

# Biochemical Analysis to Study the Nutritive Value of the Fish *Catla Catla* after Exposure To The Phytotoxin from *Lasiosiphon Erioccephalus*

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**Abstract**---The amount of biochemical constituents such as protein, lipid and glycogen in fishes is used for the determination of their nutritive value. The fresh water fish *Catla catla* when exposed to the sublethal concentration (83.60 ppm) of plant toxin from *Lasiosiphon eriocephalus*, significant decrease in total protein, lipid and glycogen content of liver, muscle and kidney was observed after 96 hrs of exposure period. Maximum decrease in the amount of calories was recorded as 17.21%, 17.54% and 11.70% respectively in liver, muscle and kidney of the fish *Catla catla*. The results were discussed on the basis of metabolism in the fish.

**KeyWords**---Fish, Nutritive Value, Phytotoxin

## I. INTRODUCTION

THE fish *C. catla* is a commercially important freshwater fish due to its food value. In India biochemical constituents of fishes have been analyzed mainly for the nutritive value of fishes [1]. The effect of factory effluent and synthetic chemicals including pesticides, detergents and fertilizers on the biochemical constituents was studied by many investigators [14]- [13]- [4]- [2]- [7] and [6]. However reports on the effect of phytotoxins on the biochemical constituents are mere. Hence, the present paper reports, studies on the effect of phytotoxin from *Lasiosiphon eriocephalus* on protein, lipid and glycogen content of liver, muscle and kidney of commercially important fresh water fish *Catla catla*.

## II. MATERIALS AND METHODS

Healthy adults of fish *Catla catla* with average length 9 cms. and average wt. 110 gms. were collected from the local tank Dhom in Satara district (Maharashtra). These fishes were acclimated to the ambient laboratory conditions, for seven days by holding them in large glass containers in chlorine free water. During acclimation fishes were fed by standard fish diet every day. The leaves of *L. eriocephalus* were collected, air dried and powdered mechanically. This powder was then extracted in ethanol by using Soxhlet's apparatus. The ethanol

extract of fruits of *L. eriocephalus* was dried in vacuum desiccators.

Then ten fishes were exposed to the sublethal concentration (83.60 ppm) of ethanol extract of fruits of *S. laurifolius*. A control set was maintained. After intoxication for 96 hrs, two fishes were taken out and stunned to death. A fish was dissected to separate, Liver, Kidney and Muscle tissues. Then all tissues were rinsed in water and kept in petridishes at 0°C.

Then tissues were weighed and used for biochemical analysis. Proteins, glycogen and lipid were estimated by method of Lowry [10], Caroll method [5], and Folch method [9] respectively.

The average values in Calories or Kilo Calories (c) obtained per gram of the tissues have been given as Glycogen = 3.60, Proteins = 4.10 and Lipids = 9.30. These values were used for the calculation of Cal / 100 gms.

## III. RESULTS AND DISCUSSION

Exposure of *Labeo rohita* for 96 hrs. to the sublethal conc. (83.60 ppm) of phytotoxin from fruits of *S. laurifolius*. showed decreased level of the proteins, glycogen and lipids in Liver, Kidney and muscle (Table No. 1).

Percentage decrease in the values of proteins, glycogen and lipids was also shown in the Table No. 1. Total proteins were decreased by 21.33%, 23.09% and 18.43% in liver, Muscle and Kidney respectively. Depletion in the glycogen content of liver, muscle and kidney was recorded as 22.46%, 23.09% and 22.19% respectively. While lipid values were also depleted by 18.14%, 10.48% and 11.11% respectively in liver, muscle and kidney.

Total percentage decrease in the calories of the liver, muscle and kidney of the intoxicated *Catla catla* was found as 19.77% 19.67% and 17.37%.

Similar type of decrease in the level of protein, glycogen and lipid was reported by [12] in Juvenile coho, [14] in *I. mossambica*, and [6] in *A. scandens* after exposure to the kraft pulp mill effluent, heptachlor, nuvacron, tannic acid and lead nitrate respectively.

Reference [19] stated that protein is the energy source to spare during the stress conditions. Reference [17] was of the opinion that decrease in protein level might be due to increased proteolytic activity, while Reference [8] reported

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that protein level in tissue may decreased due to anaerobic conditions produced by pesticide stress.

According to Reference [19] carbohydrate represents immediate and principal energy source for fishes exposed to stress conditions. Reference [3] reported that glycogen is utilized for energy production to meet higher energy demands to counteract pesticide stress.

Reference [16] concluded that decrease in the level of lipid might be due to its utilization to meet the additional energy requirement under stress, while [15] claimed that lipids might be hydrolyzed to overcome pesticide stress.

From the above discussion and present findings it is concluded that under stress condition caused by phytotoxin from fruits of *L. eriocephalus* fish required additional energy, which is obtained from metabolism of proteins, glycogen and Lipids, which further results in the decrease in protein,

glycogen and lipid contents of different tissues of fish *Catla catla*. Moreover it is also concluded that depletion in protein, glycogen and lipids decreases the nutritive value of the fish.

The nutritive value of the any food depends upon the amount of calories in the form of energy obtained from it. In our investigation after intoxication of the fish *labeo rohita*, the amount of glycogen, proteins and lipids were found decreased in the liver, muscles and kidney of the fishes, due to which amount of calories in the form of energy obtained from these nutrients get reduced. The reduction in the calories resulted in the decrease in the nutritive value of the fishes. Similar results were obtained by [11]. Hence it is concluded that piscicide from *L. eriocephalus* is the cause behind the reduction in the nutritive value of the fish *Catla catla*.

TABLE I  
CHANGE IN THE BIOCHEMICAL CONTENTS OF *C. CATLA*, AFTER EXPOSURE TO THE PLANT TOXIN FROM *L. ERIOCEPHALUS*, FOR 96 HRS.

Tissue	Biochemical constituent	Control (mg/gm)	Intoxicated (mg/gm)	% decrease	Calories (Cal/ 100gm)		
					Control	Intoxicated	%decrease
Liver	Glycogen	73.76	± 1.67	68.20	± 0.80	7.54	137.33
	Proteins	138.4	± 1.67	106.59	± 0.63	22.78	
	Lipids	58.47	± 1.48	48.57	± 0.91	16.93	
Muscle	Glycogen	73.76	± 1.67	68.20	± 0.80	18.27	94.122
	Proteins	129.14	± 1.15	101.26	± 0.81	21.59	
	Lipids	3.68	± 1.92	27.90	± 0.87	9.71	
Kidney	Glycogen	12.32	± 1.74	10.14	± 1.01	17.02	66.289
	Proteins	129.29	± 3.84	103.98	± 0.92	12.10	
	Lipids	14.53	± 1.98	13.28	± 0.71	18.60	

± SD, P<0.05

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