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STUDY OF BIOCHEMICAL ANALYSIS WITH REFERENCE TO THE NUTRITIVE VALUE OF FISH *CIRRHINUS MRIGALA* AFTER EXPOSURE TO THE PHYTOTOXIN FROM *LASIOSIPHON ERIOCEPHALUS*

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Abstract:
Cirrhinus mrigala is an important edible freshwater fish. The amount of biochemical constituents such as protein, lipid and glycogen in fishes is used for the determination of their nutritive value of the fish. The fresh water fish *Cirrhinus mrigala* when exposed to the sublethal concentration (79.90 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 amout of calories was recorded as 16.92%, 16.96% and 13.14% respectively in liver, muscle and kidney of the fish *Cirrhinus mrigala.* The results were discussed on the basis of metabolism in the fish.
Keywords – Fish, Nutritive Value, Phytotoxin

Introduction:

In India biochemical constituents of fishes have been analyzed mainly for the nutritive value of fishes Anon (1962). The fish *C. mrigala* in a commercially important freshwater fish due to its food value. The effect of factory effluent and synthetic chemicals including pesticides, detergents and fertilizers on the biochemical constituents was studies by many investigators (Radhai *et. al;* 1987, Murthy and Devi; 1982, Bengeri and Patil; 1986, Baigh *et al,* 1991; Deoray and Wagh, 1991 and Somanath, 1991, Chandravathy and Reddy, 1994). 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 *C.mrigala.*

Material and Methods:

Healthy adults of fish *C.mrigala* with average length 9±2 cms. and average wt. 12±2 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 feed 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 vaccum desicators.

Twenty fishes were exposed to the sublenthal concentration (79.90 ppm) of ethanol extract of leaves of *L. eriocephalus.* 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 00C.Then tissues were weighed and used for biochemical analysis. Proteins, glycogen and lipid were estimated by method of Lowry (Lowry *et al,* 1951), Caroll method (Caroll *et al,* 1956), and Folch method (Folch *et al,* 1957) 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.

Result and Discussion:

Fishes *C. mraigala* when exposed. to the sublethal conc. (79.90 ppm) of phytotoxin from fruits of *L.eriocephalus* for 96 hrs showed decreased level of the proteins, glycogen and lipids in Liver, Kidney and muscle (Table No. 1) Observations on percentage decrease in the values of proteins, glycogen and lipids are also shown in the Table No. 1. Total proteins were decreased by 17.40%, 18.31% and 14.54% in liver, Muscle and Kidney respectively. Depletion in the glycogen content of liver, muscle and kidney was recorded as 20.20%, 21.78% and 19.12% respectively. While lipid values were also depleteted by 15.00%, 12.41% and 5.32% respectively in liver, muscle and kidney. Total percentage decrease in the calories of the liver, muscle and kidney of the intoxicated *C. mrigala* was found as 16.92%, 16.96% and 13.14%.

Such type of decrease in the level of protein, glycogen and lipid was reported by Mcleay and Brown (1974) in Juvenile coho, Radhai *et al*, (1987) in *I. mossambica,* and Reddy (1994) in *A. scandens* after exposure to the kraft pulp mill effluent, heptachlor, nuvacron, tannic acid and lead nitrate respectively.

Table. 1- Alteration in the nutrients in some organ of *C.mrigala*, 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	71.50 ± 1.32	57.06 ± 1.32	20.20	137.589	114.308	16.92
	Proteins	136.18 ± 1.21	112.48 ± 1.21	17.40			
	Lipids	61.00 ± 1.22	51.85 ± 1.22	15.00			
Muscle	Glycogen	33.11 ± 0.60	25.90 ± 0.60	21.78	89.335	74.185	16.96
	Proteins	123.12 ± 0.94	100.58 ± 0.94	18.31			
	Lipids	29.32 ± 1.00	25.68 ± 1.00	12.41			
Kidney	Glycogen	11.40 ± 0.92	9.22 ± 0.92	19.12	71.271	61.904	13.14
	Proteins	132.98 ± 0.83	113.65 ± 0.83	14.54			
	Lipids	13.72 ± 0.87	12.99 ± 0.87	5.32			

± SD, P < 0.05

According to Umminger (1997) the protein is the energy source to spare during the stress conditions. Sastry (1979) was of the opinion that decrease in protein level might be due to increased proteolytic activity, while Dudhat and Bapat (1984) reported that protein level in tissue may decreased due to anaerobic conditions produced by pesticide stress.

Stress.

Umminger (1977) also stated that carbohydrate represents immediate and principal energy source for fishes exposed to stress conditions. Bakthavashsalam and Reddy (1983) reported that glycogen is utilized for energy production to meet higher energy demands to counteract pesticide stress.

Roe and Rao (1981) concluded that decrease in the level of lipid might be due to its utilization to meet the additional energy requirement under stress, while Rao *et al,* (1985) 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 *C. mrigala.* Moreover it is also concluded that depletion in protein, glycogen and lipids decreases the nutritive value of the fish.

Amount of calories in the form of energy obtained from food decides the nutritive value of the any food. In our investigation after intoxication of the fish *C.mrigala,* 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 (Pisca *et al,* 1992). Hence it is concluded that piscicide from *L. eriocephalus* is the cause behind the reduction in the nutritive value of the fish *C.mrigala.*

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