

Effect of CuSO₄ on protein content of *Channa punctatus*

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Abstract

The present work was conducted to study the effect of CuSO₄ on protein content of *Channa punctatus*. The present investigation indicate that the protein content in liver, muscle, and gills of experimental fish becomes decreased as compared to control one. It is due to effect of toxicant like Cuso4 on health of fish

Keywords: *Channa punctatus*, CuSO₄, Protein content

INTRODUCTION

Copper occurs naturally within the environment. At low concentrations, it is an essential element both for plants and other organisms, however, large doses can be harmful. Copper is an important trace element essential for all aerobic organisms. It is involved in diverse life processes, including cellular respiration, antioxidant defense, pigment formation, neurotransmitter production and peptide biosynthesis [1]. But if copper levels are not properly controlled, the element can be very harmful. Studies have shown the negative effects of various copper formulations on entomopathogenic fungi, nematodes, and parasitoids, and some have found that it is harmful to other organisms. Qiu^[2] showed that copper has toxic effects on the larval development of the barnacle *Balanus amphitrite* and that molting was a more sensitive end-point than survival. Studies on different biochemical parameters have proved useful in determining the adaptive and protective mechanisms of the body to resist the toxic effects of the toxic substances.

Total protein is an important constituent of all the cells and tissues which play vital role in the physiology of living organism. The purpose of present investigation was to determine the effect of copper sulphate on protein content of certain important tissues, i.e. Muscle, Gills, Liver of the fresh water fish, *Channa punctatus*.

MATERIAL AND METHODS

Healthy and Disease free Specimens of *Channa punctatus* having mean weight and length were collected from the "Godavari River" and brought to the laboratory in living condition. They were fed on "Tubifex Food" i.e. standard fish food. Tap water was used during this work. Twenty fish were selected and divided into two groups of each. First group was maintained in tap water and serve as control. Second group was exposed to concentration of '5' mg/lit. Copper Sulphate in '30' liter capacity of aquarium. This group of fish was exposed for 24 hrs 48 hrs 72 hrs 96 hrs 120 hrs respectively.

At the end of each exposure period, the fish were sacrificed and the required tissues i.e. Muscle, Liver, Gills were collected for Protein estimation. The experimental tissues were dissected out and processed for the protein assays method of Lowry's.

RESULT

The protein content in control as well as experimental fish *Channa punctatus* are represented in Table-1 and Table-2. The high amount protein content in all the tissue of control fish. while slightly low content of protein were recorded in all the tissue of Experimental fish *Channa punctatus*.

Table 1: Protein content in Control fish.

Sr. No.	Hours	Protein content in mg/gm wt. wet of Tissue		
		Muscle	Gill	Liver
1	24 hrs	27± 2.2	23.4±2.12	28.5±2.24
2	48 hrs	21.52±1.8	22.32±1.7	27.9±1.82
3	72 hrs	18.22±2.4	21.56±2.1	24.4±2.32
4	96 hrs	16.26±1.7	19.83±1.9	22.76±2.4

Table 2: Protein content in experimental fish.

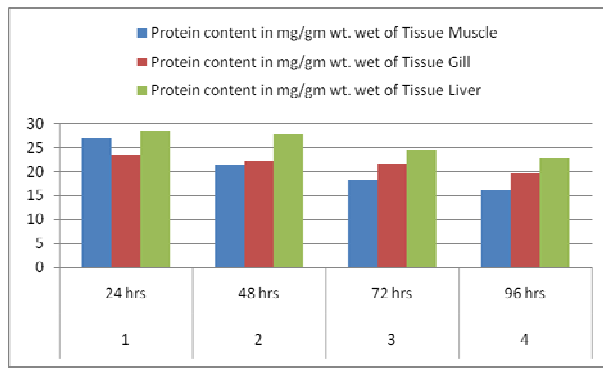
Sr. No.	Hours	Protein content in mg/gm wt. wet of Tissue		
		Muscle	Gill	Liver
1	24 hrs	24.2±1.88	21.86±1.96	26.86±1.98
2	48 hrs	19.9±2.12	19.29±2.26	25.29±1.86
3	72 hrs	18.86±2.24	18.6±2.18	20.86±2.36
4	96 hrs	13.72±2.34	18.43±2.38	19.29±2.32

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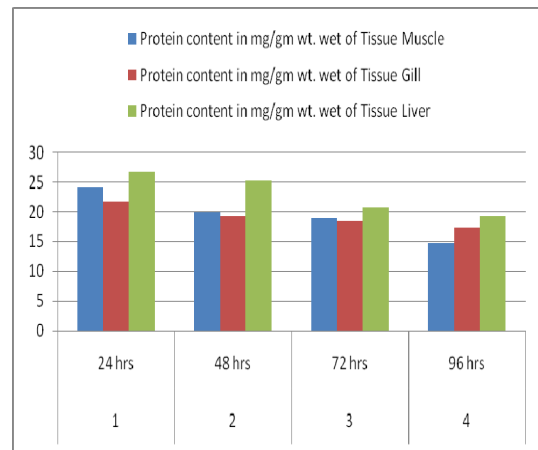
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Graph 1:- Protein content in control fish



Graph 2:- Protein content in Experimental fish

DISCUSSION

The impact of 5 mg/lit Copper Sulphate on the Protein level of the certain tissues of *Channa punctatus* after 24 hrs 48 hrs 72 hrs and 96 hrs treatments is presented in table.

There was gradual and significant decline in the Protein level from the control value with an increase in the time period of treatment up to 96 hrs i.e. 4 days. The result clearly indicated that gills, liver, muscle, was affected after 96 hrs exposure.

This study was supported by the study of Khillare and Wagh^[3], recorded protein declined in muscle of *Puntius stigma* after exposure of endosulfan, malathion and sevin. Lomte and Sabhia Alam,^[4] studied effect of Malathion on the biochemical components of prosobranch, *Belamia bengalensis* and reported that the decrease in glycogen, protein and lipid under pesticidal stress. The study of Kabir Mohammed Adamu and Ovie Kori-Siakpere^[5], suggest that tobacco leaf dust caused a stress-induced effect on protein synthesis which must have led to the depletion in the serum protein. The depletion of tissue protein-pesticides stress influences the conversion of tissue protein into soluble fraction reacting in the blood for utilization. Meenakumari et. al,^[6] observed the protein content of serum, liver and muscle tissues decreased significantly due the metabolic stress of copper in *Labeo rohita*. Mastan,^[7] studied the impact of (5mg/l) copper on the protein level of the certain tissues of *Heteropneustes fossilis* after 30 days, 60 days, 90 days treatment. There was a gradual and significant ($P < 0.001$) decline in the protein level from the control value with an increase in the time period of treatment up to 90 days. Jha,^[8] also noticed protein depletion in liver and gonads of *Anabas testudineus* under the stress of heavy metals.

When an animal is under toxic stress, diversification of energy occurs to accomplish the impending energy demands and hence the protein level is depleted. The depletion of protein content may be due to break down of protein free amino acid under the affect of Copper sulphate at the lower exposure period.

CONCLUSION

These types of results indicate that the protein content in liver, muscle, and gills of experimental fish becomes decreased as compared to control one. It is due to effect of toxicant like CuSO_4 on health of fish i.e. *Channa punctatus*.

REFERENCES

- [1] Danks, D.M. 1988. Copper deficiency in humans. *Annual Review Nutrition* 8, 235–57.
- [2] Qiu J.W., Thiyagarajan V., Cheung S. and Qiu PY 2005. Toxic effects of copper on larval development of the barnacle *Balanus amphitrite*. *Marine Pollution Bulletin* 51(8- 12), 688–93.
- [3] Khillare, Y.K. and Wagh S. B. 1989. Effects of endosulfan, malathion and sevin on biochemical constituents of freshwater *Puntius stigma*. *Environ. Ecology*. 7(1): 66-69
- [4] Lomte, V.S. and Sabiha Alam. 1984. Changes in the biochemical components of prosobranch, *Belmia bengalensis* on exposure to Malathion. *Proc. Att. India. Ymp.*, 69-72.
- [5] Kabir Mohammed Adamu and Ovie Kori-Siakpere 2011. Effects of Sublethal Concentrations of Tobacco (*Nicotiana Tobaccum*) Leaf Dust on Some Biochemical Parameters of Hybrid Catfish (*Clarias gariepinus* and *Heterobranchus Bidorsalis*) BRAZILIAN ARCHIVES OF BIOLOGY AND TECHNOLOGY Vol.54, n. 1: pp. 183-196,
- [6] Meenakumari, S., Showkat Ahmad Perry and Saravanan, T.S. 2010. Ambient copper induced alterations in haematology and biochemistry of major carps *Labeo rohita* (Hamilton). *International Journal of Integrative Biology*. Vol.2 No.2 pp119-123.
- [7] Mastan, S. A. 2008. Copper induced changes in protein level of certain tissues of *Heteropneustes fossilis*. *J. Herbal Medicine and Toxicology*. Vol.2 (2) pp.33-34.
- [8] Jha, B. S. 1991. *J Ecobiol.*, 3: 29-34.