

TOXICITY OF SOME ORGANIC BIOCIDES TO EXOTIC CARP FINGERLINGS *HYPOPHTHALMICHTHYS MOLITRIX* (C & V)

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ABSTRACT

Bioassay study was made using three organic pesticides to determine their comparative toxicity to fingerlings of *Hypophthalmichthys molitrix*. There was wide variation in the toxicity of different pesticides with 24 hr LC_{50} values ranging from 0.000403 to 0.294 mg/l. Endosulfan appeared to be the most toxic, whereas BHC was the least.

It is almost established that most of the biocides used for various purposes in agricultural fields, ultimately get deposited in nearby water bodies, influencing the aquatic environment and biomass in many ways (Joshi *et al.*, 1975). The present paper deals with the bioassays made on three biocides - Benzene hexachloride (BHC), Methyl parathion and Endosulfan for evaluating their 24 hr LC_{50} , fiducial limit, relative toxicity and safe concentration using the fingerlings of *H. molitrix* as test animal.

The live fingerlings of *H. molitrix* (70-100 mm) were collected from private fish culturist, Calcutta (W.B.). The fishes were kept in a big size plastic pool containing chlorine free water for 10 days. They were fed with rice bran and ground nut oil cake (1:1). Live plankton were also given as food. The feeding was discontinued 24 hr before and during the experiment. The chemicals were supplied by the following companies.

Present Address:

* Dighirahnia Fish Farm, Sunhat, Balasore (Orissa).

** Bara Sagar Dighi Fish Far, Malda (W. Bengal).

*** M.P. State Fisheries, Bhopal.

Chemical	Source
BHC-50 WDA Gamma Isomer 6.5%	Artee Minirals, Faridabad (Haryana)
Endosulfan 35EC	Shaw Wallace & Co., Madras
Methyl parathion 50EC	Pesticides fo India, Udaipur (Rajasthan)

Bioassay was conducted at 29-30°C employing the method of Tarzwell (1971). Ten fingerlings were taken for each concentration in every twenty five litre capacity aquarium, using 10 litre chlorine free water with the control to elucidate the natural mortality. All cares were exercised to select fish free from all external parasitic infection, injuries and any abnormality etc. Mortality was recorded as and when it occurred during 24 hr. No mortality was observed in the control set. During the experiment DO, CO₂, pH, total alkalinity and hardness of water were determined as per standard methods (APHA, 1980) and the observed values ranged between 6.5 - 7.0 ppm, 1-3 ppm, 7.7 - 7.9, 210-220 ppm, and 60-80 mg/l respectively. The experimental data were analysed by probit techniques (Finney, 1964). Fiducial limits at 5% level have been derived for each insecticides by taking normal variate 1.96 after testing the heterogeneity by X(3):

During the experiment abnormal behaviour such as erratic swimming, excitation, jerky movements and finally loss of equilibrium and death has been observed, when fingerlings were subjected to lethal concentration of biocides. The dead fingerlings were found covered with excess mucus on the body surface. These behavioural activities resembled with those reported by Verma *et al.* (1974 & 75), Toor and Kaur (1975), Joshi *et al.* (1975), Singh *et al.* (1981) and Panwar *et al.* (1984).

Analysis of experimental data revealed that among the three biocides, Endosulfan was the most toxic to the test fingerlings followed by Methylparathion and BHC (Table I, Fig. 1) Panwar *et al.* (1984) reported a similar toxicity trend for fry and fingerlings of *Cyprinus carpio*. Relative toxicity of biocides measured at selective level of kill (24 hr LC₅₀) showed that Endosulfan 732 times and Methylparathion 388 times more toxic when compared to BHC (Fig. 1). Panwar *et al.* (1982) observed that Ethylparathion 6.48 and BHC 5.32 times more toxic than

Table 1: LC₅₀ Values, fiducial limits and relative toxicity of different biocides for fingerlings of *H. molitrix*

Biocides	Equation of regression lines	LC ₅₀ mg/l	Fiducial limit mg/l	Potency relative to BHC
BHC	$Y=5.4542821x7.9395735$	0.295	0.9828524-0.3929524	1.0
Methylparathio	$Y=2.949088x14.528929$	0.000759	0.6262131-0.6246951	388.0
Endosulfan	$Y = 2.1559394 x 12.345066$	0.000403	0.0107852-0.0099792	732.0

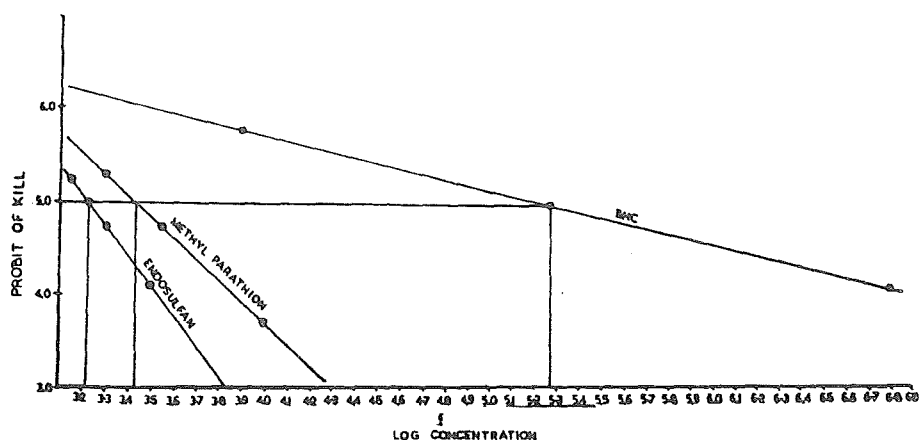


Fig. 1. Relationship between log concentration and probit of kill

Malathion on *Viviparous bengalensis*. The safe concentration in respect of BHC Methylparathion and Endosulfan were estimated as 0.00295, 0.00004 and 0.0000075 mg/l respectively.

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