to 12 days. After 4, 8 and 12 days both the groups of bivalves were dissected and their tissues of gonads, digestive glands were excised and whole body mass of remaining animals was taken. All tissues were dried at 80^{0C} in an oven till constant weight was obtained. The dried powders of different tissues of control and experimental animals were used for estimation of lipids. Total lipids were estimated by using Vanillin reagent method as given by Barnes and Blackstok (1973).

RESULTS AND DISCUSSION

Table shows lipid fluctuation levels in different tissues of *Lamellidens marginalis* after chronic exposure to heavy metal salts, lead nitrate. The lipid contents of different body tissues like gonad, digestive gland and whole soft body tissues were found to be decreased with increase in the exposure period after chronic treatment of lead nitrate. In the present study different tissues were selected because different tissues and organs have different activities and metabolic rates and therefore their responses to the same toxicant may be different. The lipid fluctuation in different tissues was due to heavy metal stress indicates the change in activity of an organism. The lipid in control bivalves in gonad is 3.37 to 3.22,in digestive glands is 6.34 to 5.85 and in whole body is 4.48 to 2.67. lipid fluctuation in experimental group in gonads is 3.15 to 2.67,in digestive gland 5.05 to 4.36 and in whole body is 4.15 to 3.56.The lipid fluctuation is more in digesve glands as compared to gonads and in whole body.

Table: Lipid content in different tissues of fresh water bivalves,Lamellidens cosobrinus after chronic exposure to heavy metal salt, $PbNO_3$

Treatment	Sr No.	Body Tissue	The lipid content (%) ± S.D.		
			4 Days	8 Days	12Days
(A) Control	I	G	3.37 ± 0.321	3.24± 0.275	3.22± 0.281
	II	D.G	6.34 ± 0.425	6.10 ± 0.426	5.85 ± 0.223
	III	W.B.	4.48 ± 0.230	4.29 ± 0.190	4.25 ± 0.254
(B) 6.661 ppm $PbNO_3$	I	G	3.15 ± 0.230 (-6.528)*	2.75 ± 0.221 (- 15.123)*	2.67 ± 02.27 (- 17.080)*
	II	D.G	5.05 ± 0.340 (- 20.347)*	4.75± 0.142 (- 22.131)*	4.36 ± 241 (- 25.470)*
	III	W.B.	4.15 ± 0.309 (-7.366)*	3.64 ± 0.321 (-15.151)*	3.56± 0.524 (-16.235)*

***W.B.**- Whole Body, **G** – Gonad , **D.G.**-Digestive gland*
1. Values are expressed as mg/100 mg of dry weight
2. ± indicates S. D. of three observations.
3. % value of compared with respective control*

The decrease in lipid content in the fresh water snail's, after lead nitrate treatment may be due to reduced synthesis of lipid or increased activity of lipase involved in oxidation of lipids (Hollands, 1978).The lipid alterations in various animals after exposure to toxicants were studied by (Bhagyalakshmi, 1981; Patil

1986 and Chaudhary 1988).Thompson and Lee (1987) demonstrated that the free phosphatide pool of the digestive gland in B. glabrata is significantly reduced in infected snails. Southgate (1970) reported that in the pulmonate snail L. Truncatula infected by the rediae of F. hepatica, there was an increase in fatty acid content, but a decrease in total lipids.

CONCLUSION

It is concluded from this study that, overall decrease in lipid levels in different soft tissues of fresh water bivalve, *Lamellidens marginalis* was due to chronic treatment of heavy metal salt, lead nitrate. It has been also observed that severity of depletion in lipid content was more prominent as the exposure period increases

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