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Toxicity and behaviour under Mardo intoxication in a fresh water teleost, *Mystus vittatus* (Bloch)

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Abstract- Studies on the effect of Mardo (organophosphate pesticide Profenofos, Mol, Wt. 373.6, Molecular formula C_{11} H_{15} Br Cr_{03} PS, obtained from Crop Health products Ltd, Ghaziabad U.P. India) on changes in behavioural of fresh water Teleostean fish, *Mystus vittatus* (Bloch) on the basis of interpolation of the data, the LC_0 and LC_{100} Values of Mardo were calculated to be 0.13 mg/l and 0.65 mg/l respectively. Calculated LC_{50} Values has been observed to be 0.490, 0.420, 0.330 and 0.270 mg/l at 24 hours, 48 hrs, 72 hrs, and 96 hrs exposure respectively. The treatment of sub lethal dosages (0.16,0.24, 0.32, 0.40, 0.48 and 0.56 mg/l) of Mardo for 24 hrs, 48 hrs, 72 hr and 96 hrs exposure respectively shows statistically significant decrease in most of the above noted in dices as compared to control. The reason for such changes has been discussed in this research paper.

Key words: Mardo, Toxicity, Behavioural, Teleostean, Interpolation, Statistically, *Mystus vittatus* (Bloch).

INTRODUCTION

The increased application of pesticides to ameliorate the agriculture problems couse pollution of fresh water ponds, lakes and rivers, as these pesticides reach the fresh water system through run off and other means of transportation. The industrial effluents let out by major industries from another source of pollution of water bodies. This severe problem of fresh water bodies has evinced enormous interest among researchers to carry out the investigation towards understanding the effect of a wide spectrum of pesticides on different species of fishes, for careful application of pesticides in agriculture operations. Since the fishes are extremely sensitive to pesticides and they are also used as indicators in water quality management.[1-4] In view of the paucity of information, an attempt is being made to study the toxicity and behaviour under mardo (an organophosphate pesticide) intoxication was grossly dependent on concentration and length of exposure, in an air breathing fish, *Mystus vittatus* (Bloch).

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MATERIALS & METHODS

Live specimens of fishes *Mystus vittatus* (Bloch) were procured from local fish dealers at Gaya, Bihar. The fishes were transported to the laboratory for proper acclimatization for first Ten days in the laboratory condition. They were fed daily with pieces of goat's liver.

Before Starting any experiment, toxicity values of Mardo an organophosphate pesticide were calculated by the method as described by APHA *et al.* (2012)[5] and the

experiments were conducted at sublethal concentrations (as illustrated in Table-1)

Table 1- Showing mortality percentage of *Mystus vittatus* (Bloch) exposed to mardo at water temperature 30.+ 1.0^0 c, N= 6, Body wt. 35 + 1.0 g.

Sl. No.	Concentration (mg/liters)	Time intervals (hrs)			
		24hrs	48hrs	72hrs	96 hrs
1.	0.16	10	20	30	40
2.	0.26	30	40	40	60
3.	0.32	40	60	60	70
4.	0.40	60	60	70	80
5.	0.48	70	70	80	90
6.	0.56	80	80	100	100

OBSERVATION & RESULT

On the basis of interpolation of the date the LC_0 and LC_{100} Values of Mardo were calculated to be 0.13mg/l. and 0.65 mg/l. respectively. Calculated LC_{50} Value has been observed to be 0.490, 0.420, 0.330 and 0.270 mg/l at 24 hrs, 48 hrs, 72 hrs and 96 hrs exposures respectively.

Table 2- LC_{50} (Median concentration) values (mg/ litre) of Mardo exposed in *Mystus vittatus* at water temperature

Group	Pesticide	LC_{50} Values (mg/L)				LC_0	LC_{100}
Organo phosphate	Mardo	24hrs 0.49	48hrs 0.420	72hrs 0.330	96hrs 0.270	0.13	0.65

The behavioural response of fish towards toxicant was grossly dependent on concentration and length of exposed when fishes were suddenly opposed to higher concentration of Mardo hyper excitability, increased aerial excursions and increased opercular movements.[6] Fishes were often observed swimming with jerky movements on the surface of water and tried to jump out of aquaria.[7,8] The higher concentration of Mardo exposure showed white wound patches on the skin surfaces, marked discoloration and depigmentation of the skin.

CONCLUSION

The present investigation deals with some information about the toxicity of mardo (profenofos). LC_{50} values and behavioural changes after the long time exposure have been taken into consideration on a fresh water edible fish *Mystus vittatus* (Bloch) and the study of aquatic animals is an essential first step concerning to the toxicity and evolution of pesticide impact on the fresh water environment. However, water temperature is one of the most important factors in the environment of an aquatic organism and also play a vital role in the determining their distribution, behaviour metabolism, respiration, blood circulation, growth and reproduction. This pesticide is very toxic but does not last long. It disintegrates fast due to this property. It is considered to be friendlier by farmers, as comparison to organochlorine and other organophosphate group of pesticides.

Since, pollutants induced toxicity in fresh water fishes, is well documented. So, toxicants induced changes in the respiratory behaviour and metabolic rate of fishes that seek the attention of many biologists. It is very interesting to note that all the different groups of pesticides of the same group do not have the same effect on fishes. However, it may be considered as an adaptive mechanism to avoid the stress of pesticide in the aquatic media, a view consistent with the finding of Chaturvedi (2007)[9], Roy and Kumar (2013)[10], Kumar and Keshri (2016)[11] in *Channa punctatus* (Block). Thus, the behavioural response of fish towards toxicant was grossly dependent on concentration and length of exposure.

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