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Toxicity on Blood Profile of Fresh Water Fish Heteropneustes Fossilis due to Pesticide γ-BHC

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ABSTRACT

γ-BHC caused 52.23%, 48.00% and 48.78% decrease in Haemoglobin, RBC count and Haematocrit of the fish within 24 hours at 123.50 mg/L concentration. Leucocytosis was evident due to the effect of the pesticide. Key Words: Pesticide, γ-BHC, Haematology and Fish.

INTRODUCTION

 γ -BHC is a contact insecticide and is used against bugs, grass-hoppers, thrips and many others. Earlier, the effect of γ -BHC on serum and tissue enzymes (SGOT & SGPT) of fish, *Heteropneustes fossilis* were studied (Goel and Maya, 1986, Goel et al., 1982, Gopal et al., 1982). In this paper, the effects of γ -BHC on haematological parameters - Hb, RBC, Hct and TLC exposed for 24 hours at 123.50 mg/L concentration, are given.

MATERIALS AND METHODS

Live specimens of fish, *Heteropneustes fossilis* were obtained from the river Gomti at Lucknow through fish hunters, Fishes were brought to laboratory in wide mouthed pots in natural water, and washed two times in tap water, and treated with 2% KMnO₄ to remove external parasites. Normal and healthy fishes were selected for the experiment and transferred to large glass aquaria. Fishes were acclimatized for 72 hours. Earlier, the lethal concentration of the pesticide γ -BHC for 24 hours was recorded (Mishra, and Srivastava, 1983). Water characteristics were analysed before and after 24 hours of pesticide treatment. Fishes were taken out after 24 hours of treatment. Blood was collected from the live fish (by puncturing the caudal vein) in vials and mixed with anticoagulant EDTA (Ethylene Diamino Tetra Acetic acid). Data in respect of Hb (gm%), RBC count (million/cmm), Haematocrit (%) and TLC (per cmm) were obtained by using Boehringer Mannheim Diagnostics HC-555 Machine.

RESULTS AND OBSERVATIONS

After dissolving the pesticide, pH of the medium slightly increased and the other characteristics remain almost unaffected (Table-1).

	Temp. (⁰ C)	рН	Alkalinity	Hardness	Dissolved O ₂				
			mg/L	mg/L	mg/L				
before	21.2 ± 1.3	7.1±0.3	115±3	110±2	6.2±0.3				
Treatment									
After	21.4±0.9	7.8±0.2	116±1	117±3	6.0±0.1				
Treatment									

Table 1. Water Characteristics	(Mean ± S.D.).
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Hb, RBC & Hct decreased 52.23%, 48.00% and 48.78% from controls respectively while TLC increased 120.00% at the same concentration (Table 2).

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	Hb (gm%)	RBC	Count	Hct (%)	TLC (per cmm)			
		(mill/cmm)						
Control*	6.7±1.2	2.5±0.8		8.2 ± 1.3	15000 ± 1,700			
Treated*	3.2 ±1.5	1.3±0.5		4.2 ± 1.1	33,000 ± 2,000			

Table 2. Haematological parameters (Mean ± S.D.).

* Number of observations 10 in each case

DISCUSSION

Haematological parameters can be used as indicators or monitors of prevailing aquatic pollution under natural ecological conditions and in the experimentally created aquatic environment polluted with contaminants (Sharma and Gupta Neelam, 1982, Van-Wazar, 1978). The organophosphorus pesticide - Rogor resulted in increase of leucocytes in *Clarias batrachus* from 25.55 thousand per cmm to 32.00 thousand per cmm in 96 hours at a sublethal dose of 10 ppm (Goel and Maya (1986). This pesticide decreased RBC count from 3.85 to 2.21 millions/cmm in the same period of exposure. Decreased RBC count was seen due to the effects of pesticides Malathion and Endosulfan (Singh, 1982, Naqvi, 1983). The findings in my laboratory are comparable to others (Abel, 1974, Hisar et al., 2004, Ram Nayan et al., 2009) and haematological parameters can be used to assess the prevailing water pollution.

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REFERENCES

- Goel, K.A. and Maya (1986). Haematological anomalies in *Clarias batrachus* under the stress of Rogor. Ad. Bios., 5.: 187-192
- Goel, K.A., Tyagi, S.K. and Awasthi, A.R. (1982). Effect of malathion on some haematological values in *Heteropneustes fossilis*. Comp. Physiol. Ecol., 7: 259-261.

- Gopal, K., Khanna, R.N., Anand, M. and Gupta, G.S.D. (1982). Haematological changes in fresh water fish exposed to *endosulfan*. Indust. Health, 20: 157-159
- Mishra, J. and Srivastava, A.K. (1983). Malathion induced haematological and biochemical changes in the Indian Catfish *Heteropneustes fossilis*. Environ. Res., 30: 393-398
- Singh, R.K. (1982). Ecophysiological Studies on Some Fresh Water Fishes. Ph.D. Thesis, University of Lucknow, Lucknow.
- Naqvi, M.S. (1983). Effect of Environmental Pollution on Physiology of Fresh Water Fishes. Ph.D. Thesis, University of Lucknow, Lucknow.
- Sethi, N., Singh, R.K. and Dayal, R. (1986). Toxic effects of Diammonium Phosphate on serum aminotransferases activity of teleost *Heteropneustes fossilis*. Ind. J. Bio., 2(3): 247-254.
- Sethi, N. and Singh, R.K. (1987). Serum inorganic phosphorus levels of fresh water mud-eel *Amphipnous cuchia* under intoxication of pesticide sumition. Ad. Bios., (II): 175-178.
- Sharma, R.C. and Gupta, Neelam (1982). Carbon tetrachloride induced haematological alterations in *Clarias batrachus* J. Environ. Biol., 3: 127-129
- Van-Wazar, J.R. (1978). In Phosphorous in the environment. Its Chemistry and Bio-chemistry Ciba Foundation Symposium, 5 (New Series), 5-15.
- Brain, M.C. and Card, R.T. (1972). Effect of inorganic phosphate on red cell metabolism in vitro studies. Adv. Exp. Med, Biol. 28, 145-154.
- Pawar, K.R. and Katdare. M. (1983). Effect of sumithion on the ovaries of fresh water fish *Garra mullya* (Sykes) Curr. Sci. 52. (16), 784-785.
- Altnok, I. and Capjub, E. (2007). Histopathology of rainbow trout exposed to sub lethal concentrations of methiocrab or endosulfan Toxicol. Pathol. 35, 405-410.
- Goel, K.A. Tyagi, S.K. & Awasthi, A.R. (1982). Effect of Malathion on some haematological values in *Heteropneustes fossils*. Comp. Physical Ecol. 7: 259-261
- Gopal, K. Khanna, R.N., Anand, M. & Gupta, G.S.D. (1982) Haematological changes in fresh water fish exposed to Endosulfan. Indust. Health 20: 157-159.
- Abidi, Rehana, (1990). Effect of endosulfan on blood urea of *Channa punctatus* (Bloch). Nat. Acad. Sci. Letters, 13(2), 73-76.
- Abel. P. D. (1974). Toxicity of synthetic detergents to fish and aquatic invertebrates. J. Fish Biol. 6 : 279-298.
- Hisar, S.A., Hisar, O. Yanik, T. and Aras, S.M. (2004) Inhibitory effects of ammonia and urea on gillcarbonic anhydrase enzyme activity of rainbow trout *Oncorhynchus mykiss*. Environ, Toxicol. & Pharma. 17, 125-128.
- Ram Nayan Singh, Rakesh Kumar Pandey, Narendra Nath Singh and Vijai Krishna Das (2009) Acute Toxicity and Behavioral Responses of Common Carp *Cyprinus carpio* (Linn.) to an Organophosphate (Dimethoate). World J. Zool. 4 (2), 70-75.

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