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THE ENDOSULFAN CONCENTRATION AFFECTED ON LIPID METABOLIC VALUE IN FRESH WATER FEMALE CRAB *BARYTELPHUSA GUERINI*

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Abstract:- Lipids constitute a heterogeneous group of complex macromolecules, having high calorific value. Lipids are essential esters of fatty acids or substances capable of forming esters which consist of fats, oils, phospholipids, triglycerides, glycerol and cholesterol etc. Lipids play a vital role in the architecture of the cell and also contribute towards energy synthesis as an alternative to carbohydrates act as insulators and as a reserve source of energy.

The toxic effect of Endosulfan resulted to fluctuate the lipid value in various organ of fresh water female crab. In this paper carefully study the lipid content of female crab *Barytelphusa guerini* shows variations from 24 hours to 96 hours.

Keywords: Endosulfan, Lipid, Female crab *Barytelphusa guerini*.

INTRODUCTION

The concentration of Endosulfan in aquatic environment could be assessed by measuring certain physiological or biochemical responses of fish including changes in haematological parameters, oxygen consumption. Certain biochemical constituents and histopathological parameters. This suggestion has laid special emphasis on the need to carry out studies pertaining to the effects of sub lethal concentration of Endosulfan on non-target species. Effects of Endosulfan on the Behaviour, growth and biochemistry of *Barbus stigma* have been reported (Rangaswamy, 1984) have studied the toxic effects of Endosulfan in *Tilapia mossambica*.

Recent studies shown changes in different lipid fractions during organochlorine insecticides poisoning in mammals and the insecticidal residues are found to be associated very much with lipophilic tissues (Didier et al., 1983). It has also been reported that the lipid base is in fat, responsible for the enzymatic inhibition of Mg⁺⁺ ATPase by organochlorine insecticides the organochlorine and organophosphorous pesticides cause severe changes in the lipid fractions of animal tissues. Ramana Rao and Ramamurthy (1980) reported changes in total lipids under sumithion stress in snails. Ramamurthy (1987) reported alterations in lipid fractions in fish hepatic and muscle tissues under heptachlor intoxication.

Similar results were noticed by many workers in different systems by using different organochlorine insecticides (Prasad Rao, 1987). Swami *et al.*, (1983) have observed that there is metabolic shift from carbohydrate to lipid metabolism in freshwater mussel under organochlorine insecticide intoxication. The decrement of free fatty acid content in the tissues of fish exposed to lindane (Madhu, 1983). Fat infiltration and elevated triglyceride levels were also observed on organochlorine insecticide poisoning.

MATERIALS AND METHODS:

The total lipid content was estimated by the method of Floch et al., (1957). The tissues were isolated, dried, weighed and homogenized in a medium containing chloroform: methanol (2:1 v/v) and centrifuged at 1000 rpm for 10 min. The supernatant was taken in pre-weighed container.

The content was then evaporated at 50–60°C to dryness and the container was weighed again. The

difference between the final & initial weight of the container represent the total lipid content. The total lipid content was expressed as mg lipid / gm dry wt. of tissue.

RESULT:

Alteration due to the Effect of Endosulfan pesticide on the lipid content of leg muscle, gill muscle, hepatopancreas, heart muscle of Freshwater female crab *Barytelphusa guerini*, after exposure to the concentration of Endosulfan for 24, 48, 72 and 96 hours, the values of lipid contents were expressed in term of mg lipid/100 gm dry, weight.

The total lipid content expressed in mg/100 gm dry weight in the tissue of freshwater female crab *Barytelphusa guerini* varied from 23.13 to 27.00 in leg muscle; 20.01 to 29.45 in gill muscle; 26.36 to 34.16 in hepatopancreas and 15.06 to 21.41 in heart muscle of Endosulfan exposed animals. The total lipid content was increased in gill muscle and heart muscle up to 24 hours as compared to control and then decreased up to 48 hours and gradually increased up to 96 hours. Lipid content in Hepatopancreas it increases up to 48 hours and slight decline in slope at 72 hours again it increased at 96 hours as compared to control.

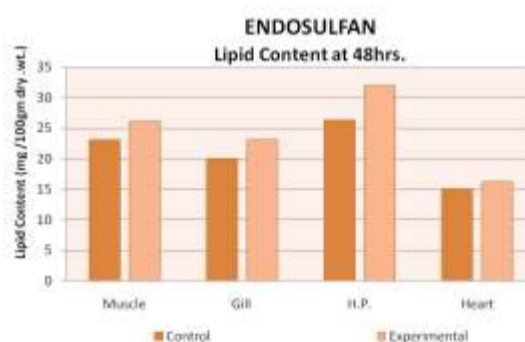
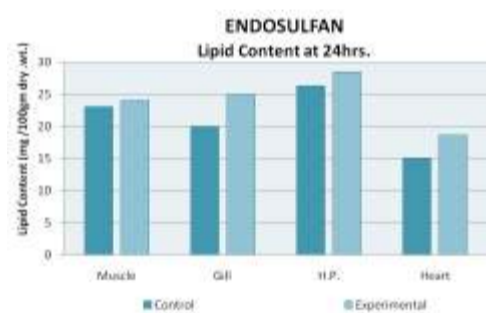
Effect of Endosulfan on Lipid contents in Freshwater Female Crab *Barytelphusa guerini*

Sr. No.	Duration of Exposure	Muscle	Gill	Hepatopancreas	Heart
1.	Control	23.13 ± 0.051	20.01 ± 0.098	26.36 ± 0.051	15.06 ± 0.081
2.	24	24.08 ± 0.098*	25.08 ± 0.040**	28.51 ± 0.075**	18.61 ± 0.075**
3.	48	26.16 ± 0.051**	23.15 ± 0.054*	32.05 ± 0.054***	16.28 ± 0.075***
4.	72	27.93 ± 0.136 NS	26.83 ± 0.051*	30.78 ± 0.040**	19.03 ± 0.048*
5.	96	27.00 ± 0.109**	29.45 ± 0.054*	34.16 ± 0.051**	21.41 ± 0.040**

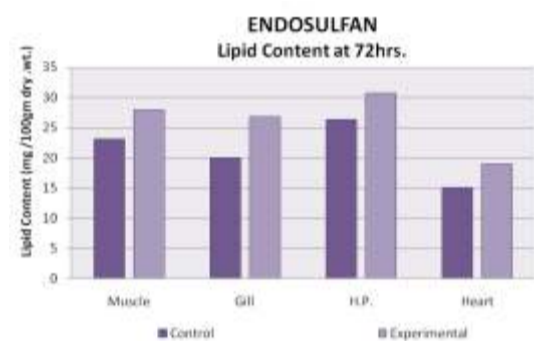
- Note: 1) Values expressed as mg lipid/gm dry, weight of animals.
 2) Each value is mean of six observations ± S.D.
 3) Value are significant at * = P<0.05, ** = P<0.01, ***=P<0.001 & NS – Not significant

Effect of Endosulfan on Lipid Content in *Barytelphusa guerini* (24 hrs. 48 hrs. 72 hrs & 96 hrs.)

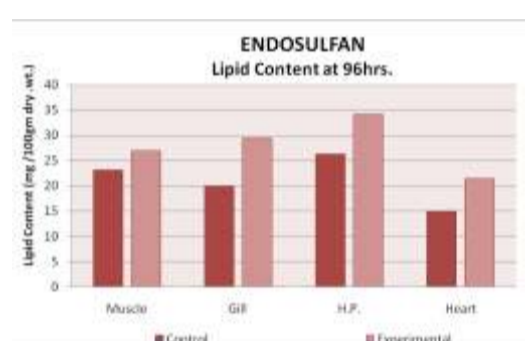
(Each value is the mean of six observations ± S.D.) (Each value is the mean of six observations ± S.D.)



(Each value is the mean of six observations \pm S.D.)



(Each value is the mean of six observations \pm S.D.)



DISCUSSION:

Lipids are the most important source of energy and structural components in crustaceans. Swami *et al.*, (1983) observed that there is a metabolic shift from carbohydrate to lipid through acetyl-CoA barrier leading to an increase in lipids in freshwater mussel, *L. marginalis* under organochlorine intoxication. Perhaps the same reason may hold good for an increased lipogenesis in crab tissues under Endosulfan exposure. The possible explanation for lipogenesis at tissue level may be due to the metabolic regulation and compensation by certain lipid fractions like phospholipids, cholesterol, free fatty acids etc. in order to overcome the stress caused by organochlorine insecticide, Endosulfan, besides safeguarding the cellular integrity and functions of the respective tissues to the extent possible.

The hepatopancreas has shown greater increase in total lipids at 96h lethal exposure indicating that this tissue has become activated under Endosulfan exposure. Though the total lipid content in the claw muscle tissue increased, the increase was not as much as it was in hepatopancreas and gill tissues, indicating lipogenesis in these tissues was more concerned with the maintenance of tissue structure function relationship. Under Endosulfan exposure next to hepatopancreas, maximum increase in the total lipids was found in gill at 96h sub-lethal. Gill is the first tissue to encounter Endosulfan impact. Hence, the gill tissue seems to become highly activated during Endosulfan exposure appears reasonable. Another noticeable aspect is the tissue specific variation in total lipid content with reference to exposure periods. Under Endosulfan exposure, the increase in lipid content in all three tissues is gradational and significant, reaching maximum level at the 96h sub-lethal.

The elevated total lipid levels in all the tissues indicated lipogenesis which appears to be responsible for maintain the dynamics of tissue metabolism and homeostasis (Madhu, 1983). Since, metabolic compensation normally occurs under any stress condition, it should involve breakdown and synthesis of products necessary to cope up with the altered situation.

The increased phospholipids content in hepatopancreas, claw muscle and gill tissues of *O. senex senex* exposed to sub-lethal and lethal concentrations of Endosulfan revealed maximum increase at 96h sub-lethal and 96h lethal exposures. An increase in the phospholipids content under organochlorine intoxication has been reported by many workers (Agarwal *et al.*, 1981; Chung Jung *et al.*, 1981; Madhu, 1983; Harold Philip, 1984).

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