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# Endosulfan Induced Changes in Ascorbic Acid Content of the Liver of *Heteropneustes fossilis*

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**Abstract:**

*In the present investigation, Ascorbic acid content was observed in the liver of Hetropneustes fossilis, exposed to sublethal concentration of endosulfan for a period of one month. All over the experiment the ascorbic acid content gradually increased in the liver of the intoxicated fishes.*

**Key words**: *Hetropneustes fossilis,* Endosulfan, Ascorbic acid, Liver.

## INTRODUCTION:-

Aquatic environment is continuously being contaminated with various toxic chemicals from industrial, agricultural and domestic waste. Due to intensive development of agriculture in recent years, there has been a great increase in utilization of pesticides because they are an integral part of present day agricultural technology. Pesticides are known to affect the quality of water, which has a profound influence on the biochemical and physiological parameters. Studies on biochemical changes in organisms inhabiting polluted aquatic habitats indicate the extent of physiological stress experienced by them and also their efforts to resist the toxic effect of the pollutants. Under the stress of energy demand imposed by

pesticide toxicity, altered metabolic pathways may be utilized to obtain energy for maintenance.

Endosulfan is one of the most commonly used organochlorine pesticide that is extensively used in agricultural practice including paddy fields, tea gardens, vegetables and household pest management. The present attempt has been made to investigate the effect of endosulfan on the ascorbic acid content in the liver of *Hetropneustes fossilis*.

## MATERIALS AND METHODS:-

For the experiment, adult cat fish *Hetropneustes fossilis* were collected and acclimated to laboratory conditions for 15 days prior to experiments. The fish were fed with commercial fish food. The water was changed on alternate days. On the basis of pre-determined $Lc_{50}$ value, these individuals were exposed to sublethal concentration of endosulfan0.04 ppm for a period of 30 days. One group was maintained as control. After exposure, the liver was separated from exposed animals on intervals of 7, 15 and 30 days. Ascorbic acid content was estimated by using 2-6 dichlorophenolindophenol dye **(Mindlin and Butler, 1938[1])** in the healthy and intoxicated fishes. The values recorded for the test fish were compared with those of the controls by employing student's t- test.

## RESULT AND DISCUSSION:-

Ascorbic Acid plays an important role in the detoxification mechanism in the animals. The Amount of ascorbic acid content indicates resistance power or ability of the animal to detoxify the toxicants. Some Scientists have studied the possible effects of stress conditions with reference to ascorbic acid. (**Gould 1963[2], McCann and Jasper 1972[3], Khillare and Wagh 1986[4], K Ramaneswari and L M Rao 2008[5], Bhattacharya and Kaviraj 2009[6], Elias Adikwu and Oputiri Deo 2013[7],**

**Prasad 2015[8]).** In the present investigations, significant increase have been observed in ascorbic acid level in liver of *Heteropneustes fossilis*.

The literature regarding changes in the ascorbic acid content after pesticidal stress on animals are scanty. **Yanovskaya (1962)[9]** reported an increased rate of biosynthesis of ascorbic acid in the rats exposed to tetrachloropentane, aniline organosilicon compounds. **Lahiri and Lloyd (1962)[10]** also reported an increase in the ascorbic acid in liver of guinea pigs, **Kachole et al. (1977)[11]** observed an increase in ascorbic acid in endrin intoxicated fishes. **Ali and Iliyas (1982)[12]** investigated elevation in ascorbic acid concentration in liver of air breathing fish *Channa-gachua* due to dimecron intoxication. **Khillare(1988)[13]** observed an increase in the level of ascorbic acid in liver of *Channa-gachua* after the exposure of $HgCl_2$ and $ZnSO_4$ **. Agrawal and Saxena (1980)[14]** & **Kaviraj and Konar(1982)[15]** also reported similar observations. **Khillare and Wagh (1989)[16]** noticed biochemical changes induced by endosulfan, malathion and sevin in liver of Puntius stigma and observed elevation in ascorbic acid content of liver by all the pesticides.

In the present study, after the exposure of endosulfan, ascorbic acid content in liver of *Heteroneustes fossilis* was increased. The increase was from 43.7216% to 105.1176% over control during 7, 15 and 30 days exposure to endosulfan (Table and Figure). These finding are in good agreement with the above referred authors as they have also reported increase in the ascorbic acid content in the liver of different fishes and other animals.

Ascorbic acid plays an important role in make-up of the metabolic disorders by compensating the immediate requirement during the stress condition. Hence the increase of ascorbic acid component in liver may be due to the acceleration of NADP enzyme activity which is essential for synthesis of ascorbic acid by the secondary catabolic pathway of glucose.

The increase also may be due to the influence of the phagocytic cells in the body or detoxifying mechanism of the tissue which initiate during toxic condition. **Leonardo et al.(2000)[17], Borane Vijay Ramdas(2013)[18], Shinde Brijlal Ramdas(2013)[19], Tambe and Pulate (2015)[20]** studied the protective role of ascorbic acid in intoxicated fishes and fresh water bivalve. They have also observed positive role of ascorbic acid in detoxification.

## CONCLUSION:-

From the presents studies, it is concluded that the endosulfan is highly toxic to fish as its administration results in augmentation of ascorbic acid content in liver of *Hetropneustes fossilis* because ascorbic acid synthesis was elevated to fulfill the energy demand to mitigate any stress condition.

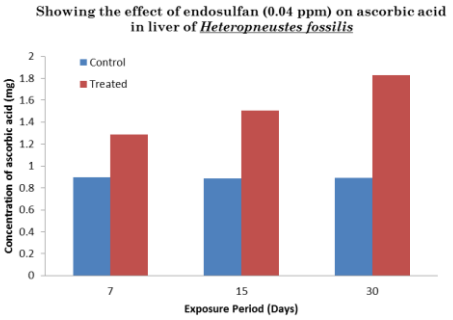
**Table**

**Effect of Endosulfan(0.04 ppm) on Ascorbic acid Content in Liver of *Hetropneustes fossilis***

| S. No. | Time (Days) | Amount of Ascorbic acid | | %age Change (Increase / Decrease) | t' value | Probability |
|---|---|---|---|---|---|---|
| | | Control (mg.) | Treated (mg.) | | | |
| 1 | 7 | 0.8947 ± 0.0877 | 1.2858 ± 0.1062 | 43.7216 | -2.5396 | ≤0.05 |
| 2 | 15 | 0.8882 ± 0.0669 | 1.5079 ± 0.0.783 | 69.7681 | -5.3802 | ≤0.001 |
| 3 | 30 | 0.8913 ± 0.0687 | 1.8283 ± 0.1397 | 105.1176 | -5.3835 | ≤0.001 |

Values Expressed as mg/100 mg wet weight of tissue. Each Value is the mean ± standard error of five Individual observations

## Figure

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