

Combined Effect of Mancozeb and Malathion Hematological Parameters in *Channa Punctatus*

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ABSTRACT

Channa punctatus Bloch (Actinopterygii: Channidae), one of the most common edible fish, if exposed to pesticides, maybe a serious threat to human health. In the present study, an attempt was made to understand the effect of combined efficacy of Mancozeb and Malathion on hematological profiles of *Channa punctatus* after exposure to 96 hours. In the present study, decrease in total erythrocyte count, hemoglobin concentration, packed cell volume, mean corpuscular volume, mean corpuscular hemoglobin and mean corpuscular hemoglobin concentration has been observed while increase in total leucocyte count and erythrocyte sedimentation rate has been observed after 24hrs, 48hrs, 72hrs and 96hrs treatment of mancozeb+malathion in experimental fish *Channa punctatus*. Thus present study concludes that the estimation of the hematological profile of fish will certainly detect early signs of stress physiology concerning their habitat.

Key words: *Channa punctatus*, Mancozeb, Malathion, Hematology

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INTRODUCTION

The overall impact of above activities related to pesticides and insecticides is contamination of aquatic bodies adversely. This affect ecosystem at every trophic level the pesticide can accumulate in aquatic organisms or directly kill them and destroy balance of ecosystem. The past work on this phenomenon is done in vast aspects. Water pollution is major issue form the last many decades. it's far more effective in rivers and water bodies almost dense cities [1].

The contamination of water with a good range of pollutants has become a matter of great concern over the previous couple of decades, not only due to the threat to public water supplies, but also with the damage caused to the aquatic life. Pollution may be a serious matter for the planet. Because many water resources are polluted thanks to different quite pollutants. The power to predict the impact of commercial waste water and municipal sewage discharge during a particular ecosystem would undoubtedly be enormously useful within the area of escalating industrialization [6]. Hence, the present investigation is aimed to study the effect of sublethal concentrations of Mancozeb and Malathion on the hametological parameters of *Channa punctatus*.

MATERIAL AND METHODS

PROCUREMENT OF TEST FISH.

Healthy specimens of snake-headed fish, *Channa punctatus* Bloch (Actinopterygii: Channidae) with bodyweight 45±5 g and body size 12±5 cm, were collected from a local fish

farm Lucknowr (Uttar Pradesh), India, and were transported to the laboratory. The fishes were carefully examined for any injury and then kept in 1 % solution of KMnO₄ for few hours to get rid of dermal infection. These were further kept in a large plastic jar containing 50 L of clean tap water and acclimatized for 15 days to the laboratory conditions. During these periods, the fishes were fed on boiled egg yolk and commercial fish food.

ANALYSIS OF LC₅₀:

LC₅₀ value of mancozeb+malathion was 27.28mg/25L with variance 0.0003, fiducial limits 1.4416(+) and 1.4352(-) and regression equation $Y = 4.56 + 4.85(X - 1.34)$ for the fish *Channa punctatus* (Bloch.). The sublethal concentration is 1/10th of LC₅₀ i.e. 2.728mg/25L [2].

EXPERIMENTATION:

The experiment was conducted in five aquariums one was used for control and rest are used for pollution study. Each aquarium contains 10 fishes, which were exposed to sub lethal concentration of mancozeb and malathion in combination at different time interval (24, 48, 72 and 96 hour). The sub lethal concentration was selected on the basis of LC₅₀ value.

COLLECTION OF BLOOD:

The blood samples were collected from live fishes through a cardiac puncture in both experimental and control groups at 24, 48, 72, and 96 hours exposures. These were allowed to stand for some time and, after that, centrifuged at 3500 rpm for 10 min to obtain serum.

HAEMATOLOGICAL ANALYSIS

Total Erythrocyte Count (TEC): The total erythrocyte count was estimated with the help of improved Standard Neubaur haemocytometer described by Kit Method.

Total erythrocyte count (million/mm³) = Total number of RBCs counted in five squares × 10,000

HAEMOGLOBIN CONCENTRATION:

The haemoglobin concentration was estimated by the standard Sahli's method. The value of haemoglobin concentration of blood is expressed in g/dl.

TOTAL LEUCOCYTE COUNT (TLC):

The total leucocytes counted with help of improved standard Neubaur chamber haemocytometer.

Total Leucocyte Count (cells/mm³) = Total number of WBC counted in four square X 100.

STATISTICAL ANALYSIS

The statistical analysis was performed using advanced numerical tools and the data presented in the manuscript as mean ± standard error (S.E.) unless otherwise stated. Student's t-test calculated the statistical significance of the difference between the control and experimental group.

RESULTS AND DISCUSSION

In the present study, decrease in total erythrocyte count, hemoglobin concentration, packed cell volume, mean corpuscular volume, mean corpuscular hemoglobin and mean corpuscular hemoglobin concentration has been observed while increase in total leucocyte count and erythrocyte sedimentation rate has been observed after 24hrs, 48hrs, 72hrs and 96hrs treatment of mancozeb+malathion in experimental fish *Channa punctatus* (Table 1-3, Fig. 1-3).

Haematological parameters of fishes constitute a crucial biological system for his or her survival against diseases. Insecticidal contamination to aquatic ecosystem can affect haematological parameters of fish [5]. Total erythrocyte count decreases due to inhibition of erythropoiesis or increase in rate of erythrocyte destruction in haemopoietic tissue. Hb conc. and PCV value are directly co-related with RBCs count because of the synergistic link among these blood parameters in all vertebrate. Similar findings observed decrease in total erythrocyte count after intoxication of carbofuran and increase in total leucocytes count is due to protective response of defence mechanism of treated fishes to compensate the pesticidal stress [5]. Adhikari *et al* [1] who observed effects of cypermethrin and carbofuran on certain hematological parameters and prediction of their recovery in a freshwater teleost, *Labeo rohita* (Hamilton); Kavitha *et al* [4] examined the toxicological effects of arsenate exposure on hematological, biochemical and liver transaminases activity in an Indian major

carp, *Catla catla*; Talas and Gulhan [7] who observed effects of various propolis concentrations on biochemical and hematological parameters of rainbow trout (*Oncorhynchus mykiss*).

Table 1: Total erythrocyte count (million/mm³) in *Channa punctatus* after sub-lethal mancozeb+malathion (2.728mg/25L) intoxication

TEC	Control	Exposure Hours			
		24 hours	48 hours	72 hours	96 hours
Mean	3.65	3.20	2.55	2.35	2.10
±S.Em.	±0.10	±0.11	±0.12	±0.15	±0.18
Significance level	-	p< 0.05	p< 0.01	p< 0.01	p< 0.001

S.Em. = Standard error of mean

Table 2: Total leucocyte count (TLC) (cells/mm³) in *Channa punctatus* after sub-lethal mancozeb+malathion (2.728mg/25L) intoxication

TLC	Control	Exposure Hours			
		24 hours	48 hours	72 hours	96 hours
Mean	8500	8800	9500	9810	9980
±S.Em.	±32.10	±55.50	±50.15	±58.90	±55.20
Significance level	-	p> 0.05	p< 0.05	p< 0.01	p< 0.01

S.Em. = Standard error of mean

Table 3: Haemoglobin concentration (g/dl) in *Channa punctatus* after sub-lethal mancozeb+malathion (2.728mg/25L) intoxication

Hb Conc.	Control	Exposure Hours			
		24 hours	48 hours	72 hours	96 hours
Mean	12.8	11.50	10.20	9.35	8.80
±S.Em.	±0.21	±0.32	±0.38	±0.20	±0.28
Significance level	-	P< 0.05	p< 0.05	p< 0.001	p< 0.001

S.Em. = Standard error of mean

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