

## STUDY OF LETHAL EFFECTS OF PESTICIDES (TRICHLORFON) ON FISH *HETEROPNEUSTIS FOSSILIS*

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**Key words :** Acute toxicity, Trichlorfon, Organophosphate, *H.fossilis*.

(Received ..... February, 2014; accepted ....., 2014)

### ABSTRACT

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Trichlorfon is a toxic pollutant, adversely affect the fauna of aquatic ecosystem. They enter in the body of organisms either directly or through food chain. The aim of the present study was to assess acute toxicity of this chemical on food fish *H.fossilis* was exposed to Trichlorfon to determine LC50 values for 24, 48, 72 and 96 hours. The mortality data was analyzed by Finney's Probit Analysis and was found to be 0.4, 0.8, 1.6, 3.2 and 6.4 mg/L respectively and the present work was undertaken to evaluate the effect of trichlorfon on acute toxicity level of fish *H.fossilis*.

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### INTRODUCTION

Water quality is important for all forms of life, nobody can live without water. If the quality of water is changed, it affects all the community found in that area. Different types of substances from both domestic as well as industrial are mixed with water and change its quality, left this one other source, agricultural runoff is also responsible for this, it drains into water bodies and cause water pollution, because different types of fertilizer, insecticides and pesticides are present in it and affect the water bodies. These chemicals are entering in their body either directly or through food chain and attack them and carry serious problem in most aquatic fauna and flora and to considerable extent man (Avoaja *et al.* 1997). Pesticides are important and useful tools in agriculture and forestry

but their contribution to the gradual degradation of the aquatic ecosystem cannot be ignored (Konar, 1975; Basak and Konar, 1976, 1977)

Trichlorfon is an organophosphorus insecticide used in agricultural fields for controlling different types of insects which are harmful for agricultural fields for controlling the parasites. It is also used for treating domestic animals for control of internal parasites (Hayes *et al.* 1982 and Cheminova, 1991). This pesticide is readily absorbed through the skin and highly toxic by all routes of exposure. When inhaled, the first effects are usually respiratory and may include bloody or runny nose, coughing, chest discomfort, difficult or short breath, and wheezing due to constriction or excess fluid in the bronchial tubes. Severe poisoning will affect the central nervous system, producing incoordination, slurred speech,

loss of reflexes, weakness, fatigue, involuntary muscle contractions, twitching, tremors of the tongue or eyelids, and eventually paralysis of the body extremities and the respiratory muscles. In severe cases there may also be involuntary defecation or urination, psychosis, irregular heartbeats, unconsciousness, convulsions and coma. Death may be caused by respiratory failure or cardiac arrest. The amount of a chemical that is lethal to one-half (50%) of test animals to which it is given is referred to as its lethal dose fifty, or LD50. The oral LD50 for trichlorfon in rats is 150 to 649 mg/kg, 300 to 1370 mg/kg in mice, 97 mg/kg in cats, 400 mg/kg in dogs, 420 mg/kg in guinea pigs, and 160 mg/kg in rabbits. The dermal LD50 in rats is 2,000 to 5,000 mg/kg and 1,500 to greater than 2,100 mg/kg in rabbits (Berg, 1986; NIOSH, 1981; Worthing, 1983; Cheminova, 1991; Witt *et al.* 1985).

## MATERIALS AND METHODS

Live and healthy fish collected from local fish market and treated with 0.05% KMnO<sub>4</sub> solution to obviate dermal infection. During this period fishes were fed with rice brain mixed with mustard oil cake and left over food in the tank was changed. After two weeks of acclimatization fishes were exposed to different concentration of trichlorfon. Stock solution of 1 g/mL was prepared in absolute alcohol. Variable quantities of stock solution were added to same volume of water in different glass aquaria whose capacity is 20 lit. By stirring with glass rod the pesticide was mixed thoroughly before adding fishes into aquarium. Fishes of similar size 15±5 cm and weight 125±5 gm. were sorted out and separated into 6 group (0.4 mL, 0.8 mL, 1.6 mL, 3.2 mL and 6.4 mL and one for control, and compared all these groups of animals. Observation made at 24 hrs to 96 hrs. The LD50 value was calculated with the help of Abbott's formula of Probite.

## RESULT AND DISCUSSION

The above work shows pesticides potential on fresh water edible fish *H. fossilis* with LD 50 0.134 mL/L which cause harmful effect on *H. fossilis*. Trichlorfon is highly toxic to both cold and warm water fish; its acute toxicity to freshwater fish is between 1.67 and 180 ppm (17). The 24-hour LC50 for striped bass was 10.4 ppm. The 48-hour LC50 for rainbow trout was 3.2 ppm. The 96-hour LC50 for fathead minnow was 180.0 ppm (Pimentel, 1971). Goel, 1981 described the toxicity of Bismark brown on clarias batrachus, F.A.

S. No.	Con.	No. of Fish Taken	No of Dead Fish After			
			24 H	48 H	72 H	96 H
1.	Con	15	00	00	00	00
2.	0.4 mL	15	00	01	01	02
3.	0.8 mL	15	01	02	03	03
4.	1.6mL	15	02	04	05	05
5.	3.2mL	15	04	05	06	----
6.	6.4mL	15	07	08	-----	----

Malla (2009) on Chloropyrifos toxicity on fish *Channa punctatus* and explained that toxicity of chemical depend upon exposure time. Trichlorfon contributes to the production of tumors Carcinogenic effects were seen in rats given oral doses of 186 mg/kg or intramuscular doses of 183 mg/kg for six weeks (NIOSH, 1981). No evidence of carcinogenicity was found in rats given the insecticide orally or intraperitoneally for 90 weeks (Hayes, 1982)

Trichlorfon primarily affects the nervous system through cholinesterase inhibition, by which there is a deactivation of cholinesterase, an enzyme required for proper nerve functioning. Trichlorfon is highly toxic to birds. The acute bird, or 'avian,' oral toxicity is 40-47 mg/kg (Windholz, 1983). Signs of intoxication in birds include regurgitation, imbalance, trembling, slowness, lack of movement and wing-beat convulsions. Signs of poisoning appeared as soon as 10 minutes after exposure, and deaths usually occurred within 30 minutes to 3 hours of treatment (Hudson *et al.* 1984).

## CONCLUSION

Pesticides are generally used routinely in the integrated farming which protect the crops from insect, weeds and disease, which posing great danger to aquatic environment persistent residue in air and water (Sharma and Prakesh, 2005,) analysed the presence of pesticides residue using solid phase extraction and gas chromatography.

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