

EFFECT OF CYPERMETHRIN ON LIPID LEVEL OF FRESHWATER CRAB *P. JACQUEMONTII* HEPATOPANCREAS AND MUSCLE

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ABSTRACT

Lipids are of immense nutritional importance from the stand point of quality and quantity. A biochemical constituent of the Muscle and Hepatopancreas was lipid in *P. Jacquemontii*. The result of total lipid content in tissues like Hepatopancreas and Muscle were determined in *P. Jacquemontii* (Rathban) freshwater crab is very sensitive to pollution. The biochemical constituents like lipid content in Muscle and Hepatopancreas in *P. Jacquemontii* was increased in normal. Lipid content was decreased in eyestalk ablated and Cypemethrin exposed crab. Lipid level was also increase in eyestalk ablated crab plus pesticide exposure and eyestalk extract injected crab i.e. as like the normal crab.

Keywords: *P. Jacquemontii*, lipid, Muscle and Hepatopancreas

INTRODUCTION

Crustaceans are the important aquatic biota (Mali and Kalyankar, 2006). Despite concern over environmental contamination by pesticides man continuousto depend on the pest control chemicals for increasing agriculture productivity and disease control. Cypemethrin one of the handful of light stable synthetic pyrethroid is registered to control cockroaches and other indoor pests. The study of impact of pesticides on animal life in fresh water is only one aspect of the much wider problem of chemical contamination of environment in general (Chandrakala *et al.*, 2008; Brittain *et al.*, 2010). Depending on the specific product formulation EPA classifies pesticide containing Cypemethrin class II or III. Compared to other pyrethroid Cypemethrin is relatively stable (Sarkar *et al.*, 2005; Suman *et al.*, 2006). Cypemethrin is considered to be moderately toxic and like all pyrethroid affects the central nervous system (Suman *et al.*, 2006; ETN Cypemethrin 1996). The present investigation has been undertaken to account for the changes

occurred in the lipid content of Hepatopancreas and muscle of fresh water crab *P. Jacquemontii*. *P. Jacquemontii* has been selected as a test animal because of it's easily and abundantly availability in most of the fish market.

MATERIALS AND METHODS

The freshwater crabs *P. Jacquemontii* were collected from local fish market. All the animals used were of same size (6.5 x 5.3cm) and weight about (55.65 gm). They were acclimatized to laboratory conditions for 3-4 days. For the purpose experimental work to take acclimatized fresh water crab *P. Jacquemontii*. The muscle tissue and Hepatopancreas tissue from group of crab were taken in separate petridishes blotted with filter paper to remove excess water weighed and dried in an oven. The dried material was assayed for biochemical composition in the lipids by soxhlet extraction procedure. The test crabs were divided into four groups having equal animals.

Table1: Group of test animals

Group-I	Normal crab treated with lethal concentration (LC 50 196) of Cypemethrin 24, 48, 72 and 96 hrs.
Group-II	Eyestalk ablated control exposed to Normal crabs treated with sub lethal concentration of Cypemethrin for 24, 48, 72 and 96 hrs.
Group-III	Eyestalk extract injected control exposed to Normal crabs treated with sub lethal concentration of Cypemethrin for 24, 48, 72 and 96 hrs.
Group-IV	Normal control exposed with Cypemethrin (LC ₅₀ 196 hrs) for 24, 48, 72 and 96 hrs.
Group-V	Eyestalk extract ablated crabs control exposed with Cypemethrin (LC ₅₀ 196) for 24, 48, 72 and 96 hrs.

Biochemical effect of sub lethal concentration of Cypemethrin exposed to eyestalk ablated with extract injected crab. After exposure of animal of above experimental group Cypemethrin Hepatopancreas and muscle were removed and kept in ice cold petridish.

Table 2 Water analysis from Ambe Ghosale Lake of Thane City, Maharashtra during January to December 2011

Parameter	January to March	April to June	July to September	October to December
pH	8.4	8.1	7.8	8.1
Temp (°C)	24.2	26.8	25.2	26.5
TDS (mg L ⁻¹)	475	502	490	510
Salinity (mg L ⁻¹)	318	322	310	340
DO (mg L ⁻¹)	7.1	5.5	6.8	6.2

RESULTS AND DISCUSSION

The result of total lipid content in tissues like Hepatopancreas and muscle were determined in *P. Jacquemontii* (Rathban) freshwater crab is very sensitive to pollution. The biochemical constituents like lipid content in Muscle and Hepatopancreas in *P. Jacquemontii* is increased in normal (Sublethal concentration). Same kind of result in (Pampatwar *et al.*, 2005) found. Lipid content is decreased in eyestalk ablated and Cypemethrin exposed crab. Lipid level is also increase in eyestalk ablated crab plus pesticide exposure and eyestalk extract injected crab i.e. as like the normal crab (such observations are observed in muscle of crab).

In Hepatopancreas of crab eyestalk ablated condition (Normal) exhibit decrease the lipid content. Increase in normal crab on exposure to Cypemethrin. Eyestalk ablated further exposure also shows decrease the lipid content in Hepatopancreas. Eyestalk ablated crab when extract injected exhibited and increase the lipid content. The lipid forms an essential part of the protoplasm. They are the important constituents of diet due to their higher energy value (Pampatwar *et al.*, 2005). Chemical composition of all carbon, hydrogen and oxygen resemble the carbohydrates. Lipid content may vary from species to species.

Table 2: Lipid content in Hepatopancreas and muscle of freshwater crab *P. Jacquemontii* exposed at 24 hrs.

Tissues	Normal (N)	Eyestalk Ablated (EA)	Eyestalk Extract Injected	Cypemethrin exposed	Extract Ablated with Cypemethrin exposed
Hepatopancreas	48.532	46.51	44.80	36.28	34.12
Muscle	38.21	36.36	34.27	32.68	30.24

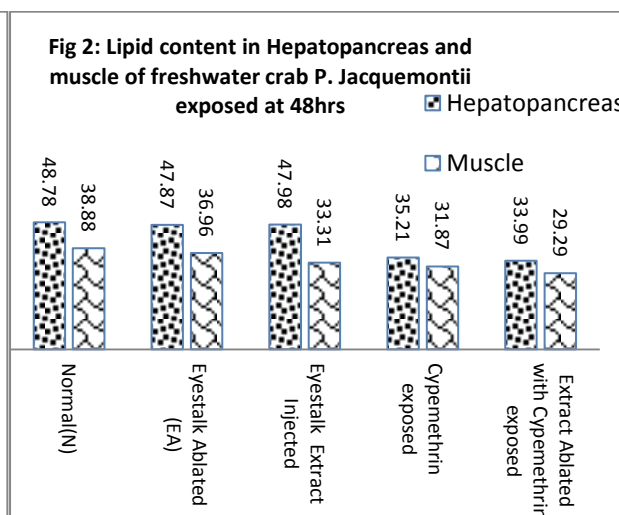
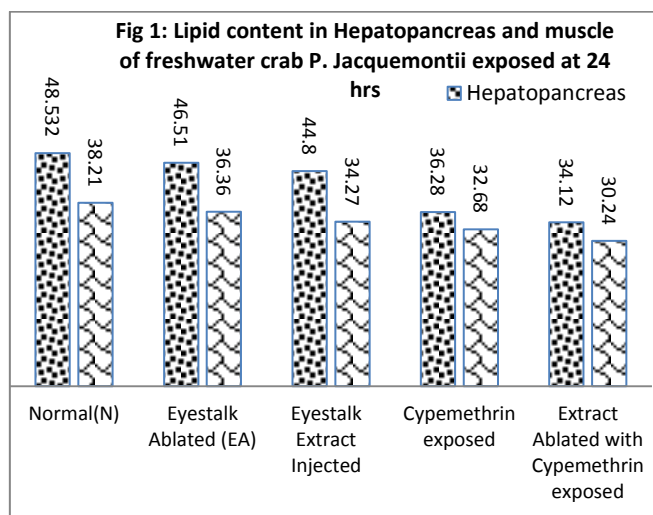


Table 3: Lipid content in Hepatopancreas and muscle of freshwater crab *P. Jacquemontii* exposed at 48 hrs.

Tissues	Normal(N)	Eystalk Ablated (EA)	Eystalk Extract Injected	Cypemethrin exposed	Extract Ablated with Cypemethrin exposed
Hepatopancreas	48.78	47.87	47.98	35.21	33.99
Muscle	38.88	36.96	33.31	31.87	29.29

Table 4: Lipid content in Hepatopancreas and muscle of freshwater crab *P. Jacquemontii* exposed at 72 hrs.

Tissues	Normal(N)	Eystalk Ablated (EA)	Eystalk Extract Injected	Cypemethrin exposed	Extract Ablated with Cypemethrin exposed
Hepatopancreas	45.86	44.98	45.03	33.19	31.87
Muscle	37.89	35.69	31.41	30.62	26.36

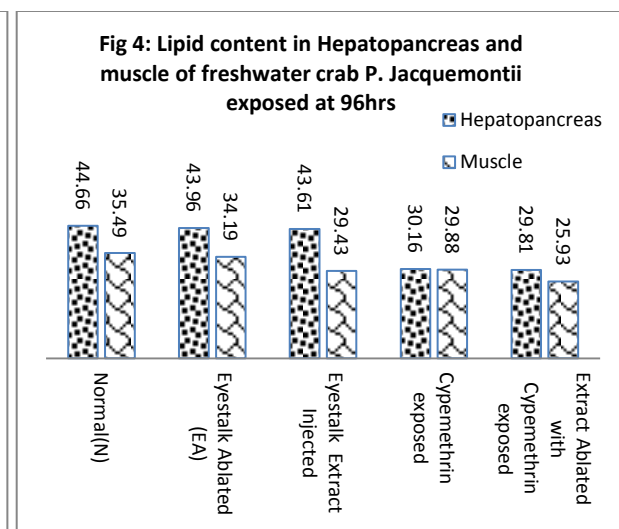
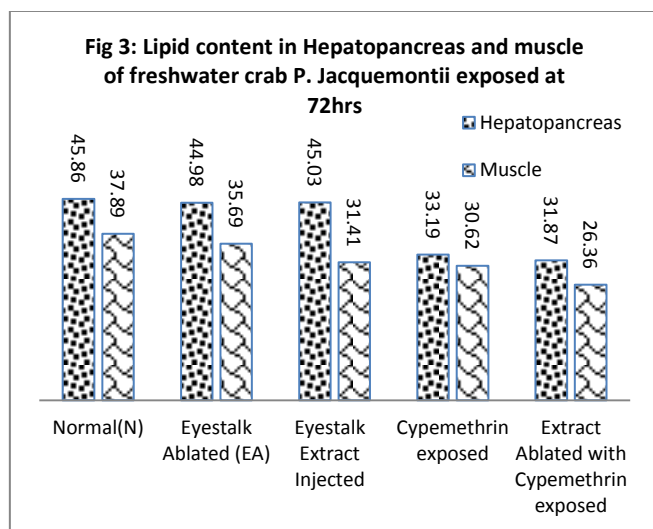


Table 5: Lipid content in Hepatopancreas and muscle of freshwater crab *P. Jacquemontii* exposed at 96 hrs.

Tissues	Normal(N)	Eyestalk Ablated (EA)	Eyestalk Extract Injected	Cypemethrin exposed	Extract Ablated with Cypemethrin exposed
Hepatopancreas	44.66	43.96	43.61	30.16	29.81
Muscle	35.49	34.19	29.43	29.88	25.93

Lipid content of Hepatopancreas increased in normal crabs on exposure (patil *et al.*, 2008); crabs on eyestalk ablation showed decrease in the lipid content from that of normal ones; ablated crabs on further exposure also showed decrease in lipid content and was found to be significant ($p < 0.001$). In contrast the ablated crabs on eyestalk extract injection exhibited an increase in lipid levels and found to be significant ($p < 0.001$) In (Bhavan *et al.*, 2008) author made detailed investigation of the sulphovanilline method for total lipids. They found the concentration of total lipid was higher in the Hepatopancreas, as well as gills and muscle. In cases total lipid, the total percentage differences were found high in the muscle, as well as in gills and less in the Hepatopancreas. When the crab was exposed to sublethal concentration of cypermethrin, the bioaccumulation (Sreenivansan *et al.*, 2011) in eyestalk was decreased whereas for higher concentration the bioaccumulation increased for 48 hrs to 96 hrs days respectively. It is observed that the lipid content level is decreased in

Hepatopancreas due to accelerated hydrolysis of lipid.

In the experimental crabs, the lipid content level decreased in all the tissues like Hepatopancreas, muscle, ovary etc tested. (Nagabhushanam *et al.*, 1972) reported reduction in lipid level in Hepatopancreas in *M. kistensis* in response to pesticides.

Similarly, in the present study, the reduced lipid content in Hepatopancreas and Muscle of Eyestalk ablated and eyestalk extract injected crab shows decreased lipid content compared to normal control crab.

In the present study of test animal *P. Jacquemontii* it was observed that tissues like Hepatopancreas and Muscle of Eyestalk ablated and eyestalk extract injected crab shows decreased lipid content compared to normal control crab. After exposure of Cypemethrin in the control crab there is drastic change in the Cypemethrin exposed as well as eyestalk extract ablated with Cypemethrin exposed crab.

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