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Review Article

**TOXICOLOGICAL CRITICAL REVIEW REPORT OF CATLA  
CATLA (HAMILTON, 1822)****Pugazhendy K<sup>1</sup>, Tamizhazhagan V<sup>1</sup>, Jayanthi C<sup>2</sup>, Sakthidasan V<sup>1</sup>, and Sasikala P**<sup>1</sup>Department of Zoology, Annamalai University, Tamilnadu, India<sup>2</sup>Department of Education, Annamalai University, Tamilnadu, India**Abstract:**

*Indian major carp Catla catla is used for the various toxicology experiments in life science and medicine field to be consumed major food sources and highly rich proteins present in the Indian major carp. Many toxicology approaches made in lower animals used to toxicants like herbicide, pesticide, insecticide heavy metals etc., widespread information about the animal has been together from various sources like books, Journals and authentic classical texts, etc. Researcher and pharmacologist and toxicological treatment may be helpful security of the whole fish was settled in the criticism. Behavior studies, hematology studies, enzyme studies, recovery studies, histology studies, immunological studies, etc., this amassed data may be helpful for the researchers to attention on the significant areas of research yet to be revealed.*

**Keywords:** Hematology, Biochemical, Histology, Catla catla.**\* Corresponding author:**

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**INTRODUCTION:**

Adversely human activities are directly or indirectly affect the environment. Developed and developing countries which are progressing rapidly in the field of agriculture, technology and industries are continuously releasing various kinds of harmful substances [1]. The increase overall lead absorption, nutrients can also have marked effects on patens of tissue deposition of lead once absorbed from the environment[2]. The importance of medicinal plants and the contribution of phytomedicine to the well-being of a significant number of the world's population[3]. Fish immune system, important for defense against a variety of harmful pathogens is very sensitive to homeostatic adjustments via endocrine regulation and is influenced by the biochemical profile of the nervous system[4]. Widely spread pesticides are used to control agricultural pests but at the same time they are highly toxic to non-target natural population in the aquatic environment. This necessitated the need to understand and evaluate the biological effects of xenobiotic on aquatic ecosystem[5]. The major sources of water pollution are domestic, agricultural and industrial wastes which are discharged into natural water bodies [6]. Domestic sewage are runoff from agriculture fields loaded with pesticides and fertilizers, pollute the water bodies. Commonly used pesticides can be harmful living organisms, pets, and their environment. The most common cause of water pollution in developing countries is domestic and industrial waste that is directly released into streams or ponds without treatment. These wastes mostly contain various types of pollutants such as heavy metals, radioactive elements, pesticides, herbicides and corrosive substances like acids and bases [7]. Supplementary fishes contain lipids particularly omega fatty acids from the human nutritious position of inspection, eminent and excellence in attendance in maritime and cultivable fishes. Various toxicity data symbolize for assortment of pesticide such as organophosphate, organochlorine, carbamide and pyrethroid pesticides have been reported for number of fish species noted various approaches and momentous researchers find out like[8, 9]. Because of their low insistence, frequent application of these pesticides are life form skillful for the have power over of pests in agricultural fields and thereby large quantities find their way into water bodies[10].The control f pest involves the heavy use of synthetic pesticides, but the widespread use of these substance has led to serious problem including toxic residue on grass and toxicity to nontarget organism such as mammals birds and fishes[11]. The first life originated in the water and first organisms was also aquatic where water was the principal external as

well as internal medium for organisms. Thus water is the most vital factor in the existence of all living organisms. Water covers about 71% of the earth of which more than 95% exists in gigantic oceans very less amount of water is contained in the rivers (0.00015%) and lakes (0.01%), which comprise the most valuable freshwater resources. Global aquatic ecosystems fall under two broad classes defined by salinity – freshwater ecosystem and the saltwater ecosystem.

Freshwater ecosystems are inland waters that have low concentrations of salt. The salt-water ecosystem has a high concentration of salt content (averaging about 3.5%)[12]. Freshwater mussels play a number of important roles in aquatic ecosystems. As sedentary suspension feeders, unionoids remove a variety of materials from the water column, including sediment, organic matter, bacteria, and phytoplankton. Siphoned material is either transferred to the mouth for digestion or sloughs off the gills and exits via the ventral margin of the shell (pseudofeces). Digested material is either used as fuel for various life processes or excreted as feces. The amount and rate of particulate matter removed from the water column and subsequent deposition of waste is largely dependent on temperature, particle concentration, flow regime, mussel size, and species[13]. These tests determine LC50 which is a quick estimate of different toxicants and assessment of a toxicant to estimate toxicant concentration to be used in the intermediate and long-term test. The intermediate test is conducted when a toxicity test is dealt with a long life cycle organism or longer life cycle stage which requires additional time for determination of LC50 [14]. Investigation on toxicity makes it possible to evaluate the effects of sublethal concentration on growth, behavior, physiology and biology of organisms, to determent their adaptation capabilities and to forecast possible consequences to toxic effect of Aquatic ecosystems that run through agricultural areas have high probability of being contaminated by runoff and groundwater is reached by a variety of chemicals[15]. Gills are the first organs (figure 1) which come in contact with environmental pollutants. Paradoxically, they are highly vulnerable to toxic chemicals because firstly, their large surface area facilitates greater toxicant interaction and absorption and secondly, their detoxification system is not as robust as that of liver. Additionally, absorption of toxic chemicals through gills is rapid and therefore toxic response in gills is also rapid [16]. The weathering of rocks, soil forms and increased use of metal-containing fertilizers in agriculture could lead acetate to a continued rise of the concentration of metal pollutants in freshwater

reservoirs as a result of water runoff, thereby representing the greatest hazard to human consumers of fish [17, 18]. Present critical reviews various filed author so many research successfully done especially water quality analysis and toxicology heavy metal

constitute a serious type of pollution in freshwater and being stable compounds, they are not readily removed by oxidation, precipitation or other processes and affect the activity in recipient animal [2, 11, 12, 16, 19-26].

**Table 1: Scientific classification of *Catla catla***

Kingdom	Animalia
Phylum	Chordata
Class	Actinopterygii
Order:	Cypriniformes
Subfamily	Labeoninae
Genus	<i>Labeo</i>
Species:	<i>L. catla</i>



**Figure 1: Morphological structure of *Catla catla***

#### **Taxonomy of *Catla catla***

The catla was formerly listed as the only species in the genus *Catla*, (Table 1) but this was a synonym of the genus *Gibelion*. More recently, Catalog of Fishes has moved this species to *Labeo*. This species has been frequently confused with the giant barb (*Catlocarpio siamensis*) of south-east Asia, and the two taxa do bear an extraordinary resemblance to each other, especially in their very large heads [27].

#### **Hematology studies of *Catla catla***

The present review is aimed to evaluate the effect of sub lethal concentration of lihocin on hematological indices various tissues of carp fish, *Catla catla* over an exposure period of 45 days [28-30]. Haematological parameters are considered as index of the total body and therefore they are important for diagnosing structural and functional strategy of fish. Experiments in the field of ecological toxicology are oriented towards studying the variations in the hematological changes [31-39]. These parameters have been used to assess the health of fish, monitoring stress responses and forebode systematic relationship and physiological adaptations of animals.

They quickly reflect the weak condition of fish [10, 28, 40, 41].

#### **Biochemical studies of *Catla catla***

The total carbohydrate content was estimated by the technique of [42]. A 10% homogenate of tissue was prepared using 5% TCA and this was centrifuged at 3000 rpm for 10 minutes. Samples were cooled in the dark at room temperature for 30 minutes. The total carbohydrate content in mg/g of tissue. Protein was estimated by the method of [43]. 1% tissue homogenate were prepared in 10% TCA and centrifuged at 3000 rpm for 15 minutes. The goal set was dissolved in 1 ml of 1N NaOH to the above 5 ml of alkaline copper reagent was added and after 10 minutes, 0.5 ml of folin phenol reagent was measured after was added and rapidly. The moisture content was estimated by subtracting the dry weight (dried in a hot air oven) of the muscle tissue from the known wet of the muscle tissue. The total lipids were extracted by the method of [44] to find out total lipid, known volume of experiment samples were homogenized with 1 ml of methanol and 2 ml of chloroform to which again 2ml of chloroform :

methanol (2:1 v/v) was added and mixed thoroughly [35, 45-51].

#### Histology studies of *Catla catla*

Generally, most of the histological studies are made on the dead cells or tissues. For microscopically studies, cells or tissues have to pass through the process such as fixation, dehydration, embedding, sectioning and staining in the present study focused various tissues like gill, liver, eyeball, kidney and etc., [52-58].

#### CONCLUSION:

*Catla catla* is used as an important toxicology approaches to provide significant results in the scientific field to help to monitor aquatic lower animal to higher animals. In the food chain to relate to human to help the veracious studies formulate new ideas and innovative of common people may be using this review approach.

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