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Coagulation Time Disorder Associated with Organophosphorus and Organochlorine Pesticides in the Fish Anabas Testudineus (Bloch)

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Abstract: ***Now-a-day modern techniques employed in agriculture and newer chemicals used have contributed much to environmental pollution, particularly to water pollution. This can result in local effects on the environment. The killing of fish by pesticides is quite common. In the present paper, an attempt has been made to evaluate the impact of 48-h LC 50 concentration of Organphosphors (Cythion and Metacid) and Organochlorine (DDT and Lindane) on the coagulation time (CT) and the total Thrombocyte count (THC) of male and female Anabas testudineus used animal. The study reveals towards pathological disturbances involiving injury and haemorrhage in tissues of the test fish with significant lowered CT value and higher THC count at different levels of the 't' value. Therefore, gradual phasing out of pesticides in fishery resources in fishery resources is suggestive. Further in order to check the use and accidental entry of pesticides in the water bodies, a number of alternative pest control methods have been developed but a complete success has not yet been achievd and thus more needed in this direction.***

Keywords: Anabas, Organophosphorus, Organochlorine, etc

1. Introduction

Now-a-day techniques employed in agriculture and newer chemicals used have contributed much to environmental pollution, particularly to water pollution. Water pollution is the cause of deaths of several interdependent aquatic forms of life and also a source of bio-magnification of persistent pesticides. This can result in local effects on the environment. The killing of fish by pesticides is quite common. It has been reported that almost all the pesticides in use are toxic to animals and human belngs. Among them, the organophosphorus compounds are the most toxic. The pesticides generally affect the central nervous system of the fish. In the present paper an attempt has been made to evaluate the impact of 48hLc_{50} concentration of Organophosphorus (Cythion and Metacid) and Organochlorine (DDT and Lindane) on the coagulation time (C.T) and total thrombocyte count (THC) of male and female Anabas testudineus used as test animals.

2. Material and Methods

For conducting the experiments about 100 matured and healthy specimen of both the sexes of Anabas testudineus (Bloch) were procured from local fish markets and ponds around Madhubani. They were acclimazed for a week in the laboratory condition. The average lenth and weight of the fishes used were 20.0 to 24.0 cms and 70.0 to 90.0 gms respectively. They were fed regularly with fish food products, but the feeding was stopped during the experiments. In the present investigation commercial grade of pesticides of organophosphorous group i.e. cythion (50% EC), Cyanamid India Limited Gujrat Metacid (50%EC), Bayer India Limited, Bombay and Organochlorine Group i.e., DDT (25% EC), Artee minerals, Haryer Lindane (20% EC), National Agrochemicals, Patna have been used. Static acute toxicity bioassay (APHA et.al., 1971) was performed to determine the Lc_{50} value. The details of methods employed in the determination of different blood parameters was those of Srivastava & Das (1979). Blood was collected in the clean and air dried syring directly by punchuring the heart. The physic-chemical characteristics of water used were: temperature, 28^0 C-32^0 C; P^H 7.5 – 8.0; dissolved Oxygen (D.O.), 4.0 ppm – 4.4 ppm; Free $CO_2$13.0 ppm and bicarbonate, 1110.0 ppm-112.0ppm

The difference of significance, if any was calculated by student's (test at levels of $p<0.05$, $p<0.1$ and $p<0.001$.

3. Observations

The results are given in table:

Table
Showing effect of 48-hLc_{50} concentration of Organophosphorus and Organochlorine pesticides on the total thrombocyte count (THC) and coagulation time (CT) of blood in an India Anabas testudineus (Bloch).

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Name of Pesticides	Sex	Total Thrombocyte Count (THC) (X 10^6/mm^3)		Coagulation (CT) (Seconds)	
		Control	Experimental	Control	Experimental
Cythion	Male	6.75 ± 1.44	7.96 ± 1.28	1.25 ± 0.07	1.12 ± 0.13*
	Female	6.13 ± 1.37	7.58 ± 1.39*	1.29 ± 0.008	1.14 ± 0.08*
Metacid	Male	6.66 ± 1.49	9.50 ± 1.18***	1.29 ± 0.009	0.46 ± 0.06*
	Female	6.13 ± 1.37	8.52 ± 0.58***	1.30 ± 0.09	0.48 ± 0.05**
DDT	Male	9.21 ± 1.62	12.92 ± 0.96 ***	1.25 ± 0.05	0.58 ± 0.22**
	Female	8.20 ± 1.51	11.10 ± 0.86***	1.22 ± 0.05	0.56 ± 0.21**
Lindane	Male	9.35 ± 2.00	12.28 ± 1.58**	1.24 ± 0.08	0.31 ± 0.06***
	Female	9.74 ± 1.57	12.55 ± 1.75**	1.21 ± 0.05	0.41 ± 0.03**

All values are mean ± standard deviation *** = < 0.001 (Students 't' tells o observation for each value).
*=p<0.05;**=p<0.01

The coagulation time (CT) of blood decreases on treatment of all pesticides taken under consideration. This decreases in CT of blood is significant ($p < 0.05$) in male and female ($p < 0.01$) when treated with cythion and highly significant ($p < 0.001$) in both the sexes in cases of metaacid, DDT and lindane intoxications. Further, from the table it is evident that the THC increases on treatment of all pesticides consideration. In case of cythion the THC increase insignificantly ($p > 0.05$) in male and significantly ($p < 0.05$) in female. On metaacid and DDT treatment THC increase very significantly ($p < 0.001$) in both the sexes. Lindane causes a significant ($p < 0.01$) increase in THC in both the sexes.

4. Discussion

Table shows that coagulation time decrease in the fish Anabas testudineus after treatment with Organophosphate and Organochlorine pesticides of common and commercial use. Similar to present findings a marked decrease in CT on treatment with pesticides have been reported earlier by Lone and Javaid (1976) in Anabas testudineus exposed to DDT; Verma *et. al.* (1979) in S. fossilis exposed to chlordane and Mishra to malathion. The decrease in coagulation time (CT) might be due to pesticides induced stress. Further, in the present work THC increases in all the four cases. Similar to present findings the increase in THC count after pesticidal intoxications has been observed by Mahjan & Juneja (1979) in C. punctatus exposed to aldrin; Srivastava & Narain (1982) in H. fossilis exposed to nauvacron and demecron and Mishra & Srivastava (1983) in H. fossilis exposed to malathion. The increase in thromobocyte count might be a response to overcome the excessive bleeding in any eventuality particularly tissue damage. Mahajan & Singh (1973) are the view that thrombocytosis is possibly to meet any contingency arising out of tissue injury. The lowered CT and raised THC count in stressed Anabas testudineus would indicate a case of haemorrhage, both these conditions are associated with haemorrhage in man (Srivastava & Das, 1979).

Thus from the preceeding analysis of Table, it is apparent that results indicate towards pathological disturbances involving injury and haemorrage in tissues of test fish.

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