

Effect of Cypermethrin on Protein Contents in Lizard *Calotes versicolor* in Comparison to That in Frog *Rana tigrina*

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Abstract: The present study highlights the effect of cypermethrin (0.1 and 1% concentration) on kidney and liver of *Calotes versicolor* and in *Rana tigrina*. In the case of *Calotes versicolor*, a decrease in protein contents was found upto 16 and 40% in liver and 17 and 35% in kidney, respectively. It was observed that protein contents were decreased in *Rana tigrina* upto 69 and 79% in kidney and 44 and 76% in liver, respectively.

Key words: Induced effect, cypermethrin, frog, lizard

Introduction

Fish, birds and wildlife that live in direct contact with environment subject to pesticide exposure are sentinel species that may be predictive our own fate. With pesticides now found routinely in drinking water, on food and in the air, we are all taking part in an experiment in pesticide exposure on a global scale (Kegley et al., 1999). Many species of amphibians provide a direct benefit to humans. They provide food for fish, birds and mammals. Amphibians are especially important as indicators of environment. Frog's legs are widely considered to be delicacies. Many countries in Europe and America import large quantities of frog's legs, mostly from Asia (Martin, 2000). Since 1980 scientists have observed that amphibian population is declining around the world. In some places, entire populations have almost completely disappeared in a relatively short period of time. These declines have even been found in areas where direct human contact is minimal. Approximately 20% of amphibians are listed as threatened (Hilton-Taylor, 2000). Current data show significant declines in all the world regions including Pakistan. The cause of this decline including human involvement in an effort to increase agricultural products and use of indiscriminate toxic material like pesticides. The effects of these toxic materials remain to be studied on non-target biodiversity. In California many frogs and toads grow extra legs and eyes and do not survive to adulthood (Kegley et al., 1999) due to some effects of toxic chemicals. The impact of the frog's leg trade in several countries, such as US, India, Bangladesh and Pakistan, has been well documented (Abdulali, 1985; Pandian, 1986; Khan, 1990; Jacques, 1999). Controlled laboratory studies have shown pyrethroids to be highly toxic to fishes, many aquatic invertebrates and amphibians (Mayer and Ellersieck, 1986; Bradbury and Coats, 1989; Haya, 1989). A lot of work has been done on the effects of pesticides on amphibians and reptiles by Antony and Ramalingham (1990), Balasundaram and Selvarajan (1990), Alvarz et al. (1995), Bauer and Dial (1995), Berrill et al. (1990), Pauli and Money (2002), Khan and Fatima (2002) and Khan et al. (2002). In the present investigation the effect of cypermethrin on protein contents in lizard *Calotes versicolor* in comparison to that in frog *Rana tigrina* was studied.

Materials and Methods

The experiment work was carried out during the 1996-2000. Adults of *Rana tigrina* and *Calotes versicolor* were collected from Karachi University campus and various of Karachi regions. Frogs were kept in ponds and lizards in glass-fronted wooden vivarium. Cypermethrin was applied in 0.1 and 1% concentrations in order to estimate for protein contents in treated animals. For this purpose, frog's and lizard's kidney and liver were taken. Biuret method was employed for the total protein contents estimation.

Results

The pyrethroid cypermethrin was applied against *Rana tigrina* and *Calotes versicolor* employing one μ l 0.1 and 1% concentration per lizard/frog. The total protein contents were estimated in

Table 1: Activity of protein contents in liver and kidney of agama lizard *Calotes versicolor* treated with cypermethrin

Time(h)	Concentrations (%)	Organ	Mean	% Inhibition
24	Control	Liver	0.295	00
		Kidney	0.255	00
24	0.1	Liver	0.245	16
		Kidney	0.210	17
24	1.0	Liver	0.175	40
		Kidney	0.165	35

Table 2: Activity of protein contents in liver and kidney of frog *Rana tigrina* treated with cypermethrin

Time (h)	Concentrations (%)	Organ	Mean	% Inhibition
24	Control	Liver	0.684	00
		Kidney	0.646	00
24	0.1	Liver	0.380	44
		Kidney	0.196	69
24	1.0	Liver	0.158	76
		Kidney	0.133	79

kidney and liver after 24 h of treatment. A batch of untreated animals (control) was also kept for comparison. In the case of *Calotes versicolor* a decrease in protein contents was found upto 16 and 40% in liver and 17 and 35% in kidney, respectively (Table 1). In *R. tigrina* a reduction in protein contents was upto 69 and 79% in kidney and 44 and 76% in liver, respectively (Table 2).

Discussion

In this study protein contents of kidney and liver were decreased after cypermethrin treatment. In the case of *C. Versicolor* decrease of protein contents was upto 16 and 40% in liver and 17 and 35% in kidney, respectively. In *R. tigrina* the reduction in protein contents was upto 69 and 79% in kidney and 44 and 76% in liver, respectively. Mineau (1993) reported that post exposure to carbamate and organophosphate, the enzymatic activity was reduced in wild birds. Larson et al. (1988) observed the effects of the herbicide atrazine on *Ambystoma tigrinum* metamorphosis and reported the significant effects of atrazine on salamander life history. Khan (2002) studied the effects of phytopesticide (Biosal) on lizards and reported the significant effects on enzymatic activity. Parson et al. (2000) observed the effect of organophosphate and carbamate on non-target wildlife species. These pesticides inhibited enzymatic activity. In this study cypermethrin produced inhibitory effect in *C. Versicolor* and *R. tigrina* kidney and livers and so the present findings are in the line with previous works. All pesticides reduced enzyme activity in wildlife species so far reported. In the present study cypermethrin was applied directly in lizards and frog's body which reduced enzyme activity. Ahmad et al. (2000) observed reduction in total protein contents after pesticides treatment in insects. Khan (2000) studied the induced effect of permethrin *Calotes Versicolor* and reported that after the treatment with permethrin, the inhibition was found upto 4.2 and 53% in kidney and 7.4 and 10% in liver,

respectively. Present investigation is in line with earlier findings and confirm the results of Khan (2000). On the basis of results *Rana tigrina* appears more sensitive to cypermethrin than *Calotes versicolor* and it is, therefore, concluded that cypermethrin is more harmful to frog and lizards.

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