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TOXICITY OF ALDRIN IN FROG, *RANA TIGRINA* (DAUDIN)

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Toxicity of Aldrin, a chlorinated hydrocarbon insecticide to frog, *Rana tigrina* has been investigated. The oral LD_{50} (median lethal dose), slope function and their confidence limits have been calculated at 24 and 48 hr of administration. The symptoms of poisoning caused by Aldrin indicate to nervous damage.

INTRODUCTION

Indiscriminate and extensive use of synthetic insecticides may pose direct or indirect health hazards to man, livestock and wildlife, as well as environmental contamination (Matsumura, 1976). Investigations have proved that chlorinated hydrocarbons are highly toxic to fish and tadpoles of amphibians (Sanders, 1970; Kenaga, 1979; Russell & Douglas, 1980). However, very little attention has been paid to evaluate their toxic effects on adult amphibians. The emulsifiable preparation of Aldrin (1, 2, 3, 4, 10, 10 Hexa-chloro 1, 4, 1, 4a, 5, 8, 8a – haxahydro – exo – 1, 4, endo 5, 8 dimethanopthalene) containing 30% E C. of an active ingredient formulated by M/s Singhal Pesticides, Agra was used for this study to simulate field conditions.

MATERIAL AND METHODS

Adult and apparently healthy frogs of both sexes weighing between 40 and 60 g were used in the present study. The experiment was conducted in

Jan. 87. During the experiment period the air temperature of the laboratory was 19 to 20°C. The animals were not fed during the experiment period and each animal was used in only one experiment.

For the determination of acute toxicity the animals were segregated into several groups, each consisting of ten frogs. The animals of each group were weighed and given a known amount of insecticide orally as a single dose. The control animals received a corresponding amount of only distilled water. Animals were examined regularly for mortality and behavioural changes at different dosages for one week. Since, preliminary tests did not show any sex difference in tolerances to Aldrin, the sex was disregarded in the subsequent experiment. From the available data the LC_{50}, slope function(s) and their respective 95% confidence limits at 24 and 48 hours were calculated using the simplified method of Litchfield and Wilcoxon (1949).

RESULTS

The data incorporated in Table I show that none of the animal that received the highest dose (380.0 mg/Kg) could survive for 24 hours, whereas, all the animals that received the lowest dose (60.0 mg/Kg) survived for 48 hours. No mortality was observed in controls.

The oral I D_{50} of Aldrin in adult frog, *R. tigrina* was found to be 250.0 and 137.93 mg/Kg at 24 and 48 hours, respectively (Table II).

The test animals displayed many interesting symptoms of poisoning. Immediately after administration of the drug most animals made voilent effort to regurgitate. They vomitted out yellowish white coagulum like substance. The first sign of poisoning was observed only 3–6 hours after drug administration, whence, the animals became depressed and unreactive. They showed uncoordinated locomotion movements and signs of muscular weakness. Hyperexitability was observed only in few animals that received higher doses of Aldrin. This was followed by tremors and convulsions. The frogs repeatedly stretched out their fore and hind limbs showing tonic convulsions.

Most animals produced loud crying sounds and frequently opened their mouth to gulp in air during convulsions. Thereafter, they became paralysed and finally died. Though, no change was observed in texture of the skin, small

Table I. Effect of single oral administration of Aldrin 30% E. C. at various dose levels on the survival percentage of the adults of *Rana tigrina*.

Time (hrs)	Dose (mg/Kg) at 19–20°C												
	60	80	100	120	140	160	200	220	240	260	300	340	380
24	100	100	100	100	100	80	70	60	50	50	30	20	0
48	100	90	70	50	50	30	20	0	0	0	0	0	0

Table II. Estimated oral LD_{50} values, slope function and their respective 95% confidence limits for Aldrin 30% E C. administered as single dose to adults of *Rana tigrina*.

Time (hrs)	LD_{50} (mg/Kg)	95% confidence limits (mg/Kg)		Slope function(s)	95% confidence limits of 'S'	
		Lower	Upper		Lower	Upper
24	250.0	222.0	284 55	1.23	1.20	1.25
48	137.93	110.34	172.41	1.43	1.23	1.66

diffused orange red patches were seen on the ventral side of the abdomen at higher dose levels.

DISCUSSION

Toxicity of Aldrin was found to be dose dependent. The survival percentage of test animal decreased with an increase in the amount of dose (Table I). This is in conformity with the findings of Mulla (1963), Judd (1977) and Wohlgemuth (1977). Only a rew attempts have been made so far to evaluate the acute oral toxicity of chlorinated hydrocarbon insecticides in adult amphibians as such (Tucker & Crabtree, 1970; Harri *et al* , 1979, and probably none for Aldrin.

The values of LD_{50} indicate that Aldrin is "moderatelv toxic" to *R tigrina*. These values are decidedly higher than that reported in rats (Matsumura, 1976), thereby, showing that the test animal is more tolerant to Aldrin than the rats.

The symptoms of poisoning indicate damage to central nervous system. This is in agreement to those of Ferguson & Gilbert (1967) and Cooke (1974) who reported more or less similar kind or symptoms of poisoning by chlorinated hydrocarbon insecticides and concluded that these biocides cause damage to nervous system.

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