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The Effect Of Ekalux On Biochemical Parameters Of The Fresh Water Fish, "Labeo Rohita"

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Abstract: *To get an idea about the nature of effect of Ekalux on the biochemical aspects of aquatic organisms, fishes belonging to the species Labeo rohita were exposed to sublethal concentration of 0.095 ppm for long term duration. Biochemical characteristics like protein, carbohydrate and lipid were estimated in gill, liver, kidney and muscle. The decrease of biochemical constituents from the control were noted. The results are statistically analysed and most values were found to be significant.*

Keywords: *Protein, Carbohydrates, Lipid, Ekalux, Labeo rohita.*

I. Introduction

Water is the prime requirement for the existence and maintenance of biosphere has a scarce resource. The advancement of the technology and urban industrial concentrations has burdened the mother earth in terms of environmental degradation. Water pollution has become a serious problem throughout the world, it is unfortunate that the rivers are being increasingly used as natural dustbin for discharge of all sort of community and industrial wastes. [1]. Biochemical changes induced by herbicides strain lead to disturb the metabolism, inhibition of an enzyme, retardation of growth and reduction in the longevity of organisms. [2]. Therefore an attempt has been made to study the possible impact of Ekalux on some biochemical aspect of a fresh water fish Labeo rohita.

II. Materials And Methods

Labeo rohita is a fish of the carp family Cyprinidae, found commonly in rivers and fresh water lakes in around South Asia and South East-Asia. Bulk of sample of fishes Labeo rohita ranging in weight from 14-17 gms and measuring 7-10 cm in length were procured from Aliyar fish farm. Fishes were acclimatized to the laboratory conditions for one month in large plastic tank (200 L).The fishes were fed with adlibitium, rice bran, wheat bran and oil cakes. Appropriate narrow range of concentration 0.095 ml was used to find the median lethal concentration and the mortality was recorded for every 24 hrs upto 72 hrs. It was found as 0.095 ml for 72hrs using probit analysis method [2]. Three groups of fishes were exposed to 0.0095 ml (1/10th of 72hrs LC_{50} value) concentration of the insecticide Ekalux for 24, 48 and 72 hrs respectively. Another group was maintained as control.

At the end of the each exposure period, fishes were sacrificed and tissues such as liver, gill, muscle and kidney were dissected and removed,the tissues(10 mg) were homogenized in 80% methanol,centrifuged at 3500 rpm for 15 minutes and the clear supernatant was used for the analysis of different parameters. Total protein concentration was estimated by the method of [3].Quantitative estimation of glycogen in the tissues was done following the method as described by [4].Cholesterol was estimated based on enzymatic method using cholesterol esterase,cholesterol oxidase and peroxidase [5].

III. Results And Discussion

In the present investigation, the effect of an insecticide Ekalux on biochemical nature of carbohydrates, protein and cholesterol has been studied in the different tissues (liver, kidney, gills and muscles) of the freshwater fish, Labeo rohita. The results were tabulated (1-3) and statistically analyzed.

In Short term duration, Carbohydrate content was found to decrease from control in all tissues in all exposures. Liver tissue was found to contain 8.31, 7.98, 5.43 mg/gm kidney tissue was found to contain 2.88, 2.51, 1.81 mg/gm gill tissue was found to contain 10.50, 9.81, 9.41, mg/gm muscle tissue was found to contain 8.81, 6.91, 6.51 mg/gm of carbohydrate in 0.0095 ml concentration of insecticide Ekalux in 24, 48 and 72 hours respectively.

The control values were noted as 15.50, 3.12, 12.40 and 15.50 mg/gm in Liver, Kidney, Gills and Muscles respectively. The decrease in the carbohydrate content in the toxicant exposed animals seemed to induce the glycogenolysis possibly by increasing activity of glycogen phosphorylase to meet the energy demand under stress condition of the toxicant [6].

Liver recorded 0.91, 0.81 and 0.67 mg/gm, Kidney recorded 0.54, 0.31, 0.20 mg/gm, Gills recorded 0.98, 0.94, 0.90 mg/gm, Muscle recorded 0.79, 0.77, 0.58 mg/gm of protein in 0.0095 ml concentration of insecticide Ekalux in 24, 48 and 72 hours exposures. The decrease in protein was taken as an alternative source of energy due to high energy demand induced by the insecticide. Also, the depletion in tissue proteins may be due to impaired or low rate of protein synthesis [7] and their utilization in cell repair and organization [8] and the decrease in uptake of aminoacids into the polypeptide chain.

Liver recorded 9.81, 9.01, 7.31 mg/gm, Kidney recorded 8.87, 5.10, 3.41 mg/gm, Gills recorded 16.90, 15.60, 11.60 mg/gm, Muscle recorded 10.90, 10.60, 9.81mg/gm of Cholesterol in 0.0095 ml concentration of insecticide Ekalux in 24, 48 and 72 hours exposures. The alternation of cholesterol content may be due to its utilization in control steroidogenesis and also impairement in the synthesis of cholesterol [9] low level of total cholesterol recorded in the insecticide treated fish suggested that lipids might have been channeled for energy production for other metabolic functions in which these products play a vital role during stress conditions.

IV. Tables

Table 1. Changes in the Carbohydrates content (mg/g) in the (liver, kidney, gills, muscles) of Labeo rohita exposed to 0.0095 ml of insecticide Ekalux on Short term duration.

Tissues mg/g		**Exposure Periods**		
		24 hours	**48 hours**	**72 hours**
Liver	**Control**	15.50±0.71	15.50±0.71	15.50±0.71
	Experimental	8.31±0.39	7.98±0.05	5.43±0.07
	't' value	17.67	21.0	28.08
	% change	-46.38	-48.51	-64.96
Kidney	**Control**	3.12±0.07	3.12±0.07	3.12±0.07
	Experimental	2.88±0.08	2.51±0.06	1.81±0.07
	't' value	4.619	13.51	26.67
	% change	-7.69	-19.55	-41.98
Gills	**Control**	12.40±0.24	12.40±0.24	12.40±0.24
	Experimental	10.50±0.29	9.81±0.04	9.41±0.04
	't' value	9.979	20.80	24.02
	% change	-15.32	-20.96	-24.19
Muscle	**Control**	15.50±0.12	15.50±0.12	15.50±0.12
	Experimental	8.81±0.05	6.91±0.07	6.51±0.07
	't' value	100.7	120.7	129.1
	% change	-43.16	-55.41	-58.00

Results are mean (± SD) of observations
% = percentage decrease over control
* = Significant at 0.05 level ** = Significant at 0.01 level *** = Significant at 0.001 level
NS = Non Significant

Table 2. Changes in the Protein content (mg/g) in the (liver, kidney, gills, muscles) of Labeo rohita exposed to 0.0095 ml of insecticide Ekalux on Short term duration.

Tissues mg/g		**Exposure Periods**		
		24 Hours	48 Hours	72 Hours
Liver	**Control**	0.99±0.04	0.99±0.04	0.99±0.04
	Experimental	0.91±0.06	0.81±0.09	0.67±0.05
	't' value	2.18	3.67	9.71
	% change	-8.08	-18.18	-32.32
Kidney	**Control**	0.81±0.05	0.81±0.05	0.81±0.05
	Experimental	0.54±0.06	0.31±0.06	0.20±0.08
	't' value	5.25	12.6	13.4
	% change	-5.25	-61.72	-75.30
Gills	**Control**	1.20±0.08	1.20±0.08	1.20±0.08
	Experimental	0.98±0.02	0.94±0.04	0.90±0.09
	't' value	5.66	6.24	5.51
	% change	-18.33	-21.66	-25
Muscle	**Control**	0.81±0.06	0.81±0.06	0.81±0.06
	Experimental	0.79±0.07	0.77±0.06	0.58±0.10
	't' value	0.044	0.95	3.83
	% change	-5.46	-4.93	-28.39

Results are mean (± SD) of observations
% = percentage decrease over control
* = Significant at 0.05 level ** = Significant at 0.01 level *** = Significant at 0.001 level
NS = Non Significant

Table 3. Changes in the Cholesterol content (mg/g) in the (liver, kidney, gills, muscles) of Labeo rohita exposed to 0.0095 ml of insecticide Ekalux on Short term duration.

Tissues mg/g		Exposure Periods		
		24 Hours	**48 Hours**	72 Hours
Liver	**Control**	14.10±0.06	14.10±0.06	14.10±0.06
	Experimental	9.81±0.12	9.01±0.14	7.31±0.08
	't' value	64.77	83.96	135.1
	% change	-30.49	-36.09	-48.15
Kidney	**Control**	10.10±0.13	10.10±0.13	10.10±0.13
	Experimental	8.87±0.07	5.10±0.07	3.41±0.04
	't' value	16.68	67.57	96.31
	% change	-12.17	-49.5	-66.23
Gills	**Control**	18.80±0.37	18.80±0.37	18.80±0.37
	Experimental	16.90±0.44	18.80±0.37	18.80±0.37
	't' value	6.62	11.14	25.07
	% change	-10.10	-17.02	-38.29
Muscle	**Control**	11.60±0.10	11.60±0.10	11.60±0.10
	Experimental	10.90±0.62	10.60±0.06	9.81±0.08
	't' value	2.23	16.63	27.74
	% change	-6.03	-8.62	-15.43

Results are mean (± SD) of observations
% = percentage decrease over control
* = Significant at 0.05 level ** = Significant at 0.01 level *** = Significant at 0.001 level
NS = Non Significant

V. Conclusion

Carbohydrates showed maximum decrease as (-64.96 %) in liver during 72 hours exposure and minimum as (-7.69 %) in kidney during 24 hours exposure. Protein showed maximum decrease as (-75.30%) in kidney during 72 hours exposure and minimum as (-4.93%) in muscles during 48 hours exposure. Cholesterol showed maximum percentage decrease as (-66.23%) in kidney during 72 hours exposure and minimum as (-6.03%) in muscles during 24 hours exposures. It can be concluded that the toxicity of the insecticide may lead to severe effect of aquatic organisms.

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