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By T.S. Naqvi

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Dr. T.S. Naqvi http:// <u>www.sasjournals.com</u> http:// <u>www.jbcr.co.in</u> jbiolchemres@gmail.com

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Effects of Fertilizer Muriate of Potash on Haematological Parameters of Fish *Clarias batrachus*

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T.S. Naqvi

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

ABSTRACT

The toxic effects of Muriate of Potash Fertilizer on haematological parametershaemoglobin, haematocrit, total erythrocyte count, and total leucocyte count of fish. Clarias batrachus were investigated and their functional relevance discussed in this paper. Keywords: Fertilizer, Muriate of Potash, Haematology and Clarias batrachus.

INTRODUCTION

The potash fertilizers contribute significantly to the presence of various forms of Potassium in the soil. Further, soil minerals, pH, aeration, moisture, Cations and Anions help in increasing the amount of Potassium in soils, thereby affecting the fauna and flora.

Increasing use of potash fertilizer in agriculture has prompted to investigate its effect on the health of river fauna especially the fish, *Clarias batrachus*. Keeping this in mind, the effects of fertilizer muriate of potash on haematological parameters of the fish were studied.

MATERIALS AND METHODS

Haemoglobin, total erythrocyte count, haematocrit and total leucocyte count of fresh water commercial fish, *Clarias batrachus* were measured (Joshi, 1978, Singh, 1982, Naqvi, 1983). The fertilizer Muriate of Potash (Potassium oxide 61%) was purchased from Government Approved Agricultural Shop, Daliganj, Lucknow).

RESULTS

Water characteristics, analyzed before and at the end of each set of experiment, using standard procedures (American Public Health Association), were well comparable (Table-I). However, the pH remained slightly changed after using the fertilizer.

At low concentrations (5.70, 6.25, 6.80 g/l) and brief exposure, the three parameters studied-haemoglobin, total erythrocyte count and haematocrit-remained almost unaffected. However, the fishes died in prolonged exposures, i. e. 96 to 144 hours, when the haemoglobin levels had fallen as compared to those from the controls.

At higher concentrations (7.20, 7.90, 8.80 g/1) and shorter exposures (24 to 72 hours) sharp falls in the levels of the three blood parameters were noticed. Maximum lowering of 25.75% in haemoglobin content, 31.25% in total erythrocyte count and 36.10% in haematocrit were recorded (Fig. 1, 2 & 3).

	Fertilizer	Exposur	Room	Aquari	рΗ	Hardness	Hardne	Alkalini	Dissol
	concentr	e Time	temp	a temp		(total	SS	ty	ved
	ation	(hr)	(⁰ C)	(⁰ C)		ppm)	(perma	(methyl	oxyge
	(g/L)						nent	orange	n
							ppm)	ppm)	(ppm)
	0.00*	00*	30.0*	23.5*	7.05*	182*	182*	264*	7.94*
		144*	29.6*	32.2*	7.20*	164*	164*	284*	7.19*
	5.70	00	30.2	24.5	7.20	178	178	464	7.79
		144	32.2	25.3	7.25	162	162	404	7.19
	6.25	00	30.2	94.2	7.25	159	159	449	7.64
		120	31.6	25.6	7.55	139	139	424	7.14
	6.80	00	30.2	24.0	7.37	153	153	474	7.79
		96	29.6	24.6	7.41	131	131	464	7.05
	7.20	00	30.2	23.9	7.40	151	151	494	7.59
		72	29.6	28.7	7.57	139	139	464	6.94
	7.90	00	30.6	23.2	7.35	141	141	569	7.84
		48	30.4	24.1	7.53	135	135	579	7.19
	8.80	00	30.6	23.1	7.45	131	131	531	7.59
		24	30.2	24.5	7.67	113	113	593	6.89

Table 1. Water	r characteristic after disslolving fertilizer muriate of potash at different time
	intervals and concentration with the fish <i>Clarias batrachus</i> .

* Control Values

Total leucocyte count at low concentrations (5.70, 6, 25, 6.80 g/1) and brief exposures, were similar to those of controls, while it increased gradually with progressing concentrations in longer time intervals. Total leucocyte count was the highest (43.77%) at the lowest concentration of 5.70 g/1 in 144 hours, after which the fertilizer proved lethal to the fishes. (Fig. 4).

DISCUSSION

Potassium salts are derived mainly from potash mines, and they cause branch-tip death, chlorosis and necrosis of leaves. Different chemicals and toxicants like mineral products, rock phosphate, potassium chloride and other potassium salts are formed during manufacture of fertilizers and they cause toxicity to animal including human beings (Barnhart, 1969, Furukawa et al., 1977, Kariya et al., 1976, Neathery et al., 1979).







Observed such clinical toxicity symptoms as excessive salivation, muscular tremors of legs and excitability with potassium dose 0.55 g /kg, and administration of potassium chloride at the dose levels of 1.75 g/kg proved fatal within three hours of administration. Toxicity of excessive potassium intake resulted in diminished growth rate, discoloration, haemorrhagic patches, drying and scaling of skin in mouse (Ogiwara and Hakoyarna, 1976). The toxic effect of the fertilizer Muriate of Potash resulted in significant hypervitaminosis to fishes *Clarias batrachus* and *Heteropneustes fossilis* (Joshi, 1978).

Haematological values can be used as a diagnostic tool to detect the impact of particular pollutant to fishes (Singh, 1982). As fertilizer Muriate of Potash caused remarkable changes in haematological values of fish *Clarias batrachus*, it can be used as an indicator for biomonitoring water pollution. Significat toxicity was observed due to agricultural fertilizers in fishes (Altnok and Capjub 2007, Erdogan et al., 2005, Hisar et al., 2004, Ram Nayan Singh et al., 2009, Randall and Tsui, 2002, Ufodike and Onusiriuka, 2008, Yaro et al., 2005, Zachary et al., 2004, El-Shefai et al., 2004).

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