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By
T.S. Naqvi

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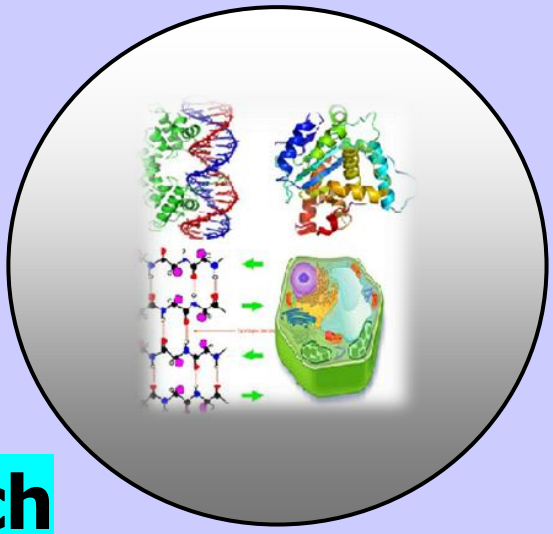

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Dr. T.S. Naqvi
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RESEARCH PAPER

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Sumithion Intoxication on Serum Inorganic Phosphorous Levels of Mud Eel, *Amphipnous cuchia*

T.S. Naqvi

Department of Zoology, Shia P.G. College, Lucknow-226020 U.P. India

ABSTRACT

Sumithion intoxication resulted in elevation of serum inorganic phosphorous levels of mud eel, Amphipnous cuchia. Maximum of 61.78% above control was observed after 96 hours exposure to 6.25 mg/l, concentration while minimum (7.72%) was seen at 3.25 mg/l. concentration after 144 hoots exposure. The fishes showed restlessness, efforts to escape from the toxic environment, gasping, unconsciousness, when either the concentration was gradually increased or the time of exposure was prolonged at lower concentrations.
Keywords: Amphipnous cuchia, Sumithion and Pesticide.

INTRODUCTION

Serum inorganic phosphorus plays an important role in phosphate homeostasis by inducing changes in ionised calcium, which in turn affects the secretion of parathyroid hormones. Several physiological abnormalities due to alterations in serum inorganic phosphorus levels occur in the toxicity of different chemicals. Increase in blood phosphate results in precipitation and decrease of calcium ions. In chronic liver disease, phosphate metabolism is disturbed. Toxicants disturb the phosphorus levels of fishes.

MATERIALS AND METHODS

The fresh water mud eel, *Amphipnous cuchia* were dug out from the pond, near Bakshi-Ka-Talab in the suburbs of Lucknow in the months of March to May. Fishes brought to laboratory in wide mouthed pots in natural mud, were washed 5 times in tap water, then treated with 2%, $KMn0_4$ to remove infections like fungi, bacteria, protozoa, monogenetic trematodes and arthropods etc. Uninfected, apparently normal and healthy fishes were transferred to glass aquaria and acclimated for 72 hours. Water characteristics were

estimated at beginning of experiment. Toxic environment was produced by dissolving calculated amount of the pesticide in water.

Fishes were taken out after definite time interval and were exposed to desired concentration of the pesticide, avoiding injuries and stresses of all kinds as far as possible. Blood from caudal vessels, or directly from heart and ventral aorta, was collected in clean, dry test-tube and allowed to clot at 10°C. The contents then centrifuged at 3000 r.p.m. and serum transferred to another clean dry test-tube and stored in refrigerator at 0°C. Serum inorganic phosphorus was estimated according to Gomori's method. Optical density was determined at 680 nm, by Spekol Spectrophotometer.

RESULTS AND DISCUSSION

The water characteristics, analyzed at the beginning of the experiment have been presented in Table - I and results obtained after experiment are shown in Table - 2.

Table 1.

Temp. O^0C	pH	Alkalinity mg/L	Hardness mg/L	Dissolved O_2 mg/L
25.92±1.57 (24.00-27.80)	7.62±0.09 (7.60-7.70)	120.00±3.35 (117.00-125.00)	118.25±1.60 (116.00-120.00)	6.30±0.18 (6.10-6.50)

Phosphorus chemicals degrade the environment frivolously (Van-Wazar, 1978). Increase in phosphorus contents in the body interfere with different metabolic pathways. In small quantities, it is utilised for promoting different activities and the excess is excreted in some form or the other. Inorganic phosphate just above the normal physiological range affected the metabolism of red cells in human's ATP and diphosphoglycerate levels were increased due to oral administrations of isotonic phosphate and it resulted in hyperphosphataemia in children (Brain and Card, 1972).

Phosphate stimulated parathyroid glands which resulted in increased serum phosphorus levels and decreased calcium levels in rats. Sumithion caused atresia of oocytes in *Garra mullya* (Pawar and Katdare 1983). The atresia of follicles may be due to inhibition of enzyme in steroidogenesis. A decrease in GSI was also observed. The present findings are supported by work of other workers, as the toxicity of sumithion evidently increased serum inorganic phosphorus levels of the mud-eel, *Amphipnous cuchia*. The behavioural changes seen in the mud eel, *Amphipnous cuchia* were well marked evidences on the toxic effects and discomforts felt by the fishes, which died when the dose became lethal. The fishes tried to ward off the toxic effects in the beginning and phosphorus levels increased, to the climax and then started falling until the fishes were exhausted and killed due to continued exposure to the toxic environment. Significant toxicity was observed due to agricultural fertilizers in fishes (Altnok and Capjub, 2007, Goel et al., 1982, Gopal et al., 1982, Singh, 1982, Naqvi, 1983, Abidi, Rehana, 1990, Abel, 1974, Hisar et al., 2004, Ram Nayan Singh, 2009, Ganga Rao et al., 2010, Pinar et al., 2011).

Table 2. Effect of Sumithion on Serum Inorganic Phosphorus Levels of *Amphipnous cuchia*.

Pesticides Concentration mg/L	Serum Inorganic Phosphorus mg/100*ml* Mean ± S.D. Range in Parentheses					
No. of Obs. 16 in each case	Time of Exposure in Hours					
	24	48	72	96	120	141
			Control value 2.46 ± 0.04 (2.42-2.53)			
3.75	2.82 ± 0.10 (2.61-2.84)	2.91 ± 0.09 (2.82-3.04)	3.69 ± 0.04 (3.65-3.75)	3.51 ± 0.04 (3.44-3.55)	2.75 ± 0.05 (2.73-2.83)	2.65 ± 0.09 (2.61-2.90)
5.00	2.75 ± 0.05 (2.73-2.83)	2.97 ± 0.04 (2.93-3.05)	3.32 ± 0.05 (3.24-3.34)	3.06 ± 0.02 (3.04-3.09)	2.87 ± 0.04 (2.03-2.93)	
6.25	2.90 ± 0.05 (2.88-2.93)	3.26 ± 0.17 (3.04-3.44)	3.93 ± 0.09 (3.87-4.08)	3.98 ± 0.09 (3.85-4.06)		
6.50	2.78 ± 0.04 (2.69-2.80)	2.89 ± 0.05 (2.81-2.91)	2.86 ± 0.04 (2.81-2.92)			
7.00	2.67 ± 0.04 (2.62-2.73)	2.78 ± 0.05 (2.73-2.83)				
8.00	2.88 ± 0.04 (2.79-2.91)					

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Corresponding author: Dr. T.S. Naqvi, Department of Zoology, Shia P.G. College, Lucknow-226020 U.P. India
Email: tsnaqvi8@gmail.com