International Journal of Applied Research 2020; 6(10): 133-134

ISSN Print: 2394-7500
ISSN Online: 2394-5869
Impact Factor: 5.2
IJAR 2020; 6(10): 133-134
www.allresearchjournal.com
Received: 16-08-2020
Accepted: 21-09-2020

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Impact of the pesticide methyl parathion toxicity on some aspects of biochemical changes in air breathing fish *Anabas testudineus* (Bloch)

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Abstract
In this paper an Application of pesticides to control irritations of monetarily significant plants is basic in public food and fiber creation and furthermore for the control of creepy crawly borne ailments. Yet, indiscriminate and unnecessary utilization of wide range or non-specific pesticides harms the biological system, now and then irreversibly taints soil surface and ground water just as evolved ways of life and subsequently bargains the wellbeing and prosperity of the occupants of oceanic and earthbound condition. Organophosphate mixes include bug sprays right now utilized worldwide for farming and family applications. These bug sprays produce harmfulness by restraint of the chemical acetylcholinesterase which collects in the neural connections of the focal and fringe sensory system. This thusly results into over enactment of postsynaptic cholinergic receptors and indications of cholinergic neurotoxicity. Among different gatherings of pesticides, organophosphates are all the more much of the time utilized, because of their high insecticidal property, low mammalian poisonousness, less perseverance and quick biodegradability in the earth.

Keywords: Parental attitude, participation, sports, girls

Introduction
Anabas is a class of climbing gouramies local to southern and eastern Asia. In the wild, Anabas species grow up to 30 cm (1 ft) long. They possess both bitter and new water. Anabas species have a maze organ, a structure in the fish's head which permits it to inhale climatic oxygen, so it tends to be out of water for an all-inclusive timeframe (6–8 hr), consequently its name from the Greek anabainein 'stroll up', from ana-'up' + bainein 'go'. They are meat eating, living on a tight eating routine of water spineless creatures and their hatchlings, and - rather than the vast majority of their family members - are disperse spawners with no parental consideration. Species are found in South Asia, including India, Sri Lanka, Bangladesh, Burma, Indonesia, Malaysia, Thailand, Cambodia, and the Philippines.

Anabas testudineus (Bloch) is regarded as one of the most important teleost in India being the rich source source of nutritive materials available in abundance and thus affordable to the low income group of people. The significant decrease in both protein and nucleic acids levels would suggest that pollutant impair the process of protein synthesis in the tissues of fishes exposed to cypermethrin. The long–term effects of such biochemical changes induced by aquatic pollutants are poorly known and need to be investigated more extensively.

Pesticides usage in the agricultural fields to control pests in extremely toxic to non-target organisms like fish and affects fish health through impairment of metabolism, sometimes leading to mortality. Cypermethrin is synthetic pyrethroid insecticide used to control many pests. It is highly potent and broad spectrum pyethroid, used extensively for pest control. Fish are particularly highly sensitive to very low concentration of cypermethrin.

Thus seeing the potentialities of the work, researchers have been inserted in for several years is that of studies on the impact of the pesticide methyl parathion toxicity on some aspects of biochemical changes in a Air Breathing Fish *Anabas testudineus* (Bloch).

Methyl parathion is an organophosphate possessing contact and systemic properties. Fish serves as a bio-indicator species as it responds with great sensitivity to changes in the aquatic environment and thus, has an important role in monitoring of water pollution.

The purpose of this investigation is to evaluate the acute toxicity of an organophosphate pesticide for the catfish, was selected because it is hardy, readily available, easy to handle and can be kept alive for longer duration in the aquaria. This is a common edible fresh water fish of great economic importance and forms important species in many water resources mainly ponds, ditches, swamps, marshes and sometimes occurs in muddy rivers. The pesticide methyl parathion was selected for study because it is a widely used organophosphate pesticide to kill mites and aphids among other insects and is applied on citrus, fruits, cotton, olives, potatoes, tea, tobacco and vegetables. It is also used on files in home gardens and on livestock. Methyl parathion is highly soluble in water and can leach in to nearby water sources and affect aquatic organisms. This is a low persistence pesticide possessing half-life of 4-16 days but can last longer depending on the conditions.

In this paper attempts to evaluate the toxicological impacts of fourth generation newly introduced insecticide metacid or methyl parathion on histopathological parameters, such as liver, kidney and gonads as well as blood metabolite levels i.e. blood glucose, serum protein and serum cholesterol and at tissue metabolite levels i.e. glycogen, total proteins, total lipids and alkaline and acid phosphatases.

Metacid or methyl parathion is fourth generation pyrethroid used by farmer in pest control. It is extreme toxicity to fish, which may ultimately restrict their use.

Methyl parathion photodegrade rapidly with half life 8 – 16 days reported by U.S. Environmental Protection Agency (1989). Methyl parathion is classified by WHO, it interacts with sodium channels in nerve cell through which sodium enters the cells in order to transmit a nerve signal. It also interferes with other receptors in the nervous system. Symptoms of poisoning includes abnormal facial sensations, headache, nausea, fatigue, vomiting and increased stomach secretion. It is also a skin and eye irritant.

During present study the physico-chemical characteristics of water was analysed by APHA, AWWA & WPC (1985). LC_{50} of methyl parathion for different 24 hrs, 48 hrs, 72 hrs and 96 hrs was determined by the methods of Regression Equation by Downi & Heath (1970). During present study the LC_{50} for 24, 48, 72 and 96 hrs were .25 ppm, .30 ppm, .35 ppm and .40 ppm respectively.

The sublethal concentration of metacid or methyl parathion was .103 ppm by Hart *et al.* (1945). When fish were .106 ppm the fish showed various behavioural changes like faster body movement, faster and erratic opercular movement, surfacing and gulping of air difficultly in respiration and convulsion and propose mucous secretion. All these behavioural changes are signs of distress.

When the test fish were subjected to a sublethal exposure of metacid or methyl parathion (.103 ppm) for 30 days profound charges at histopathological tissues such as in liver, kidney, testis and ovary. The treated liver showed hyperemic loci, liquefactive necrosis, vacuolar degeneration and splitting of the hepatocytes moderate dilation of sinusoidal spaces. Loss of parenchymatous ground, swelling of hepatocytes and cell degeneration. Kidney showed swelling of mucous cells. Treated ovary showed large intrafollicular space and rupture of nuclear membrance in stage II oocytes. The absence of stage III–IV oocytes reflects almost complete absence of hitellogenesis under methyl parathion stress.

The blood glucose level was calculated by Sinha *et al.* (1990). The blood glucose level increased (29%) and highly significant at ($p < 0.001$) reflecting hyper glycemic response under methyl parathion exposure. The serum protein determination by Varley *et al.* (1980) and the level decreased (21%) and highly significant at ($p<0.001$) cause hypoproteinemia. The serum cholesterol was determined by Kabara (1966).

The fish also exhibited induction of serum cholesterol (7%) and showed non-significant ($p < 0.05$) and causes hypercholesterolemia. At the tissue level there was significant depletion of glycogen in liver, kidney, testis and ovary by (Caroll *et al.*, 1986). Maximum depletion was found in Testis (30%) followed by Gill (28%), followed by Ovary & Liver (25%). During present study gill showed highly significant ($p < 0.001$) while liver and testis showed significant at ($p < 0.01$) and ovary showed non-significant ($p < 0.05$). Similarly the profiles of total protein in liver, kidney, testis and ovary by (Lowry *et al.*, 1957, Folch, 1957) showed depletion. Maximum depth were found in liver and ovary (24%) followed by Kidney & Testis (12%). During present study all liver, kidney, testis and ovary showed highly significant ($p < 0.001$). As far as total lipids showed decline tendency in liver, kidney, testis and ovary. Maximum depletion were found in liver (16%) followed by testis (13%) followed by gill and ovary (10%). During present study all the tissues liver, kidney, testis and ovary showed non significant ($p < 0.05$).

Conclusion

On the basis of above fact it is quite clear that permethrin is extremely toxic to fish. On the basis of SSEPA it is weak category concern. It produces lung tumor at the highest dose level. During sublethal dose treatment it showed various behavioural distress i.e. depletion of oxygen and ultimately death. Under histopathological findings it showed most important pathological changes which causes sever disorder i.e., headache, vomiting, stomach secretion and even skin and eye problems. At serum metabolite levels it showed hyper glycamea, hypoprotonemia and hypercholesterolemia while at tissue level glycogen, protein, total lipids, alkaline phosphatase were decreased while acid phosphatase were increased to cause several diseases and abnormalities to the fish, leading to death.

References

1. Bradbury SP, Coats JR. Rev. Environ. Contam. Toxicol 2019;108:143-177.
2. Villarini M, *et al.* In vitro genotoxic effects of the insecticide deltamethrin in human peripheral blood leukocytes: DNA damage (‘comet’ assay) in relation to the induction of sister-chromatid exchanges and micronuclei, Toxicology 1998;130:129-139.
3. Yadav RS, *et al.* Deltamethrin treated bednets for control of malaria transmitted by *Anopheles culicifacies* (*Diptera: culicidae*) in India, J. Med. Entomol 2001;38: 613-622.
4. Comparative toxicity of certain mosquitocidal compounds to larvivorous fish, *Poecilia reticulata*, Indian J Malariol 1994;31:43-47.
5. Holbrook, Jr. DJ. Effects of toxicants on nucleic acid and protein metabolism In: Introduction to biochemical toxicology Eds: Hodgson E, Guthrie FE. Blackwell Scientific Publications, Oxford 2000;261-284.