

ETHION INDUCES BEHAVIORAL CHANGES OF FRESH WATER FISH *CLARIAS BATRACHUS*, PAINGANGA RIVER, OF UMARKHED MAHARASHTRA

Dr. Madhav M. Kalyankar^{1*}

^{1*}Department of Zoology Gopikabai Sitaram Gawande College Umardhed

***Corresponding Author:** Dr. Madhav M. Kalyankar

*Department of Zoology Gopikabai Sitaram Gawande College Umardhed

Abstract

Ethion is the pesticide used to control the plant pests ultimately Ethion contaminate the water along with aquatic ecosystem. The fresh water fish, *Clarias batrachus* was selected for present investigation. The fishes were collected and brought to the laboratory for acclimatization. The freshwater fishes were subjected to different concentrations of Ethion. The LC₅₀ value for 72 hours exposure to Ethion was found to be 0.050 p ml/L. The behavior of fishes was observed for 24, 48, 72 and 96 hours. Alteration in the behavior of the fish *Clarias batrachus*, was found. In order to protect aquatic ecosystem along with human, awareness must be initiated to the farmer to control agricultural pest by natural methods and using organic manure in proper dose.

Key Words: Ethion, *Clarias batrachus*, Painganga River, Umardhed.

Introduction

The water Pollution and the heavy traces of pollutants is serious problem of water ecosystem. Heavy modernization, industrialization and evolution in farming cause the several changes in the natural water bodies. All insecticides, chemical manure and pesticides consumed to control the pest eventually pollute the water resources and alternately cause the serious hazards to aquatic life (Konar, 1975). The pesticide pollution is harmful to human, animals and wild life fauna by directly through pesticides or their degraded products. Any changes in chemical composition of the natural aquatic biota generally affect the behavioral and physiological systems of the inhabitants (Edward, 1973). To cope of this situation the exact loss should be studied and hence in present investigation fresh water fish *Clarias batrachus* has been used as an indicator organism. *Clarias batrachus* is one of the Indian major carp edible fresh water fish of a great economic importance. The effect of Ethion Pesticide on behavioral alterations has been studied in detail.

Material and Methods

The fresh water fish *Clarias batrachus* were collected through fisherman from Painganga River, Umardhed. They were brought to the laboratory and cleaned by using 0.1% Potassium Permanganate solution to avoid dermal infection. Only healthy fishes ranging between 100-125gms were selected for experiments. They were acclimatized in glass aquarium for 07 days and water in the aquaria was replaced every day. The assessment of toxicity of Ethion with reference to aquatic biota especially fresh water fish is crucial in toxicity evaluation. The LC₅₀ value for 72 hours exposure to Ethion was found to be 0.050 p ml/L.

Results

Various symptoms of poisoning have been observed from studies of determination of LC₅₀ as well as many alteration in the behavior of the fish *Clarias batrachus* were remarkably noted. Dube et.al, (2012) showed acute toxicity of mercuric chloride with behavioral changes on fresh water crustacean *Barytelphusa guerini*.

Behavioral Observations of Control and Experimental Fish

Animal behavior is the highly specialized characteristics of every animal. Normal behavioral of animal is sign of healthy animal. Aquatic biota also exhibits various normal behaviors of animal including fishes. In present investigation, the control set of experiments were showed various normal behavioral activities of fresh water fish *Clarias batrachus* such as they were very active with their well co-ordinated movements. They were very alert at slightest disturbance. They were swimming and breathing normally. But at sub lethal concentration of Ethion, they become irritable and hyper excited at initially along with jumping movement. They showed changes in their skin color at sides and mouth, barbeles becomes reddish and on the caudal fins black spots seen. The fishes were became restlessness and finally fish turned upside down. At last period of lethal dose the mucus secretion and loss of equilibrium were also observed. They slowly become sluggish and finally they settle down at the bottom prior to death. Schein and Cairns (1966), Panigrahi and Konar (1990) studied and shown that the abnormal behavioral by test fish may be attributed to impairment of nervous and sensory system at fish to pesticide.

Discussion and Conclusion

The problem of water pollution is burning issue of recent era and human being has to face the crucial situation. The aquatic life is strongly influenced by agro-pollutants including insecticides, pesticides like Ethion and frequently cause serious hazards to aquatic life. Among the aquatic fauna, fishes are affected significantly than other aquatic animals. Many people have worked on the effects of different pesticides and heavy metals on the physiology and biochemical aspects of different animals (Tungare et.al. 2000; Mali, 2010; Jagtap, 2009; Shailaja, 2008 and Rajaiah, 2007) toxicity evaluation. Ethion is used as effective pesticide on citrus and apples. It is used to kill aphids, mites, scales, leafhopper, maggots & foliar feeding larva. Ethion is a colorless and insoluble in water. It has very disagreeable odor. It is highly toxic by inhalation, dermal exposure and ingestion. It is very irritating to the eye and caused slight inflammation and redness in the eye & skin. It is used on wide variety of food, fiber & ornamental crops including green house crops, lawns and turf. The chemical formula of Ethion is $C_9H_{22}O_4 S_4$. Ethion pesticide is helpful to the farmer to control the pests, but farmers are not using in proper format. They are not using the pesticide with recommended dose. This excess amount of pesticide ultimately causes damage to soil and water. The toxicity evaluation showed that excess use of pesticide residues alters the molecular, cellular, biochemical and behavioral changes in fresh water fish *Clarias batrachus*. It may be dangerous the human being if fruits or vegetables or water contaminated by Ethion used in daily life. Hence, it is suggested that the Ethion is not safe to non-target organisms like fishes. In order to protect the whole aquatic ecosystem along with man, awareness must be initiated to the farmer to control the agricultural pest by biological methods and using organic manure properly, somehow if there is no alternative to use the Ethion, farmer should use it in only recommended dose.

References

1. Edward C. A. (1973): In: *Environmental pollution by pesticides*. (Plenum Press New York)
2. Jagtap, A. R. Afsar, S.K. Kothole, S.D. and Mali, R.P. (2009): Effect of pollutant from car washing centre on oxygen consumption in freshwater fish, *Channa punctatus*, *J. Aqua. Biol.* 24 (2): 189-192.
3. Dube K. V. and R. P. Mali (2012): Acute toxicity of mercuric chloride on freshwater crab, *Barytelphusa guerini*. *J. Environ and Sociobiology*: 9(2): 121-124.
4. Konar, S. M (1975). Pesticide and aquatic ecosystem. *Ind. J. Fish.*, 22: 80-85.
5. Mali, R. P. Afsar, S. K. and Jagtap. A. L (2010): Impact of cadmium induced alterations in the glycolytic potential of freshwater female crab *Barytelphusa guerini*. *Geobios*. 37:100-102.
6. Rajaiah, V. and Venkaiah Y. (2007): Effect of parathion on esterase patterns of
7. *Channa punctatus*. *J. Aqua. Biol.* 22(1): 181-185.
8. Panigrahi, A. K. and Konar, S. K. (1990): Sublethal effects of mixture of crude petroleum oil and anionic detergent on fish. *Env. J. Col.*, 8: 877-822.
9. Schein, A. and Cairns, J. Jr. (1966): Persistence of gill damage in *Leopomis gibbosus* following brief exposure of alkyl benzene sulfonate. *Not. Nat. Acad. Nat. Sci., Philadelphia*, 392: 1-8.
10. Shailaja, V., Madhuri, E., Ramesh Babu, K, Rama Krishna, S. and Bhasker, M.
11. (2008): Study of exposure to altered pH media. *Ecology and Fisheries*. 1(1): 85-92.
12. Tungare, S.M. and A.D. Sawant (2000): Physiological effects of heavy metals on prawns. International conference on Probing in biological system in Mumbai Feb. 2000 pp. 139.