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Acute and Chronic Effect of Pursuit on Protein Contents in Liver and Kidney of Fingerlings of *Tilapia mossambica*

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Abstract - Pesticides are continuously reaching water bodies from crop-fields either by rain drainage or by direct processes. On reaching water bodies these pesticides have fatal-effect on fishes, fingerlings, fries and eggs, causing damages to their organs and affecting their metabolism and survivalness. Present observation is an attempt to evaluate the toxicity impect of herbicide Pursuit on protein content of liver and kidney of Tilapia mossambica fish fingerlings exposed to acute and chronic sub-lethal concentration of pursuit exhibited significant depletion in the level of protein in liver and kidney.
Keywords: Herbicide, Tilapia, Protein metabolism, Liver, Kidney, Toxicity, Fingerlings.

Introduction - Pollution means the presence of any foreign substances in water that degrades the quality to constitute a hazard or impair its usefullness. Any changes in water component adversely affect the entire ecosystem resulting many organisms to death or extinction. The pollution of aquatic environment by pesticides adversely affects the survival of aquatic organisms including commercially important fish species (Johnson, 1973).

As fish is considered the most important and vital-link in the food chain of the ecosystem and the inland fisheries are important sources of protein in a nation's dite. So a through understanding of pesticidal effects on fishes would be really vital for fish conservation and fisheries development (Awasthi, 1998).

Pesticide which have been classified in various ways, amongst which herbicides are a class which specifically target to destroy weeds is a very familiar economical poison used in agricultural fields for the control of annual weeds to get maximum yield of crops in agriculture. Liver & Kidney are the organs which are involved in the metabolic and excretory mechanisms of the body. During this process they themselves get damaged by pollution in water. In the view of above facts the present work was undertaken which attempts to evaluate the impact of pursuit on the liver and kidney biochemical profile of the T. mossambica fingerlings.

Material & Method : Live fingerlings of Tilapia mossambica (average length of 5 to 7 cm) were collected and acclimatized in the aquaria for 15 days. The LC_{50}-value of species were determined. To observed the acute (96 hrs.) toxic effect of pursuit three different sublethal concentrations (63.7 ppm, 85.0 ppm and 127.5 ppm) of their LC_{50} were selected and to observed chronic toxicity (15 & 30 days) of these toxicant one sub-lethal value is considered. Quantitative estimation of total Protein were measured by the method of Lowry, et.al.

Result & Discussion : The effect of Pursuit on biochemical parameters of protein estimation was studied to understand their mode of action. The variation of protein contents is taken as good indicator for the extent of damages due to pesticide pollution of aquatic environment in general and pursuit in particular. In the present observation the total protein of experimental fingerlings are significantly decreased according to dose and duration of exposure when compared with control fingerlings. Toxicity of pursuit on biochemical constituents of liver for 96 hrs, 15 and 30 days are present in Table no. 1. The decrement of protein is due to the increased utilization of protein during stress condition. The result of pursuit toxicity on protein constituents of kidney for acute and chronic exposure are presented in Table no. 2.

Table No. 1 & 2 (see in next page)

(Each value experessed as mg/100 mg. wet weighted of tissue and each value is the mean $\pm$ standard eror of five individual observations).

The pursuit treated individuals showed a significant decreases -7.0344%, -17.3517%, -36.0410% over controle after acute exposure. Thereafter a gradual decrease in protein contents were noticed from -34.9085%, -45.1490% in a gradual manner after 15 & 30 days exposure. These observations were supported by the results of Shakoori et.al.

(1994), who investigated the toxicity of mercuric chloride in liver of chenopharyngodon and found decline trend in protein content. Bhaskar (1997), also noticed the effect of alloxen monohydrate on the protein content in the liver of Anabus and found remarkable depletion.

It may be possible that enhancement of protein in pursuit stressed fingerlings is due the increased proteolysis and utilization of the products of their degradation for metabolic purposes. After acute exposure of herbicide the kidney showed consistent depletion in amount of protein from -9.1946%, -9.6269%, -25.5412% over control. Thereafter 15th & 30th days of herbicide pursuit exposure the kidney showed consistent depletion in amount of protein from -36.3319% to -53.6826% over control. It may be suggested that initial decrease of protein content in kidney after acute and chronic exposure is the result of increased rate of protein synthesis and decreased rate of protein degration.

These increase or decrease of RNA play a vital role in protein synthesis. That's why the findings of Rajyashree and Anuradha (1996), supported this suggestion as they have reported anelevation in RNA along with protein content in liver of carbamid exposed Labeo-rohita and selenium exposed Anabas respectively. The investigation of Sivaprasad and Ramana Rao (1979), also exposure of Methyl parathion, Tannic-acid and endosalfon respectively.

References:-

1. Bhaskar S.G. (1997): Effect of alloxan monohydrate administration on the biochemical constituents of the bony fish Anabas testudineus (Bloch) part 1, Ecotoxicol, Monit, 7(1) : 027-032.
2. Lowry, O.H., Rosenbrough, N.J., Four, A.L. and Randall, R.J. (1951): Protein measurement with the folin phenol reagent, J.Biol.Chem. 193:265-275.
3. Rajyashree, M., Anuradha, C.H., Raju, T.N. (1996): Elevation in RNA along with protein content in liver of carbamid exposed Labeo-rohita and selenium exposed Anabas, J. Ecotoxicol. Environ. Monit. 6(1): 041-044.
4. Shakoori, A.R., Iqbal, M.J., Mughal, A.L. and Ali, S.S. (1994): Biochemical effect of mercuric chloride in liver of Ctenopharyngodon idella. J. Ecotoxicol. Environ. Monit. 4(2): 081-092.
5. Shivprasad Rao and Ramana Rao (1979): Effect of sublethal concentration of methyl parathion on selected oxidative enzymes of the Tilapia mossambica. Curr. Sci., 48:526-528.

Table No. 1. - Acute and Chronic Effect of Pursuit on Protein Content in Liver of Tilapia-mossambica Fingerlings

S.	Dose / Duration	Amount of Protein		% Change
		Control (mg)	Experimental (mg)	
1	63.7 ppm/96 hrs	44.2482 ± 19.7889	41.2419 ± 18.4444	- 7.0344
2	85.0 ppm/96 hrs	44.2482 ± 19.7889	36.6336 ± 16.3835	- 17.3517
3	127.5 ppm/96 hrs	44.2482 ± 19.7889	24.0903 ± 10.7738	- 45.1490
4	63.7 ppm/15 days	39.6606 ± 17.7475	25.8376 ± 11.5552	- 34.9085
5	63.7 ppm/30 days	37.5504 ± 16.7935	23.9749 ± 10.7222	- 36.0410

Table No. 2. - Acute and Chronic Effect of Pursuit on Protein Content in Kidney of Tilapia-mossambica Fingerlings

S.	Dose / Duration	Amount of Protein	% Change	
		Control (mg)	Experimental (mg)	
1	63.7 ppm/96 hrs	44.1737 ± 19.7550	40.1149 ± 17.9405	- 9.1946
2	85.0 ppm/96 hrs	44.1737 ± 19.7550	40.4579 ± 18.0938	- 9.6269
3	127.5 ppm/96 hrs	44.1737 ± 19.7550	32.9661 ± 14.7167	- 25.5412
4	63.7 ppm/15 days	41.6606 ± 18.6317	26.5764 ± 11.8857	- 36.3319
5	63.7 ppm/30 days	35.0084 ± 15.6567	16.1850 ± 7.2383	- 53.6826

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