Changes in Some Blood Values of *Clarias batrachus*
Exposed to Lead Nitrate

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The fish *Clarias batrachus*, experimentally exposed to sub-lethal concentration of lead nitrate (2.65 mg/L) showed conspicuous alterations in several blood values. The fish tends to become hypoglycemic, hypocalcemic and anemic.

Severe effects of a variety of chemical pollutants on important fish tissues are well documented. But studies on the clinicopathological aspects of piscine blood, as affected by the inorganic pollutants are comparatively scant. This paper describes changes in some blood parameters of *Clarias batrachus*, exposed to sublethal doses of lead nitrate.

MATERIALS AND METHODS

Out of a batch of 210 specimens of *Clarias batrachus*, well acclimated to laboratory conditions, 90 specimens were transferred to three aquaria, at the rate of 30 fishes to each, containing 150 liters of lead nitrate solution, at a concentration of 2.65 mg/L. As following the bio-assay studies, this concentration was found to be sublethal for a period of 35 days.

The fourth aquarium containing 150 L of plain tap water with 20 specimens of *Clarias* served as control. Ten fishes out of the treated batch, were sacrificed on scheduled days (Table-1). From the control group five specimens were sacrificed on first and five on the last day, and their values pooled together vide Wedmeyer and Yasutaka. Observations were made on total erythrocyte count (TEC), total leucocyte count (TLC), haemoglobin (Hb), calcium, glucose and phosphatase activity of the blood.

RESULTS AND DISCUSSION

The TEC, TLC, calcium and alkaline phosphatase values showed a sudden rise from the respective control values, post one day of lead nitrate treatment, on the other hand Hb, glucose and acid phosphatase contents showed a fall, against the respective control values.


Show any significant alteration at these levels.

Student t-test: Level of significance * P < 0.05 ** P < 0.01 and *** P < 0.001. Rest other values did not.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Control</th>
<th>Days post</th>
<th>Acid (mg/100 ml)</th>
<th>Phosphate (K, A.U./dl)</th>
<th>Glucose (mg/100 ml)</th>
<th>Calcium (mg/ml)</th>
<th>Hemoglobin (g/dl)</th>
<th>TLC</th>
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All values are mean ± S.E. for 10 observation each.

Table 1: Alterations in some blood values of Clarias gariepinus following lead nitrate treatment (0.255 mg/L).
The glucose contents showed a continuous fall till 5th day, while the Hb and acid phosphatase values improved little, during the same period, as against the values on first day. Sastry and Gupta\textsuperscript{3} while making similar studies of liver and stomach in the fish *Chauna punctatus*, did not find any change in alkaline phosphatase activity, though a marked and significant inhibition in the pyloric caeca and the intestinal enzyme activity, by the end of 15th day, was noted. On the contrary acid phosphatase activity was found to be elevated, all through.\textsuperscript{3}

The calcium, TEC and TLC values were still higher in *Clarias batrachus* on 5th day, as compared to the control. All values declined, henceforth, as noted on 10th day, except the glycemic level (Table-1). But contrary to the present findings, while experimenting with malachite green, Glagoleva and Malikova\textsuperscript{2} noted a marked leukopenia, but no alteration in Hb and TEC values, in the fish, Baltic salmon.

The lead is reported to interfere with erythropoiesis and haeme synthesis\textsuperscript{10}. In fishes the effects appear to be quite conspicuous. The present observations also tend to show that exposure to lead nitrate cause excitation of kidney and haemopoietic organs of fishes, as a result there occure an abrupt release of erythrocytes and the leukocytes, in circulation. Though it also appears that haemopoiesis is inhibited from 5th day onward in *Clarias batrachus*. Similarly following the malachite green treatment of the fish Coho-salmon, leucopoiessis was found excited 4th day onward\textsuperscript{8}.

The TLC, Hb, calcium and acid phosphatase values, however, showed a tendency of marginal improvements over the preceding values, during the last five days, though the TEC and alkaline phosphatase values were still depleting (Table-1). Besides, in *Clarias batrachus* hypoglycemia generally persists in the treated fish.

ACKNOWLEDGEMENT

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REFERENCES