



Study of Cholesterol Level in the Alimentary Canal of *Heteropneustes fossilis* exposed to Endosulfan

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ABSTRACT

In the present investigation, Cholesterol content was observed in the Alimentary canal of *Heteropneustes fossilis*, exposed to sublethal concentration of endosulfan for a period of one month. All over the experiment, the cholesterol content was gradually reduced in the Alimentary canal of the intoxicated fishes.

Keywords: *Heteropneustes fossilis*, Endosulfan, Cholesterol, Alimentary canal.

INTRODUCTION

Water is vital for all forms of life on this earth. So, water pollution which is assuming world-wide magnitude these days is a cause of concern for all. Fertilizers, pesticides and agricultural drainage water entering the water bodies, affect the fish. Fish can absorb toxicants directly from water as well as by ingesting contaminated food.

Endosulfan is one of the organochlorine pesticides of the cyclodien group. The organochlorine compounds are the halogenated pesticides. The affinity of these pesticide residues to tissue of aquatic animal is due to their lipophilic nature. These pesticides dissolve in body fat and accumulate to harmful doses. The organochlorinated pesticides are most toxic to fish as they are stable neither metabolised nor excreted easily and remain stored in tissue.

The present attempt has been made to estimate the level of aquatic pollution by endosulfan on cholesterol content in the fish *Heteropneustes fossilis*. The alimentary canal was selected for the present study because nutrients are essential for energy production and some amount of pesticides can adversely affect the process of digestion of food material and absorption of nutrients by the intestine.

MATERIALS AND METHODS

The live specimens of fish *Heteropneustes fossilis* were collected from lake. They were acclimated to laboratory conditions for 4-5 days prior to experiments. On the basis of pre-determined LC 50 values, these fishes were exposed to sublethal concentration of endosulfan 0.04 ppm for a period of 30 days. One group was maintained as control. On interval of 7-15-30 days of exposure to endosulfan, 3 specimens from each experimental and control groups were removed by means of small hand net to avoid injury to fish. They were sacrificed by giving sharp blow on head and the alimentary canal was taken out after dissecting the fish and weighed. Then washed in

saline water to remove blood and homogenized in appropriate solvent. Cholesterol content was estimated by Liebermann - Burchard (Kabara - 1966)¹ method. The values recorded for the test fish were compared with those of the control by employing student's t-test.

RESULTS AND DISCUSSION

Various scientists have paid attention in the field of histopathology and histochemistry but scanty literature is available regarding the biochemical changes due to pesticidal exposure in the alimentary canal of fishes.

For many years, liver was enjoying the privilege of maintaining the homeostasis of blood cholesterol. Recently it has been shown that small intestine also synthesises considerable amount of Cholesterol (Venugopala Rao & Ramakrishnan, 1982²). Hence, in present investigation the amount of cholesterol was investigated in alimentary canal, because intestine is the main part of alimentary canal.

The results of the present investigation are given in Table 1 and Fig 1. The cholesterol content in alimentary canal of *Heteropneustes fossilis* was significantly decreased from 44.1972% to 70.6376% over control, throughout the experimental period.

Very few scientists have paid attention to study the cholesterol content in alimentary canal of animals. Pugalendhi et al., (1992)³ studied the effect of antimicrobials on cholesterol synthesis in small intestine of Albino rats and found decreased level of cholesterol in small intestine due to tetracycline, ampicillin and Bactrim. Pugalendhi & Ramakrishnan (1990)⁴ and Ramakrishnan et al. (1993)⁵ observed the effect of quality and quantity of dietary protein on cholesterol metabolism in small intestine of rat. They revealed that both low and high protein diets leads to decrease of intestinal cholesterol. Hota (1996)⁶ reported the toxic effect of arsenic in intestine of *Channa-punctatus* and found reduction in cholesterol content. Ganeshwade R M (2012)⁷ also found



decreased level of cholesterol in intestine of *Puntius ticto* after dimethoate intoxication .

The decreased cholesterol content in alimentary canal of *Heteropneustes fossilis* due to endosulfan intoxication may be due to decreased rate of cholesterol biosynthesis and increased metabolism of cholesterol and fatty acid from intestine for energy supplement during stress. It is also reported by Cahill (1977)⁸.

Mandal & Kulshrestha (1980)⁹, Arora & Kulshrestha (1984)¹⁰, Virk et al. (1987)¹¹, Khillare & Wagh (1988)¹², Khare (1993)¹³, Mehrotra (1996)¹⁴, Bais & Lokhande

(2012)¹⁵ and Haloi et al.(2013)¹⁶ histopathologically observed damaged tissues of alimentary canal in different fishes after the intoxication of pollutants. According to these findings, the other cause of reduction of cholesterol may be due to the destruction of tissues, as it is important component of outer cell membrane.

Hota (1996)⁶ and Ganeshwade R M (2012)⁷ confirm the results of present investigation as they also reported decreased level of cholesterol content in intestine of *Channa-punctatus* and *Puntius ticto* respectively due to toxicant.

Table 1: Effect of Endosulfan (0.04 ppm) on Cholesterol

[Content in Alimentary Canal of *Heteropneustes fossilis*]

Time (Days)	Amount of Cholesterol		% age Change (Increase / Decrease)	t' value	Probability
	Control (mg.)	Treated (mg.)			
7	0.6588 ± 0.0179	0.3676 ± 0.0214	-44.1972	9.3423	≤0.001
15	0.6855 ± 0.0127	0.3019 ± 0.0114	-55.9608	20.0843	≤0.001
30	0.6502 ± 0.0235	0.1909 ± 0.0137	-70.6376	15.1171	≤0.001

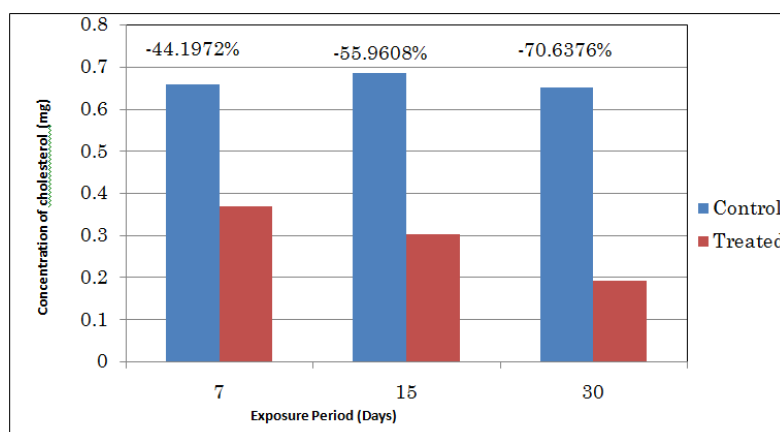


Figure 1: Showing the effect of Endosulfan (0.04 ppm) on Cholesterol content in Alimentary Canal of *Heteropneustes fossilis*.

CONCLUSION

From the present studies, it is concluded that endosulfan is highly toxic to fish as its administration results in the depletion of cholesterol content. On the basis of present study it may be suggested that necessary care must be taken to avoid contamination on fresh water bodies while spraying pesticides.

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