HAEMATOLOGICAL ALTERATIONS CAUSED BY MERCURIC CHLORIDE IN FRESHWATER CATFISH, *Clarias gariepinus*

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**ABSTRACT**

The present study deals with the haematological alterations caused by mercuric chloride (HgCl₂) in the African catfish *Clarias gariepinus* for a period of 60 days. The fishes were divided into two groups. Group first was kept as control and group second was exposed to 0.08 mg/l mercuric chloride. After 60 days of exposure the group 2 showed the value of red blood cells (RBCs) as 4.10, 3.51, 2.86, 1.48 and 0.82 x 10⁶ mm⁻³, total white blood cells (WBCs) showed mean values as 7.80, 10.34, 11.86, 13.08 and 14.78 x 10⁶ mm⁻³ and the estimation of haemoglobin (Hb) showed mean values as 12.36, 10.86, 9.04, 7.76 and 6.42 g/dl for 0, 15, 30, 45 and 60 days, respectively. The fishes exposed to mercuric chloride showed drastic deviation from the normal haematological parameters of the fish.

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INTRODUCTION
Aquatic systems get affected by pollution worldwide and there is an urgent need for its efficient monitoring. The entry of toxicants into aquatic media may affect the water quality parameters which in turn lead to severe changes in the hematological preface of fish due to close association with the external environment. Heavy metals become toxic when they are not metabolized by the body and get accumulated in the soft tissues easily. Heavy metals like HgCl2 may enter into the body of fish through food, water and absorb through the skin. Ingestion is the most common route in freshwater fishes [1]. In fishes, heavy metals may produce anomalies changes in the blood vessels and blood cells [2-4]. Heavy metals cause early mortality of mature red blood cells and inhibit haemoglobin formation [5, 6]. Present study was carried out to check the haematological changes incurred in the fish, Clarias gariepinus exposed to mercuric chloride.

MATERIAL AND METHODS
The specimens of Clarias gariepinus, having an average length and weight of 12-15 cm and 100-120 g respectively were brought from local fish markets of Bhopal (M.P), India to the laboratory and treated with 0.1% KMnO4 solution to remove any pathological infection before introducing them into the aquaria. The fishes were acclimatized to laboratory conditions for 15 days before exposure to mercuric chloride (HgCl2). The fishes were stocked at the rate of 20 fishes per aquarium in two groups of 200ml capacity each for the experimental run. Group first was kept as control and group second was exposed to 0.08mg/l HgCl2.

PREPARATION OF EXPERIMENTAL DIET
A formulated diet was made to feed the fishes of the control and mercuric chloride challenged group

<table>
<thead>
<tr>
<th>Constituents of feed</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fishmeal</td>
<td>79.07%</td>
</tr>
<tr>
<td>Wheat flour</td>
<td>8.93%</td>
</tr>
<tr>
<td>Cod- liver oil</td>
<td>10.00%</td>
</tr>
<tr>
<td>Vitamin Premix</td>
<td>2.00%</td>
</tr>
</tbody>
</table>

HAEMATOLOGICAL ANALYSIS
The blood samples were taken by puncturing the caudal vessels, using EDTA as anticoagulant. Haemoglobin concentration was estimated by using haemoglobinmometer, red and white blood cells were counted under light microscope with an improved Neubauer haemocytometer. Both the treated and controlled blood samples were used to estimate the haematological parameters.

RESULTS
a). Total RBC count
The red blood cell count of healthy fishes of control group showed a mean value of 4.134 x 106 mm-3. The fishes exposed to sublethal concentration of 0.08 mg/l HgCl2 showed values as 4.10, 3.51, 2.86, 1.48 and 0.82 x 106 mm-3 for 0, 15, 30, 45 and 60 days, respectively.

b). Total WBC count
White blood cells count of fishes of control group was found to be 7.83 x106 mm-3. The fishes exposed to sublethal concentration of 0.08 mg/l HgCl2 showed mean values as 7.80, 10.34, 11.86, 13.08 and 14.78 x 106 mm-3 for 0, 15, 30, 45 and 60 days, respectively.

c). Estimation of Haemoglobin
The control fishes showed the mean value of haemoglobin as 12.39 g/dl. The fishes exposed to sublethal concentration of 0.08 mg/l HgCl2 showed mean values as 12.36, 10.86, 9.04, 7.76 and 6.42 g/dl for 0, 15, 30, 45 and 60 days, respectively.
DISCUSSION AND CONCLUSION

The result of the present investigation showed that the mercuric chloride exposure inflicted a drastic reduction in total count of RBCs and haemoglobin and increased the concentration of WBCs as compared to the normal fish Clarias gariepinus. Saroch et al. [7] investigated the effect of mercuric chloride on the haematological parameters in the freshwater catfish, Clarias gariepinus. The treatment with mercuric chloride was found to inflict a drastic reduction in the total count of RBC’s. The reduction was time dependent; as concentration of mercuric chloride increased, the RBC level declined. Exposed fishes showed a significant increase in W.B.C count when compared to the control. Whereas the fishes exposed to mercuric chloride showed significant decrease in haemoglobin content and haematocrit level when compared to the fishes unexposed to mercuric chloride. The deviation in haematological parameters obtained in the present study emphasizes the need of more study on large number of fish species to authorize these findings.
REFERENCES