

**SUBLETHAL EFFECT OF ASATAF ON THE LIPID CONTENT OF BLOOD AND MUSCLE OF OREOCHROMIS MOSSAMBICUS**

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Article Received on 08/02/2019

Article Revised on 01/03/2019

Article Accepted on 22/03/2019

**INTRODUCTION**

Modern agricultural practices has affected the chemical nature of our environment. This may have deleterious effects on native flora and fauna. Pesticides form an indispensable part of modern agricultural practices. Their indiscriminate use has also led to destructions of many plants and animals. Despite the hazards that pesticides cause to the environment and human health, farmers apply ever increasing amounts of these toxic chemicals to their fields. The extensive use of pesticides to increase agricultural output has resulted in their adverse effect on non-target species also. Present study investigates and evaluates the toxic effect of Asataf, a commonly used organophosphate pesticide to the fish *Oreochromis mossambicus*.

**MATERIALS AND METHODS**

Healthy, uninjured specimens of *Oreochromis mossambicus* were collected and brought to the laboratory and were acclimatized to lab conditions for one week. Commercial formulation of pesticides Asataf was selected for the present study. The 96 hr. LC<sub>50</sub> value was determined using bioassay methods proposed by Doudoroff *et al.* (1951) and Probit analysis proposed by Finny (1971). One by two of LC<sub>50</sub> value was fixed as the experimental concentration. Quantitative estimation of total lipid in liver and muscle tissue and serum cholesterol, was done. Estimation of total lipid was carried out by Barnes and Blackstock (1973) method and estimation of cholesterol was carried out by Zlatkis *et al.* (1953) method. Data obtained on every 5<sup>th</sup> day for 30 days and statistically analyzed using ANOVA. A control was also maintained.

**RESULTS**

Total lipid content of the liver and muscle showed no major changes in values for fifteen days. The control values for liver total lipid ranged from 57.67 and 59.17.

In experimental fishes, up to fifteen days the values showed no significant changes from control values, whereas from twentieth day onwards there was a gradual decline in liver total lipid content. Values were 44.00, 38.00 and 34.83 on 20<sup>th</sup>, 25<sup>th</sup> and 30<sup>th</sup> day of exposure. Similar results were obtained in the case of muscle total lipid also. The control values were between 16.47 and 17.07. The experimental concentration recorded a decline in muscle total lipid from twentieth day onwards, the lowest values being 7.75 on 30<sup>th</sup> day of exposure (Table 1)

In control blood cholesterol values ranged between 118.92 and 122.5. Experimental concentration caused elevation of blood cholesterol values from fifteenth day onwards, values being 130.43, 150.89, 172.52 and 195.67 on 15<sup>th</sup>, 20<sup>th</sup>, 25<sup>th</sup> and 30<sup>th</sup> respectively. That is in experimental concentration the pesticide caused a reduction in lipid content in liver and muscle and an increase in blood cholesterol from twentieth day onwards.

**Table 1: Effect of experimental concentration of Asataf on the liver and muscle total lipid of *Oreochromis mossambicus*.**

Duration	Liver		Muscle	
	Control	Experiment	Control	Experiment
5 <sup>th</sup> Day	57.67	58.21	16.47	15.89
10 <sup>th</sup> Day	57.67	57.00	16.72	15.88
15 <sup>th</sup> Day	57.67	57.35	16.67	15.37
20 <sup>th</sup> Day	57.67	44.00	16.72	12.32
25 <sup>th</sup> Day	59.17	38.00	16.47	10.78
30 <sup>th</sup> Day	58.83	34.83	17.07	7.75

VR \*\*

CD (5%) = 0.64

**Table 2: Effect of experimental concentration of Asataf on the blood cholesterol level of *Oreochromis mossambicus***

	Control	Experiment
5 <sup>th</sup> Day	118.92	122.67
10 <sup>th</sup> Day	118.00	122.96
15 <sup>th</sup> Day	120.23	130.43
20 <sup>th</sup> Day	122.43	150.89
25 <sup>th</sup> Day	122.50	172.52
30 <sup>th</sup> Day	118.88	195.67

VR \*\*

CD(5%)=11.34

## DISCUSSION

Lipids serve as energy reserves to meet the metabolic demand for more energy and mitigate toxic stress. Since they form the energy rich reserves whose calorific value is twice that of carbohydrates or proteins, the mobilization of lipid reserves indicate higher energy demands, which generally occur during severe stress. In the present study, a decrease in the total lipid content of liver and muscle and an increase in serum cholesterol in the experimental concentrations suggest that lipids might have undergone lipolysis leading to energy production under severe stress. Earlier studies also showed utilization of lipids in various animals under toxic stress. Parvathy et al. (2000) reported a reduction in liver total lipid in *Tilapia mossambica* exposed to phosalone for 150 days. The fish, *Glossogobius giuris* exposed to fenthion showed an increase in cholesterol content of the testis (Zutshi, 2003). It is interesting to note that in the present study, lipid reserves started declining in the tissues slowly. Up to 20<sup>th</sup> day of exposure there was no significant change in liver and muscle lipid content and blood cholesterol level. Increased blood cholesterol in fishes treated with experimental concentrations of the pesticide, Asataf suggests stress induced hyper metabolic state of the animal indicating mobilization and utilization of cholesterol through blood

## REFERENCES

1. Barnes, H. and Blackstock, J. Estimation of lipids in marine animals and tissues: Detailed investigation of the sulphophosphovanillin method for 'total' lipids. *J. Exp. Mar. Biol. Ecol.*, 1973; 12: 103–118..
2. Doudoroff, P., Anderson, B.G., Burdick, G.E., Hart, W. B., Patrick, R., Strong, E. R., Surber, R. and Van Horn, W.M. Bioassay methods for the evaluation of acute toxicity in industrial wastes to fish. *Sew. Ind. Wastes.*, 1951; 23: 1380–1397.
3. Finney, D. J. Probit analysis. Cambridge University Press, 1971.
4. Parvathi, M. L. S., Reddy, C. S. and Chetty, N. In vivo recovery and long term effect of phosalone on total lipid and triglycerides in freshwater fish *Tilapia mossambica*(Peters). *Poll. Res.*, 2000; 19(3): 345–351.

5. Zlatkis, A., Zak, B. and Boyle, A. J. A New method for the direct determination of serum cholesterol. *J. Lab. Clin. Med.*, 1953; 41: 486 – 492.
6. Zutshi, B. Effect of fenthion on the testis of freshwater fish *G.giuris* (histochemical and biochemical). *Poll. Res.*, 2003; 22(2): 231–236.