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By
T.S. Naqvi

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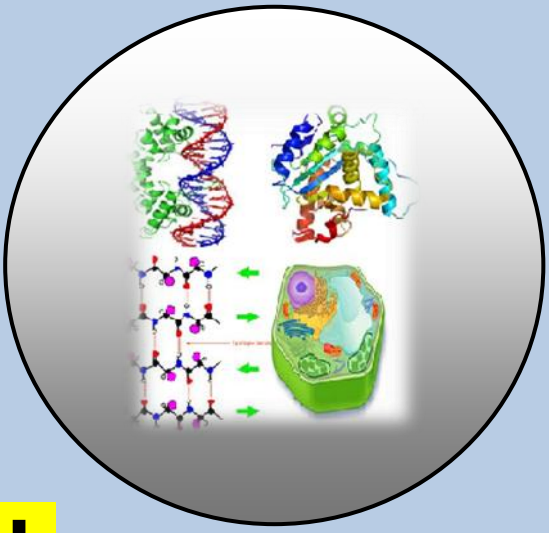

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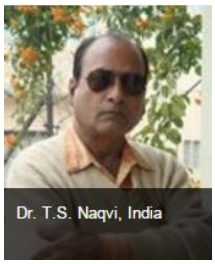

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RESEARCH PAPER

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Toxicity of Fertilizer Muriate of Potash on Serum Inorganic Phosphorus Levels of Cat Fish *Clarias batrachus*

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

ABSTRACT

Maximum increase 121.29% above control was observed after 24 hours interval, at 7.80 g/L concentration, while the minimum 4.14% was seen, after 144 hours, at 5.70 g/L concentration.
Keywords: Toxicity, Clarias batrachus, Muriate of Potash and Fertilizer.

INTRODUCTION

Increase in phosphorus contents in the animal body interfere with different metabolic pathways. In small quantities, it is utilized for promoting different activities and the excess is excreted in one form or the other. The total phosphorus contents of an aquatic area intensely affect the growth of aquatic plants and algae (Dillon and Rigler 1974, Dillon, P. J. and Rigler (1975), Vollenweider, (1975), Schindler, (1977). This often results in production of undesirable species of plants and fishes, and elimination of desirable economic forms of life. The effect of commonly used fertilizer muriate of potash was observed on serum inorganic phosphorus levels of cat fish *Clarias batrachus*, and results are given in this paper.

MATERIAL AND METHODS

Fresh water fish *C. batrachus* were collected from river Gomti of Lucknow, with the help of local fisherman by using hand nets. They were transported to the laboratory in natural water, in wide mouthed large plastic containers, avoiding injuries and stresses of all kinds. The fishes were washed three times in tap water, then treated with 2% $KMn0_4$ to remove infections like Protozoans,Trematodes Arthropods etc. Uninfected, apparently normal and healthy fishes were transferred to large glass aquaria maintained for these studies. The fishes were acclimated for 72 hours. Toxic environment was produced by dissolving different amount of the fertilizer in water.

Small mesh, hand nets of soft material were used for transferring fishes from holding aquaria to experimental aquaria. Three g/L water load was taken throughout the studies. The test solutions were selected by taking the highest concentration of the chemical lethal in 24 hours. Then progressively lower concentrations were used to find the concentrations lethal in 48, 72, 96, 120 and finally 144 hours, the maximum time of test in these studies. Fishes after definite interval and exposure were taken out and blood was taken in clean, dry test tube. The blood was centrifuged at 3,000 r. p. m. for ten minutes and serum was separated. For estimation of inorganic phosphorus in serum, the method of Gomorri was used (Gomorri, G. (1942).

RESULTS

The results obtained on serum inorganic phosphorus levels of fish *C. batrachus*, exposed for 24 to 144 hours, to six varied concentrations of muriate of potash are given in Table 1. The toxicity of the' fertilizer resulted in serum inorganic phosphorus levels at all concentrations and exposures. In the initial exposures, sudden high elevations were seen, and it decreased gradually. The fishes died in the terminal lethal intervals.

Table 1. Effect of Fertilizer Muriate of Potash on Serum inorganic Phosporus levels of *C. batrachus.*

Fertilizer Conc. g/L	Serum Inorganic Phosphorus mg/100ml. Mean+ S.D. (Range in Parenthesis) Exposure Time in Hours					
	24	48	72	96	120	144
No. of observation 10 in each case			Control value 4.61 ± 0.20 (4.40-4.83)			
5.70	7.33 ± 0.5 (6.65-7.97)	6.96 ± 0.10 (6.73-6.97	8.71 ±0.15 (8.66-8.98)	9.76 ±0.10 (9.73-9.97)	5.23 ±0.09 (4.99-5.21)	4.85 ±0.33 (4.17-4.81)
6.25	8.72 ±0.17 (8.43-8.78)	6.25 ±0.12 (6.18-6.47)	7.21 ±0.62 (6.29-7.66)	9.79 ±0.06 (9.74-9.89)	5.58 ±0.23 (5.32-5.79)	
6.80	9.62 ±0.18 (9.52-9.95)	9.08 ±0.07 (8.96-9.13)	6.42 ±0.10 (6.33-6.57)	5.83 ±0.08 (5.79-5.99)		
7.20	9.79 ±0.13 (9.61-9.90)	6.45 ±0.31 (6.01-6.75)	7.64 ±0.16 (7.42-7.79)			
7.80	10.26 ±0.68 (9.63-10.89)	7.54 ±0.14 (7.39-7.65)				
8.85	8.72 ±0.14 (8.61-8.92)					

DISCUSSION

It has been observed that aerosols of NaCI and ammonium sulphate disturb lipid metabolism and pulmonary functions of animals (Bruch et al., 1978). Potassium restriction in diet of dogs resulted in hyperchloremic acidosis (Hulter et al., 1980). Mineral metabolism in sheep was not affected by dietary potassium (Nishino et al., 1979), while sodium fluoride resulted in increase of diuresis and phosphate urea, sodium potassium (Kessabi et al., 1980), calcium and magnesium (Suketa et al., 1979). In-organic phosphate was excreted in phosphate and saline loading in sheep (Gunther, (1977). Phosphate levels of dogs were altered or increased in body fluids in intestinal infraction (Jamieson et al., 1979). In our study, elevations in serum inorganic phosphorus levels were observed showing disturbance of body chemistry of the fish.

In *Tilapia guinensis* various experiments were done using organic fertilizers (Altnok and Capjub (2007). Histopathological changes due to the use of methiocrab or endosulfan were studied on ranbow trout (Chukwu, and Okpe, (2006). Sub lethal dose of ammonia and urea concentrations inhibited physiological disorder in rainbow trout *Oncorhynchus mykiss,* (Erdogan et al., 2005), In the same fish ammonia and urea affected the activity of enzyme, gillcarbonic anhydrase (Hisar et al., 2004), The tobacco leaf dust altered the biochemical parameters of Hybrid catfish, *Clarias gariepinus* and *Heterobranchus bidorsalis* (Kabir Mohammad Adamu and OvieKori-Siakpere (2011). The organophosphate (Dimethoate) caused Acute Toxicity and Behavioral Responses of Common Carp *Cyprinus carpio*, (Ram Nayan Singh et al., 2009). In fishes ammonia toxicity caused many physiological disorders (Randall, and Tsui, (2002). Acute toxicity of inorganic fertilizers to African catfish, *Clarias gariepinus* (Teugals) had also been reported (Ufodike and Onusiriuka (2008). Acute toxicity levels and ethological responses were reported in *Channa striatus* to fertilizer and industrial wastewater (Yadav et al., 2007). Toxicity in rice-cum-fish culture systems were reported due to the effect of use of different fertilizers (Yaro et al., 2005). Fertilizers and drainage from turf grass affected the quality of ground and surface water (Zachary et al., 2004). Chronic ammonia toxicity to duckweed fed Tilapia, *Oreochromis niloticus* had also been reported (El-Shefai et al., 2004). Haematological response of African catfish *(Clarias gariepinus)* & rat to crude oil exposure had also been reported (Taofik et al., 2008).

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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