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RESEARCH PAPER

Changes in Haemoglobin Concentration of Fresh Water fish *Channa punctatus* (bloch.) under the Exposure of Insecticide Aldicarb

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ABSTRACT
India has long coastal area throughout the country where fisheries and aquatic resources play an important role in maintaining the economy of country. But presently pesticides are one group of toxic compounds linked to human use that have a profound effect on aquatic life and water quality. Pesticides produce many physiological and biochemical changes in fresh water organism by altering the chemical composition of the natural aquatic environment usually affect behavioural and physiological stem of the inhabitants, particularly those of the fish. The present investigation deals with the analysis of blood of Channa punctatus (Bloch.) exposed to different sub lethal concentrations of aldicarb (LC_{50} - 1.006 Mg/l) for a period of 24, 48, 72 and 96 her. The study showed significant decrease in haemoglobin concentration. Hb con. decreased at all concentration and exposure time of aldicarb.
Key words: *Pesticide, Carbamate, Aldicarb, Hb con., Channa punctatus (Bloch.).*

INTRODUCTION

India is an agricultural country. Its population is increasing rapidly and mainly depends on agricultural products. So to enhance the crop production, the extensive use of pesticides, insecticides and other chemical fertilizers are being promoted by the government of India. Although these chemicals are beneficial but there excessive use causes serious damage to ecosystem – terrestrial as well as aquatic. There brocken down intermediates enter the water bodies as a result of rain and leaching from soil because of their careless direct discharge in to aquatic ecosystem. It is assumed that 25% of total used pesticides drain off in to open water bodies through rain fall and floods [1].

The most important aquatic fauna is fish that is highly sensitive to very low concentration of pesticides. Pesticide use is one of many factors contributing to the decline of fish and other aquatic species [2].

Haematological values are widely used to determine systematic and physiological adaptations including the assessment of general health conditions of animal. Blood is the most assessable body fluid and acts as a medium for transportation of various chemicals to various metabolic organs of the body. Thus provide an ideal medium for toxicity studies.

The haemoglobin concentration shows valuable information about red blood cell in a routine examination of a patient. Hb con. is the most accurate procedure available for the detection of anaemia or hypohaemoglobinemia.

In the present study, the fresh water fish *Channa punctatus* (Bloch.) was chosen an assay organism to evaluate the toxic effects of commonly used carbamate pesticide aldicarb.

MATERIALS AND METHODS

Fresh water fish *Channa punctatus* were collected from local fish market and were acclimatized for 7 days in large glass aquarium (80×80×50 cms.). The LC_{50} of aldicarb for the fish was determined by using linear regression method for 24, 48, 72 and 96 hrs. then these fishes were exposed in two different sub-lethal concentrations 0.60 mg/l and 0.80 mg/l of aldicarb. After exposure fishes were taken out of aquarium and blood was collected from caudal peduncle for haemoglobin concentration.

The Hb Con. was measured by Standard Sahli's method out lined by Wintrobe's method [3].

RESULT AND DISCUSSION

In the present study haemoglobin concentration was selected for evaluating the effect of aldicarb in *Channa punctatus* (Bloch.) for 24 to 96 hrs.

The results obtained on haemoglobin concentration of *Channa punctatus* expose to sub-lethal concentration of aldicarb for 24, 48, 72 and 96 hrs. are summarized in table-1.

In control set Hb con. ranges from 10.07 to 10.02 gm/dl with an average 10.04 gm/dl. After 24 hrs. treatment of aldicarb at 0.06 mg/l concentration the value of Hb con. is 9.52 gm/dl while after 48, 72 and 96 hrs. it decreases significantly up to 7.67 gm/dl. This decrease can also be seen at 0.80 mg/l concentration i.e up 7.55 gm/dl within 96 hrs.

This reduction of Hb con. in treated sets were indication of decline in haemoglobin synthesis as well as reduction in o_2 carrying capacity which was perhaps related to the interference of the pesticide with heam or globin synthesis pathway. The similar observations of decreasing Hb con. were also noted by Rao and Hymawathi [4], Savboda et al. [5], Tyagi and Srivastava [6] and Zahra and Shreeshth [7].

Reduction in haemoglobin concentration may also be due to hypohemoglobinemia. The finding is also supported by Joshef John [8] and Parma et al [9].

Table – 1:Total Hb con. in *Channa punctatus* after different sub-lethal concentration of Aldicarb

Hrs. → / Doses ↓	Control set	Treated sets			
		24 hrs.	48 hrs.	72 hrs.	96 hrs.
0.60 mg/l	10.07 ± 0.24	9.52 ± 0.23*	9.10 ± 0.25**	8.50 ± 0.45**	7.67 ± 0.46****
0.80 mg/l	10.02 ± 0.29	9.37 ± 0.19*	9.02 ± 0.20**	8.22 ± 0.49***	7.55 ± 0.44****

(Mean ± S.Em) all values in gm/dl

* Non Significant; * *Significant; ***Highly Significant; **** Very Highly Significant

REFERENCES

1. Anonymous, 1994. Monthly fisheries and livestock bulletin published by Fisheries and livestock information centre, Farmgate Dhaka – 1215, pp:130.
2. Kumar, A.V. 1994. Endosulfan induced biochemical and pathophysiological changes in fresh water fish *Clarias batracus* (Linn.) Ph.D. thesis, Osmania University, hydrabad, india.
3. Wintrobe, M.M. 1977. Clinical haematology Henery kipton. London. pp- 448.
4. Hymavathi, v. and L.M. Rao. 2000. Effect of sub-lethal concentration of lead on the haematology and biochemical constituents of *Channa punctatus*. Bull. Pure & Applied Sci. 19a(1):1-5.
5. Savaboda, M., V. Luskova and J. Drasticova Zlabe. 2001. The effect of diazinon on haematological indices of common carp *Cyprinus carpio*. Acta. Net. BRNO. 70: 457-465.
6. Tyagi, A. and N. Srivastava. 2005. Haematological response of fish Channa punctatus (Bloch.) to chronic zinc exposure. J. Environ. Biol. 26(2):228-232.
7. Zahra, K. and S. Shreeshth. 2006. Effect of glyphosate on various blood parameter of fresh water fish *Heterpneustes fossilis*. Flora Fauna, 12(1):100-104.
8. John, J. 2007. Alteration of certain blood parameters of fresh water fish *Mystus vittatus* after chronic exposure to metasystox & sevin. Fish. Physical. Biochem. 33: 15-20.
9. Parma, M.J., A. Loteste., M. Campana and C. Bacchetta. 2007. Changes in haematological parameters in *Prochilodus lineatus* exposed to sublethal concentration of cypermethrin. J. Environ. Biol. 28(1): 147-149.