

Biochemical change in protein of fresh water fish *Channa punctatus*, in response to treatment with glyphosate

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Manuscript details:

Available online on
<http://www.ijlsci.in>

ISSN: 2320-964X (Online)
ISSN: 2320-7817 (Print)

Cite this article as:

Rohankar Pratibha H and Feroz Ahmad Dar (2019) Biochemical change in protein of fresh water fish *Channa punctatus*, in response to treatment with glyphosate, *Int. J. of. Life Sciences*, Special Issue, A13: 110-112.

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ABSTRACT

Glyphosate [N-(phosphonomethyl) glycine] is a broad spectrum, post growing herbicide and is widely used in agricultural chemicals globally. Fish are highly sensitive to a wide variety of agrochemicals with glyphosate herbicide that may occur from not only on purpose discharge of these chemicals into waterways but also from approved agricultural practices. Herbicide Glyphosate has been extensively used in aquatic and agricultural weed control in numerous countries including India. Glyphosate plays vital role in agriculture to control the growth of weed species in the fields and yield high production of harvesting, but are very dangerous for flora and fauna. In the present study protein shows significant decrease in fresh water fish *Channa punctatus* for 24, 48, 72 and 96 hours respectively. Kidney Protein have been estimated by Lowry's method.

Keywords: Protein estimation, kidney, glyphosate, *Channa punctatus*.

INTRODUCTION

Pesticides yield high result of production in agriculture and public health activities. The pesticides impact in ecological particularly in streams, lakes, river water etc. are determined by their toxicity, persistence, fate and content of impurities. Pesticides are vital environmental contaminants due to higher concentration of biological toxicity (Moustafa *et al.*, 2016). The importance of herbicides is to protect the crops, is a predictable for management practice and benefit of agricultural productivity. Glyphosate is the active constituent and is first introduced in 1974 for nonselective weed control (Franz *et al.*, 1997).

Mishra and Sharma (2004), have examined that the proteins are the main source of energy, and plays an important role in tissue manufacturing. The protein in kidney has its own importance, but over protein is dangerous, but in fact pesticides cause alteration in the amount of protein present in kidney. The acute exposure due to glyphosate causes various symptoms have features and underlying mechanisms already well known (Bradberry *et al.*, 2004; Roberts *et al.*, 2010). Accumulation of pesticides in tissues can cause many physiological and biochemical changes in fresh water fishes, and influencing

the activities of various enzymes. Various workers have reported that the alteration or change in biochemical contents in various tissues of fish, due to toxic effects of various herbicides (Das *et al.*, 1999; Khare and Singh, 2002).

The present study is thus aimed at examining the toxicity and effects of herbicide a glyphosate on fresh water fish *Channa punctatus* by determining the protein alterations in the kidney due to toxic stress.

MATERIALS AND METHODS

Some live specimens of snake headed fishes *Channa punctatus* were brought from the local market Amravati. The fishes having average length, weight 15 ± 1 cm and 50 ± 5 gm respectively were brought to the laboratory and were treated with 0.1% KMnO₄ then after transferred aquarium. These specimens were kept in

aquarium for ten days for acclimatization, and aquarium was connected with aerator. As *Channa punctatu* is carnivores dried fish was given daily after changing the water of aquarium. The specimens were treated with glyphosate herbicide after completion of acclimatization. Alteration in protein was done in kidney *Channa punctataus*. Protein estimation was done by Lowry's method 1951. The herbicide, glyphosate was purchased from local market chemist shop for the present study.

RESULT AND DISCUSSION

The result shows the significant decrease in protein due to the exposure of glyphosate an herbicide in kidney. Below, table shows gradual change and difference or significant change between control and 24 hrs, 48 hr, 72 hrs, 96 hrs in the kidney of fresh water fish *Channa punctatus*.

Table 1: Changes in Total Protein level of fresh water fish *Channa punctatus* exposed to Glyphosate a herbicide at different exposure period (mg/ 100 mg wet wt. tissue)

Biochemical Organ	control	24	48	72	96
Kidney	36.04 \pm 1.23	28.83 \pm 1.41	20.96 \pm 2.0	12.59 \pm 1.69	5.68 \pm 1.30

Values in mean +S.E. (standard deviation) n=5,*P<0.05, **P<0.01, ***P<0.001 when compared with control, ns = non signification.

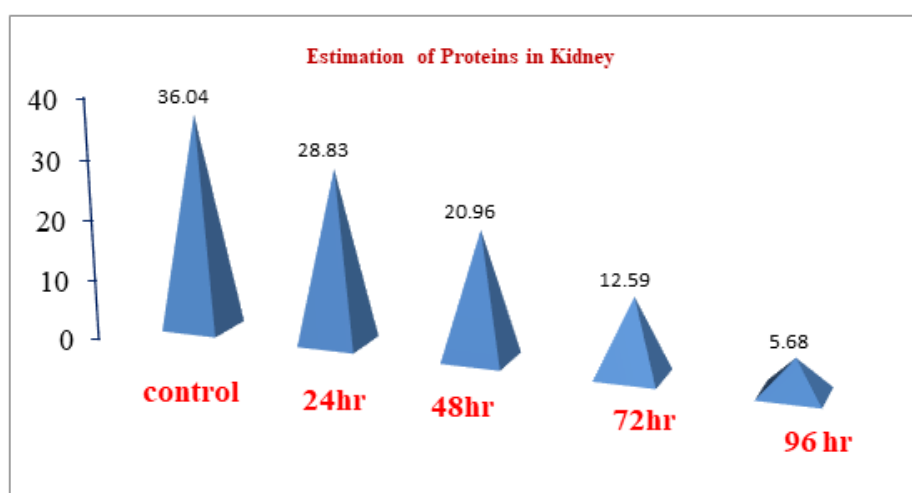


Figure 1: Changes in protein content (mg/g wet wt of tissue) in kidney of fresh water fish *Channa punctatus*, exposed to sublethal concentration of glyphosate for 24, 48, 72 and 96 hrs.

It is clear from above table, that glyphosate effects on kidney in a snake headed fresh water fish *Channa punctatus* and shows the significant decrease in protein content. Proteins play the vital role and have the top priority in the body of organisms, proteins are composed of amino acids which are organic compounds

made of carbon. As whole the body is made up of proteins, though Proteins has chief significant and high priority in the living world by their biological specificity among various types of cell (Bhushan *et al.*, 2002). Fish are main organisms that are used to identify and document pollutants released into their environment.

Various studies have been noticed and states that glyphosate a herbicide is toxic to fish which give rise to morph and functional changes in aquatic animals. While various facts shows negative outcomes from glyphosate exposure, which including birth defects and neurological, fetal death and neurodevelopment (Battaglin *et al.*,2005; Jurewicz and Hanke 2008).

CONCLUSION

It was concluded that the herbicide glyphosate is very harmful for both flora and fauna in an aquatic medium. The glyphosate is mainly used in various orchids and agriculture purposes. As, is washed out through rain and ultimately reaches to the nearby river or lakes, and ultimately affect directly or indirectly on the fauna organisms which in turn effect the human health by food chain.

Conflicts of interest: The authors stated that no conflicts of interest.

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