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TOXICITY EVALUATION OF MONOCROTOPHOS 36% E.C. CHANGE THE BEHAVIOR OF THE FRESHWATER SNAIL *PILA VIRENS*

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ABSTRACT

The Water pollution is one of the serious problems in most of the countries. Abundant use of fertilizers and pesticides became essential for better agricultural practices in most of the developing countries including India. The pesticide mainly two types organochlorine and organophosphate. In recent year Monocrotophos is organophosphate using their field of controlling the insect pest. The freshwater snail *Pila virens* some behavioural changes were recorded induced in LC36 concentrations of Monocrotophos for different exposure periods. In this concept to improve that any toxicants or any molluscicide were responsible for the alterations in behavioural of animal body.

INTRODUCTION

Adversely human activities are directly or indirectly affect the environment. Due to development activities such as construction, transportation and manufacturing not only deplete the nature resources but also produce large amount of wastes that leads to pollution of air, water and soil. Today environmental pollution has become not only a national but also an international problem. Developed and developing countries which are progressing rapidly in the field of agriculture, technology and industries are continuously releasing various kinds of harmful substances into the biosphere and thereby causing a severe threat to the environment (APHA 1995, Abbasi *et al.,* 1998).

The major sources of water pollution are domestic, agricultural and industrial wastes which are discharged into natural water bodies (De, 1996). Domestic sewages are run off from agriculture fields loaded with pesticides and fertilizers, pollute the water bodies. Commonly used pesticides can be harmful living organisms, pets, and their environment. Organisms living in aquatic ecosystem are exposed to contaminants that move relatively quickly through this system. Pesticides became one of the leading polluting agents of aquatic ecosystem (Phirke, 2008). These agrochemicals adversely affect the non-target organisms, especially plankton and fish (Joseph and Raj, 2011). Amongst the pollutants found in agricultural wastes, insecticides are most hazardous since they have an ability to immobilize or kill the aquatic organisms at extremely low concentrations (Cope, 1965 and Eisler, 1969).

Molluscs are capable of achieving tissue concentrations of metals that are 100 to 1000 times higher than those in water concentrations (Hartwig, 1995).

Pollution of aquatic environment farm industrial, domestic and agricultural waste has exposed important aquatic organisms to contaminants which not only endanger their lives but also eventually enter the food chain leading to serious public health hazards (Ilavazhahan *et al.,* 2010). Acute toxicity test of single compounds is continually released into the aquatic ecosystem from industrial and residential areas representing a potential risk to the aquatic biota (Ebrahimpour *et al.,* 2010).

The presence of toxic metals poses environmental problems due to their non-degradable and persistent nature (Sarabject and Dinesh, 2007). Many aquatic organisms have the ability to accumulate and biomagnify metals (Davies et al., 2006), which leads to concentrations several orders of magnitude higher than those of the surrounding water (Casas *et al*., 2008). Usually, the level of pollutant accumulated in such organism's tissues is used for assessing the level of pollution in its habitat (Abdallah and Moustafa, 2002).

Pesticide poisoning is an important cause of the morbidity and mortality in developing countries. Now a day's farmers are using variety of pesticide, insecticide, herbicide using agricultural field. The formers residues reaches to the environment by direct application, spray drift, aerial Among organophosphate pesticides, Monocrotophosis one of the important to controlling insect pesticide, indiscriminately using by India. Spraying, washing from the atmospheric precipitation and runoff from agricultural lands where they ravage the biotic life (Thangnipon *et al*.,1995).

MATERIALS AND METHODS

The freshwater gastropod, *Pila virens* were collected from Lower Anaicut Reservoir. After collection animals were brought to laboratory and were acclimatized in aquarium containing dechlorinated tap water for 10 days. During acclimatization and experiment, the animals were feed with freshwater algae and water of aquarium was changed after every 24 h.

Toxicity test

Toxicity tests were conducted in accordance with standard methods (APHA, 1992). Stock solution of monocrotophos 36% EC with a concentration of 0.1 ml per liter (equivalent to 1 ppm) was prepared in distilled water. Based on the progressive bisection of interval on a logarithmic scale, log concentrations were fixed after conducting the range finding test. The fish were starved for 24 hours prior to their use in the experiments as recommended by storage to avoid any interference in the toxicity of pesticides by excretory products. After the addition of the toxicant into the test tank with 10liters of water having fifteen gastropods (Each tank five animals), mortality was recorded after 24, 48, and 72 hours. Five replicates were maintained simultaneously (Kamble, 2014).

RESULTS AND DISCUSSION

The monocrotophos 36% EC pesticides to *P. virens* were calculated for 24, 48 and 72 hours by Finney's method (1951). The results of effects are summarized (Table. 1). The observed differences in tissue metal concentration in gastropod species might be due to variation in body size, growth, fitness, reproductive condition, genotype of the animal difference in metabolic rate and weight. Monocrotophos 36% used to freshwater the snail gill, mantle and foot tissue entirely changed and damaged (Fig: 1,2). The snail foot is filled with parenchymatous tissue with scattered connective tissue consists, muscle fibers, nerves and blood spaces. The unicellular glands also called as mucocytes in epidermis. Monocrotophos 36% pesiticide used in aquatic layer the snail bahaviour is slowly changed and animal tissue cells are decayed. Moreover pesticides are polluted aquatic layer and aquatic organisms.

Therefore, there is growing need to detect and assess the level of pollutants, particularly low concentration of increasingly complex mixtures of pollutants, such as metals in aquatic ecosystems. There is increasing concern that measurement of total pollution levels does not lead to a reliable estimate of water quality. Increased recognition is given to the use of biological monitors in biomonitoring programme that can give a direct and integrated measure of aquatic health (Abdullah, 2008).

Variability in metal body concentrations between closely related species are mainly caused by interspecific differences in the biokinetics of uptake, elimination and different physiological rates such as pumping, filtration and respiration. Both physiological/biochemical responses and metal geochemistry might be responsible for the differences in metal bioaccumulation as observed in different species. Interaction of metals in body tissues seems to vary from species to species. At the same time the responses of the organism is specific for different element and substance. The use of agrochemicals in the field has the potential to change the aquatic medium affecting the tolerance limit of aquatic fauna and flora as well as creating danger to the ecosystem.

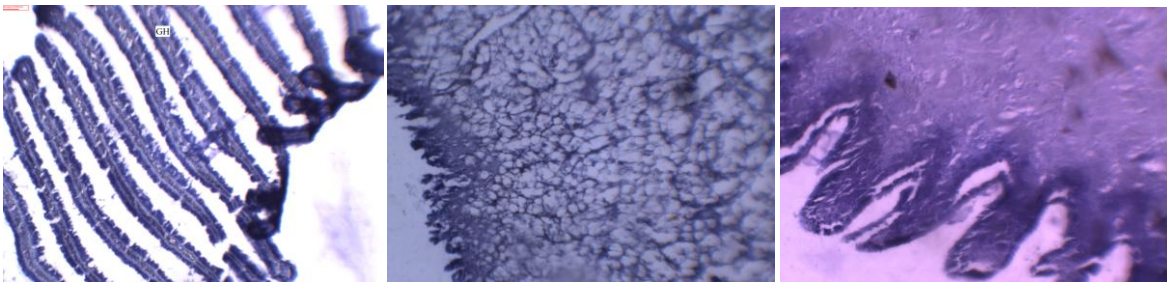
CONCLUSION

The Population explosion, rapid industrialization and consequent anthropogenic stress on the environmental degradation, particularly environment have resulted in alarming levels of pollution and of the aquatic environment. The ingestion of metal contaminants affect not only the productivity and reproductive capabilities of organisms, but ultimately affect the health of man that depends on these organisms as a major source of protein and eventually poses greater health risk. Commonly used pesticides can be harmful living organisms, pets, and their environment.

Table: 1: Behaviour changes in freshwater snail *Pila virens* against monocrotophos 36% at different exposure periods.

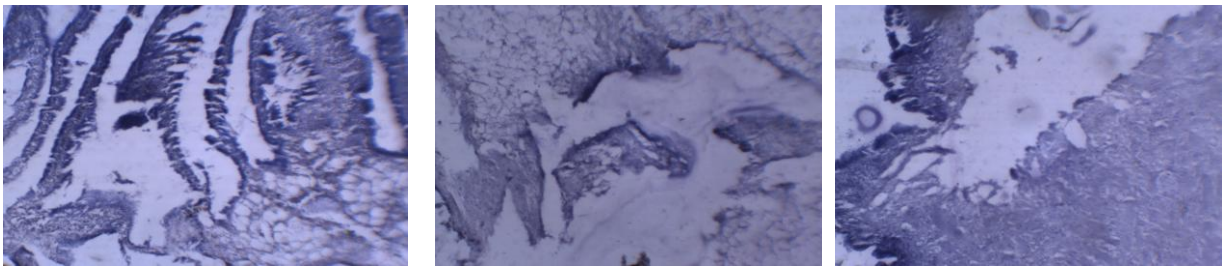
S.NO	Type of Activity	24 hrs	48 hrs	72 hrs
1	Protective behavior	Operculum slowly closed	Operculum slowly relaxed	Operculum relaxed
2	Tentacular movements	Slowed down	Movements was reduced	No free movement
3	Foot movements	Normally extended foot movement	Movement was slowed down	Foot retracted
4	Response to external stimuli	Initially quick response	Reduced response	No response
5	Mucus secretion of gill	Initiated mucus secretion	Mucus secretion was fast	Thick white mucus seen in trough

Fig: 1: Section of control gill, mantle and foot of *Pila virens*



Gill Mantle Foot

Fig: 2: Section of after 72 hours gill, mantle and foot of *Pila virens* (Monocrotophos 36% used)



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