ALTERATION IN THE ACTIVITY OF GLUTAMIC PYRUVIC TRANSAMINASE IN THE BLOOD OF A FRESH WATER FISH LABEO ROHITA UNDER THE STRESS OF AZODYES

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This study reveals significant alterations in the activity of Glutamic pyruvic transaminase (GPT) enzyme in the blood of a fresh water teleost Labeo rohita when exposed to two azodyes Metanil yellow (4 - aniline azo benzene - m -sulfonic acid ) and Bismark brown ( 2, 4 - diamino 3’ amino azo benzene ). The activity of the enzyme GPT was found to increase significantly ( P < 0.01 ) at both acute exposure ( 48 hrs. & 96hrs. ) and chronic exposure ( 15 days & 30 days ) in the blood of Labeo rohita.

The measurement of serum biochemical parameters can be useful as diagnostic tool in toxicology to find the general health status and target organs affected by toxicants. Cell contain enzymes that are necessary to their function. When the integrity of a cell is disrupted, enzymes escape into plasma/ serum where their activity can be measured as a useful index of cell integrity. Modification in enzyme activity occur by cell death, increase or decrease enzyme production, obstruction of normal excretory route, increase cell membrane permeability or impair circulation. In last few decades increase in population density, heavy industrialization and agricultural activities have resulted in more and more wastes entering in fresh water resources. Contamination of fresh water with a wide range of pollutants has become a matter of concern over last few decades. Aquatic animals have often being used in bioassays to monitor water quality. The development of biological monitoring techniques based on fish offers the possibility of checking water pollution with fast responses on low concentrations of direct acting toxicants. Fish are excellent subjects for the study of various effects of cotaminants present in water sample since they can metabolize, concentrate and store water borne pollutants. Since fish often respond to toxicants in a similar way to higher vertebrates, they can be used to screen for chemicals that are potentially teratogenic and carcinogenic in humans. The main application for model system using fish is to determine the distribution and effect of chemical contaminants in the aquatic environment.

MATERIAL AND METHODS
Livining specimen of Labeo rohita were collected from local fresh water resources and acclimatized in laboratory conditions for a minimum period of seven days before experimentation. Visibly healthy fishes were selected and treated with 0.1% KMnO₄ solution and divided into five batches. One batch was kept in water and was used as control. The remaining four batches were kept in acute and chronic concentrations of metanil yellow and bismark brown. Water was replaced periodically and black paper was used to prevent any possible photo-oxidation of the dyes. The fishes of all batches were sacrificed at 48 hrs. and 96hrs. ( acute exposure ) and 15 days and 30 days ( chronic exposure ). The blood was collected from cut caudal vein and was allowed to clot at room temperature and then centrifuged at 2000 rpm. The ‘t’ test of Fisher was used to calculate the significance of data.

RESULTS AND DISCUSSION
Conspicuous changes were observed in the activity of Glutamic pyruvic transaminase in the blood of Labeo rohita under the stress of metanil yellow and bismark brown (Table-1 ). The elevation in the blood was found to be + 70.58% and + 122.10% at acute ( 48 hrs. and 96 hrs. ) and +220.67% and +358.65% at chronic ( 15 days and 30 days ) exposures under the stress of metanil yellow. Similarly the elevation was + 40% and 159.74% at acute ( 48 hrs. and 96 hrs. ) and + 272.22% and +381.68% at chronic ( 15 days and 30 days ) exposures of bismark brown. All the elevations were highly significant.

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Glutamic pyruvic transaminase is an important enzyme involved in transamination process. In the present study the enzyme is elevated in the blood of Labeo rohita under the stress of metanil yellow and bismark brown. This enzyme belongs to the family of transferases, specifically the transaminase which transfer nitrogenous groups. It catalyzes the transfer of the amino group from L-alanine to alpha-Ketoglutarate. Serum GPT level significantly elevated in Cyprinus carpio when exposed to sublethal concentrations of chromium for various exposure period. Increased transaminase activity was reported in liver and kidney of Clarias batrachus and Heteropneustes fossilis under the stress of congo red. Serum GPT level also increased significantly in fresh water fish Clarias gariepinus exposed to Lambda cyhalothrin. GPT increased in liver tissue of Nile cat fish Clarias gariepinus inhabiting El-Rahawy Drain, Egypt due to heavy metal pollution. Increased GPT activity in the blood of Oreochromis niloticus was seen when exposed to sublethal concentrations of cadmium. It was suggested that elevated activity in the blood may due to liver disfunction. Elevated GPT activity was reported in blood of Cyprinus carpio caused by diazinon. GPT increased in the blood of Channa punctatus following treatment with mercuric chloride. It was also suggested that liver is rich in GPT and damage to it could result in liberation of large quantity of this enzyme into the blood. Significant elevation in hepatic and renal GPT activity was found in Heteropneustes fossilis when exposed to lanasyn dark violet and lanasyn dark yellow. GPT activity increased in the blood of Channa punctatus when exposed to triazophos indicating hepatic tissue damage. The enzymatic activity of serum GPT increased significantly under the influence of detergent Nirma and Tide on fresh water fish Channa punctatus. Increase in GPT activity was very high as compared to control in the liver and gills of Cirrhinus mrigala exposed to mercuric chloride and lead acetate. The activity of GPT was found to be significantly elevated in the liver of Heteropneustes fossilis with increasing concentration of sodium arsenite. GPT increased in gills of T.zillii, C. gariepinus, C. lazera and O. niloticus exposed to heavy metals. GPT is normally present in liver and heart cell. GPT is released into blood when the liver or heart is damaged. The blood GPT levels are thus elevated with liver damage or with an insult to the heart.

**REFERENCES**


**Table-1. ALTERATION IN THE ACTIVITY OF GLUTAMIC PYRUVIC TRANSAMINASE (GPT) INDUCED BY**
**METANIL YELLOW AND BISMARK BROWN IN THE BLOOD OF LABEO ROHITA. VALUES ARE + S. E. OF NINE OBSERVATIONS EACH.**

<table>
<thead>
<tr>
<th>DYES</th>
<th>C</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
</tr>
</thead>
<tbody>
<tr>
<td>4′AASA-</td>
<td>23.80</td>
<td>40.60</td>
<td>52.86</td>
<td>76.32</td>
<td>109.16</td>
</tr>
<tr>
<td>(±0.25)</td>
<td>(±0.04)</td>
<td>(±0.05)</td>
<td>(±0.10)</td>
<td>(±0.11)</td>
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</tr>
<tr>
<td>(70.58%)</td>
<td>(122.10%)</td>
<td>(220.67%)</td>
<td>(358.65%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DAAB-</td>
<td>23.80</td>
<td>33.32</td>
<td>61.82</td>
<td>88.59</td>
<td>114.64</td>
</tr>
<tr>
<td>(±0.25)</td>
<td>(±0.06)</td>
<td>(±0.06)</td>
<td>(±0.07)</td>
<td>(±0.09)</td>
<td></td>
</tr>
<tr>
<td>(40 %)</td>
<td>(159.74%)</td>
<td>(272.22%)</td>
<td>(381.68%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4′AASA- Metanilyellow T1- 48 Hrs. T2- 96 Hrs. T3- 15 Days T4- 30 Days
DAAB--- Bismark brown C--- Control


