EFFEGT OF UREA AND D.A.P. ON TOXICITY AND BEHAVIOURAL RESPONSES IN ANABAS TESTUDINEUS (BLOCH)

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***Abstract*: Studies on the effect of Urea and D.A.P. on toxicity and behavioural responses have been made in air breathing fish Anabas testudineus (Bloch). At 28.5.10C LC_{50} values of urea and D.A.P. in this has been computed to 3.415, 2.715, and 2.431 gm/l at 24th,48th and 72 th exposure respectively.The behavioural and opercular beating have also been studied after exposing the fishes at various concentration of Urea and D.A.P. The opercular beating decreased with increasing concentrations of Urea and D.A.P.**

***Keywords*: Urea, D.A.P., Behaviour, Toxicity, Opercular beatings.**

INTRODUCTION

In recent years large number of works have been carried out on the impact of insecticides and pesticides on the different aspect of fish toxicology (Kumar et al., 1995) but the various aspects of the toxicological actions and impact of the Nitrogen fertilizer, Urea and D.A.P. is still little explored as far as their effect on fish fauna is concerned. The present study, therefore, envisages the effect of Urea and D.A.P. vis-à-vis its concentrations and exposure periods ascertain the extent of toxicity and behavioural responses in air –breathing fish, Anabas testudineus (Bloch).

MATERIALS AND METHODS

Live specimens of Anabas testudineus (Bloch) of almost the similar body weight (65± 1.5 gm) were procured from local fish dealers at Katihar (Bihar) and acclimated in glass aquaria in the laboratory where fed on pieces of goat liver during a minimum acclimatization period in the laboratory for seven days. The TLM (medium tolerance limit of LC_{50}) values of nitrogen fertilizer Urea and D.A.P. was determined at 28.5 ± 1.0^{0}C by stetic acute bioars. Toxicity tests were carried out to estimate. LC_0, LC_{40} and values of Urea and D.A.P. by exposing the fisher for 24 h and 48 h in the aquarium containing Urea and D.A.P. The mortality in test concentration against time (Concentration of Urea and D.A.P. on X axis and % mortality on Y axis) was noted. The point at which the 50 % mortality occurred was considered at TLM value. Observation was considered as TLM value. Observation on behavioural responses and opercular beatings of the fish were madeduring their exposure the Urea and D.A.P.

The relationship between various concentration of Urea and D.A.P. vs opercular beating was established by least square regression method using the general equation Y= bx + a

Where X and Y are independent variables, a= intercept and b= regression coefficient

RESULTS AND DISCUSSION

The data showing the result of acute test of Urea and D.A.P.at 28.5 ± 1.00C have been summarized in Table 1 and data on opercular beating at various concentration of Urea and D.A.P. and statistical relationship between various concentration of Urea and D.A.P. vs opercular beating along with correlation coefficient are presented in Table 2. gm/l at 24th, 42th, and 72th exposure respectively. LC50 and LC100 values for 24th exposure of Urea and D.A.P. have been calculated to be 1.305 and 5.024 gm/l respectively.

Table 1 Effect of Urea and D.A.P. on toxicity in Anabas testudineus (Bloch). N= 10 for each set, water temp. $28.5 \pm 1.0^{0}C$.

Pollution	LC_{50} values (gm/l)			LC_0 (gm/l)	$LC01_0$ (gm/l)
	24th	48th	72th	24th	24th
Urea & D.A.P.	3.415	2.715	2.431	1.305	5.024

A perusal of Table 2 indicate that opercular beating decrease gradually with increase in the concentration of Urea and D.A.P. It is also observed that with unit increase in the concentration (gm/l) of Urea and D.A.P. opercular beating decrease (showing linear relationship) by a fractional power of -9.286 (b value, Table 2). The correlation coefficient (γ) value between these two parameters have been computed to be very high (-0.9996, Table 2)

Table 2. Mean opercular beating (per minute) of 48 h exposed Anabas testudineus at various concentration of Urea and D.A.P. and statistical relationship between concentration of Urea and D.A.P. vs opercular beatings.

Condition	Dose gm/l	Opercular beatings Per minute	%decrease in opercular beating	Equation Y=a+bx	Correlation coefficient(γ)
Control	------	74.0 ± 4.0			
Urea &	1.0	66.0 ± 3.0	8.33		
D.A.P.	2.0	56.0 ± 4.0	22.22	y = 75.0	-0.99-96
	4.0	38.0 ± 3.0	46.22	9.284X	

Behavioural response: When the Anabas testudineus Were suddenly exposed to lethal concentration of Urea and D.A.P. hyperexicitabitity, violent movement, increased secretion of mucus by skin and gills, bending of the body, loss of pigments, rotating all ground the aquarium, jumping and escating etc. were the symptoms usually noted in the fishes during Urea and D.A.P.

A critical evaluation of the previous literature indicates the effects of many pesticides and synthetic fertilizers on the fresh water fishes have been studied extensively and there is comparatively less work on the effect of Urea and D.A.P. compound on this group of fishes, although these compounds are commonly used in agricultural fields in this area. Toxicity is relative property of chemical which refers to its potential to have a harmful effect on living organism (Rand and petrocelli,1985). It is a function of the concentration of the chemical and duration of exposure. Toxicity tests are used to the adverse effects of a chemical on living organisms under standardized and reproducible condition which permit a comparison with other chemicals. The measure of toxicity most frequency used for fish and macro invertebrates is 96 h medians lethal concentration (Parrish, 1985, Pandey and Saxena, 1992) In the present study it has been observed that the system of Anabas testudineus can function within broad range of the fertilizer, the hyper-excitability,abnormal locomotion, disturbance in equilibrium and breathing increased opercular beatings, jumpting and escating, excessive mucous secretion on the gills and body and loss of pigmentation on the body (Sharma and Pandey, 1995) due to exposure of different toxicants as reported in different species of fishes by various investigators were also observed in the present investigation in Anabas testudineus exposed to Urea and D.A.P. during acute toxicity test.

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