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ENDOSULFAN AND PARATHION INDUCED EFFECT ON LIVER AND KIDNEY OF GARDEN LIZARD *CALOTES VERSICOLOR* IN RESPECT OF METABOLITE: GLUCOSE AND PROTEIN

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ABSTRACT:

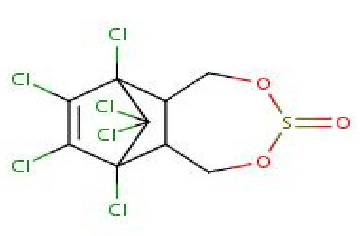
The present study highlights the effect of endosulfan (2.5µl) and parathion (3µl) on kidney and liver of Calotes versicolor. A moderate decrease in kidney protein was found in Calotes versicolor treated with endosulfan and parathion. A significant decrease were noted in liver protein in endosulfan treated Calotes for 24 and 48 hours but statistically non significant changes were found in rest of the exposure periods under the treatment of both pesticides. A significant decrease were noted in liver glucose except 24 & 48 hours whereas non significant decrease was noted in kidney glucose.

KEYWORDS – *Induced effect, endosulfan and parathion, Calotes versicolor.*

INTRODUCTION

Pesticide and related chemical destroy the delicate balance between species that characterizes a functioning ecosystem. Fish, bird and wildlife that live in direct contact with environment subject to pesticide exposure are sentinel species (Kegley *et al.*, 1999) A number of wildlife species can be affected by pesticides used in a agricultural field because of their effect on physiological functions of all kind of animals. Due to human activities and involvement in an effort to increase agricultural product and the use of indiscriminate pesticides, approximately 25% of reptiles and 20% of amphibians are listed as threatened (Hilton-taylor, 2000).Organophosphate and Carbamate are widely used and have a variety of lethal and sublethal effect on non target wild life (Parson *et al.,* 2000). A lot of work has been done on the effect of pesticides on amphibians and reptiles by Antony and Ramalingham (1990); Balasundaram and Selvarajan (1990); Alvarz *et al.*,(1995); Pauli and Money (2002). There has been great deal on interest in reptiles and amphibians ecotoxicology. Some work has been reported by Khan *et al.,* (2003) about the reduction of cholinesterase activity and protein content in *Calotes versicolor* due to pesticides. In present study the effect of endosulfan and parathion on glucose and protein content of liver and kidney of *Calotes versicolor* is observed.

MATERIAL AND METHODS



Local *Calotes* were collected from the field irrespective of sex. They were kept in a aquarium for seven days before the experiment. During captivity food and water were provided in the aquarium. Two groups of six experimental animals were exposed to the predetermined dose of (LC50 for 96 Hrs.) endosulfan (2.5µl) and parathion (3µl) separately was introduced orally to the *Calotes* (single pesticide per 6 animals).A batch of unexposed lizard were also maintained in same laboratory condition. After 24, 48, 72 and 96 hours animals were sacrificed and glucose and protein content was estimated from liver and kidney of these animals.

OBSERVATIONS

Table No. 1.

Effect of sub lethal concentration of endosulfan (2.5µl) and parathion (3µl) on kidney and liver protein (gm/dl) level of *Calotes versicolor*

Exposure periods	Tissue	Control	Experimental	
			Endosulfan	Parathion
24 Hrs.	Liver	4.1+0.260	2.8 + 0.219 ** (-31.7)	2.5+0.089** (-39.00)
	Kidney	3.8+0.089	2.6+0.148** (-31.57)	2.7+0.141** (-28.94)
48 Hrs.	Liver	4.2+0.173	2.1+0.219** (-50)	2.0+0.167** (-52.3)
	Kidney	3.7+0.14	2.1+0.118** (-43.24)	1.8+0.089** (-51.35)
72 Hrs.	Liver	3.7+0.194	3.3+0.757NS (-10.87)	2.6+1.007 NS (-3.18)
	Kidney	3.8+0.089	1.7+0.178** (-55.26)	1.5+0.089** (-60.52)
96 Hrs.	Liver	3.8+0.2)	3.4+0.118 NS (-10.52)	2.8+0.963 NS (-26.3)
	Kidney	3.9+0.141	1.10+0.148** (-71.79)	1.2+0.077** (-69.23)

Table No:-2

Effect of sub lethal concentration of endosulfan (2.5µl) and parathion (3µl) on kidney and liver Glucose (gm/dl) level of *Calotes versicolor.*

Exposure periods	Tissue	Control	Experimental	
			Endosulfan	Parathion
24 Hrs.	Liver	125.6±1.368	121.5 ± 4.037** (-3.26)	123.5±2.58* (-1.67)
	Kidney	116.5±1.378	114.3±2.277 NS (-1.89)	113.1±2.927 NS (-2.91)
48 Hrs.	Liver	124.3±4.71	119.3±1.81** (-4.02)	122.6±2.58** (-1.36)
	Kidney	116.3±1.033	115.5±0.84 NS (-0.68)	112.8±2.00 NS (-3.00)
72 Hrs.	Liver	125.3±5.988	117.8±4.490* (-5.98)	122.0±2.607* (-3.18)
	Kidney	116.0±1.095	113.8±1.169* (-1.89)	112.3±2.339* (-3.18)
96 Hrs.	Liver	125.5±6.12	116.3±4.63 ** (-7.33)	121.8±2.92** (-26.3)
	Kidney	116±0.984	113.6±2.066* (-2.06)	113.1±2.92** (-2.5)

Values are mean ± SD of six observations

NS- Non Significant,

Values are significant at *P<0.05, **P<0.01

RESULT AND DISCUSSION

Under the effect of endosulfan and parathion kidney protein was found to decrease moderately. Liver protein was found to decrease moderately in 24 and 48 hours of exposure periods but later no significant decrease were noted in protein content due to the same treatment for 72 and 96 hrs. Liver glucose was found to decrease significantly in most of the exposure periods except 24 & 48 hrs. Whereas there was non significant decrease noted in kidney glucose under the treatment of both pesticides. The result of present investigation indicate that the influence of both pesticides on the liver and kidney of *Calotes versicolor* reduce the level of protein. Similar results were also observed by Khan *et al.,* (2002) in kidney and liver protein of *Calotes versicolor* and frog *Rana tigrina* due to the treatment of cypermethrine. Khan, (2005) noted inhibition in the activity of cholinesterase in liver and kidney of *Calotes versicolor* due to the treatment of cypermethrine and Malathion. Deli and Kiss, (1988) observed a muscle damaging effect in Chicken embryo when treated with parathion and methyl parathion. They suggested that this muscle damaging effect of organophosphate insecticide may be related to the decrease of tissue content of certain cytoskeletal protein. Age dependant toxic effect of endosulfan was observed by Kiran and Verma (1988) in different age groups of rat. They observed a maximum depletion of liver glycogen and maximum inhibition of brain cholinesterase activity in 365 days old animal. Kaur and Dhanju (2005) studied toxic effect of three oraganophosphate: Monocritophus, Dimethote and methyl parathion on the ovaries of albino rat, they noted significant decrease in the concentration of cytoplasmic as well as membrane bound protein cholesterol.

Tilak *et al.,* (1999) suggested that the decrease in protein content in the kidney and liver of fish, *Labeo rohita* due to the interference of pesticides in protein metabolism and according to them when the fish exposed to pesticides stress the tissue were actively involved in deamination leading to protein depletion. A significant decrease in kidney carbohydrate was noted by Kumari and Kumar (1997) in the fish *Channa punctatus* and they augmented that this decreased kidney glucose may be due to increased glycogenolysis under the pollutant stress. Decreased liver glucose of endosulfan treated *Heteropneustes fossilis* was observed by Shrivastava and Singh (1997) and according to them this decrease was probably due to acceleration of TCA cycle, along with elevated glycogenolysis and gluconeogenesis to meet the excessive energy demand during pesticide stress condition. Shrivastsva and Singh (1997) also observed consistent depletion in the amount of glucose in liver of *Heteropneustes fossilis* under the treatment of endosulfan. Sharma (1999) noted a reduced protein level in the liver of fish *Clarius batracus* when treated with pesticide Carbaryl. Dhapate *et al.,* (2006) noted a reduction in kidney and muscle protein of the fish *Clarius batrachus* due to the treatment of endosulfan. Rajyashree (1996) also observed decline in protein level in liver during Carbamide exposure to *Labeo rohita* and augmented that this decrease due to the physiological adaptability of fish to compensate to pesticide stress.

In the present investigation the exposure of *Calotes* to endosulfan and parathion toxicity resulted into moderate decrease in kidney and liver protein which is similar to the findings of other investigators cited above. Thus we can argue that the exposure of toxicity of both pesticides brings hepatocellular damages and inhibition of protein synthesis in liver, which finally resulted into decreased in liver protein level, Secondly this reduced protein content of liver may be attributed to stress mediated mobilization of this compound to fulfill the increased demand for energy to cope with the detrimental condition imposed by the pesticides. Because to overcome the stress, animal required high amount of energy and this energy demand might have led to the stimulation of protein catabolism which finally resulted in to decline in liver protein level. The resulted decrease in protein content of kidney may be due to increased proteolytic enzymes activity for the breakdown of tissue protein into amino acid in this condition of endosulfan and parathion stress.

Glucose is the major fuel of most organisms and it can be mobilized from glycogen in the time of demand to meet day to day energy requirement. Thus we can conclude that the resulted significant decrease in kidney glucose may be due to its high utilization to meet the energy demand during stress of both pesticides endosulfan and parathion. Decreased liver glucose may be due to elevated glycogenolysis and gluconeogenesis to meet the excessive demand of energy to compensate the stress of both pesticides.

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