

Hematological Alterations in Fresh Water Fish Grass Carp (*Ctenopharyngodon Idella*) against Toxicological Effects of Chlorpyrifos (Insecticide)

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Abstract

The present study was conducted to evaluate the effect of an insecticide chlorpyrifos on blood parameters of fish, for which Grass carp (*Ctenopharyngodon idella*) was been selected as experimental object in lab. Fishes were been divided into two groups one was as control and other was treated group. Fishes to be treated were classified into fish 1, fish 2, and fish 3 to be treated for 3, 6, 9, 12 and 15 days with chlorpyrifos and blood samples were collected from all and analyzed in the lab respectively.

The mean value of different blood parameters for three fish of control group were like for Hemoglobin 4.40 Gdl, RBC .92 s ($\times 10^3 \mu\text{l}^{-1}$), HCT9.08%, MCV 101.03%, MCH 47.87 pg^{-1} MCHC 47.33 Gdl⁻¹, TLC 8100.00 (cmm), Neutrophils 10.0%, Lymphocytes 76.67%, Eosinophils 5.0%, Monocytes 8.3%, Basophils 00.0% and platelets 28000.0(cmm) while mean values of these parameters for three fishes treated with chlorpyrifose for 3 were 5.6 Gdl⁻¹, 1.04 s ($\times 10^3 \mu\text{l}^{-1}$), 11.13%, 109.3 %, 55.13 pg^{-1} , 50.66 Gdl⁻¹, 8400(cmm), 73%, 7%, 9.66%, 0.00, 17300(cmm), for 6 days were 11.166 Gdl⁻¹, 2.49, 2.9($\times 10^3 \mu\text{l}^{-1}$), 30.96%, 124.4%³, 44.833 , 36, 68, 400, 2.33, 89.66, 3.33, 4.66, 0, and 8 800, for 9 days were 7.866 Gdl⁻¹, 1.49 s ($\times 10^3 \mu\text{l}^{-1}$), 17, 112.33, 52.6, 46.66, 21566.67, 9.33, 73.33, 6.33, 11, 0 and 9000, for 12 days were 8.366 Gdl⁻¹, 1.456 s ($\times 10^3 \mu\text{l}^{-1}$), 17.1, 118.03, 57.5, 49, 28000, 9, 72, 5, 11, 0 and 19333.3 and for 15 days were 10.2 Gdl⁻¹, 5.303 s ($\times 10^3 \mu\text{l}^{-1}$), 22.33, 83.5, 38.5, 46, 33266.67, 9.333, 71.333, 6, 13.33, 0 and 13,000 respectively.

By comparison of treated group with control group of fish it is been conclude that insecticides like chlorpyrifos has a vital effect on blood parameters of fish which permit these parameters to show deviation from normal values.

Introduction

Unwanted change in any sort of living organism ecosystem that affects life inhabitants is termed as pollution in common words. Due to rapid industrialization and high amount use of insecticide, herbicide and fertilizers in agriculture for different purposes the quality of water and other resources which are vital for life on planet earth are being degrading and disturbing [1]. Infiltrated industrial, agricultural and domestic discharge of water into streams and rivers pollutes this water and led to reached to lethal level [2], cause tremendously affect fish as well other wild life. Particularly water pollution has damaged fish population by affecting reproductive health, life span and embryonic as well larval development and also cause deleterious effects in other living organisms [3]. Intense use of herbicides and insecticides for increase production of food and control of disease has tremendously contributed to environmental pollution in aquatic as well as terrestrial.

Chlorpyrifos is a well-known insecticide of the organ phosphorus family. The exposure of aquatic organisms to various stressed and pollutants practically insecticide in their environment generally causes rapid changes in various hematological parameters of fish [4].

The aim of the study is to find the toxic effect of insecticides chlorpyrifos on haematological parameters of grass carp.

Materials and Methods

Study design

During experimentation one group was kept untreated which was considered as control group while the second group was treated against the sub lethal doses of chlorpyrifos having concentration 0.01 μL^{-1} for 3, 6, 9, 12, 15 days respectively.

Hematological parameters

For examination of the hematological parameter, blood was drawn from the caudal vein of grass carp through sterile heparinized syringe and stored in EDTA tubes. Blood samples were observed through hematological Analyzer Model No (URIT 3020) placed in laboratory of Department of Zoology, University of Swabi.

Statistical analysis of collected data

At the end of the research collected data was statistically analyzed. Statistical data was analyzed by calculating mean and standard deviation.

Results and Discussion

The present experiment was conducted for the purpose to analyze the toxicity (LC15) of insecticides chlorpyrifos on hematological parameters, grass carp (*Ctenopharyngodon idella*) for 3, 6, 9, 12 and 15 days respectively against 0.01 μL^{-1} and alterations were observed in each treated group against each specific time.

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One group was considered as control group and was kept without treatment while the other groups were treated against chlorpyrifos for the time period mentioned above. Each treated group was consisted of 5 fish and after treatment three fish were collected randomly for analysis.

Various parameters including haematology, and behavioural observation of grass carp were observed against the specific sub lethal dose of chlorpyrifos herbicide for various time periods. Behavior of fish was also under observation throughout the experimentation.

Behavior of fish were observed regularly during the experimentation and noted that chlorpyrifos poisoning in fish ends in high rate of breathing due to suffocation that was observed by maximum frequency of opercula movement, loss of body balance, includes erratic and jerky swimming, frequent surfacing, becoming exhausted and lethargic and bleeding at the base of the eyeballs while blood alteration of Grass Carp expose to chlorpyrifos were shown in (Figure 1).

Chlorpyrifos has an inhibitory effect on acetylcholinesterase which very much important to normal function of acetylcholine as neurotransmitter molecule to convey impulse but this chemical stop it to be spread and accommodate at synaptic junction to block message from onward going. Fishes which have been exposed to insecticides chlorpyrifos induce reduction in haematological value which is either due to erythropoiesis, chemosynthesis and osmoregulatory dysfunction or due to an increase in rate of erythrocyte destruction in haematopoietic organs [5].

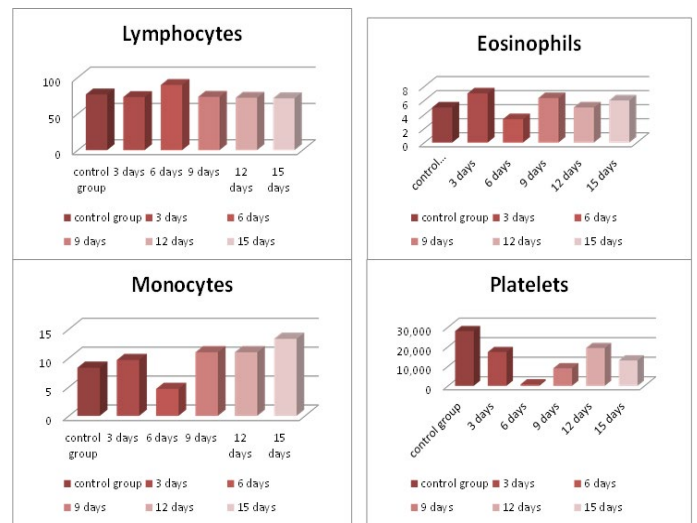


Figure 1: Blood alteration of grass carp expose to chlorpyrifos.

Exposing to insecticides like chlorpyrifos induce changes in the blood parameters as to decrease RBC, WBC, haemoglobin and haematocrit while MCV, MCH and MCHC show fluctuation which can't be described to either increase or decrease permanently [5].

Conclusion

Current study finding concluded that insecticides chlorpyrifos cause a intense alteration in hematological parameters including RBC. The need to minimize the use of these kinds of insecticides is required as to prevent lethal effects on living biota.

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Conflict of Interest

The author confirmed that the content of this manuscript has no conflict of interest.

References

- Golden JS (2004) The built environment induced urban heat island effect in rapidly urbanizing arid regions—a sustainable urban engineering complexity. *Env Sci* 1: 321-349.
- Muhammad A, Salam A, Ahmad N, Yawar B, Khan A, et al. (2004) Monthly variations in physicochemical characteristics and metal contents of Indus river at Ghazi Muzaffargarh, Pakistan. *Pak J Zool* 36: 295-300.
- Akpor OB, Ohiobor GO, Olaolu DT (2014) Heavy metal pollutants in wastewater effluents: sources, effects and remediation. *Adv Biosci Bioeng* 2: 37-43.
- Alagoa KJ, Ekweozor IKE (2009) Sublethal effect of the dispersant Goldcrew on selected blood parameters of the African cat-fish *Clarias gariepinus*. *Toxicol Env Chem* 91: 339-343.
- Deb N, Das S (2013) Chlorpyrifos toxicity in fish: a review. *Cur World Env* 8: 77-84.

