ABSTRACT

The effect of mixing of effluents of sugar and other industries in river Gomati passing through Sultanpur district of Uttar Pradesh was studied on protein contents in fresh water fish, Channa punctatus. Protein contents in Channa punctatus decreased due to pollution caused by industrial effluents and variations in fishes collected in different months showed that this reduction was also dependent on seasonal changes.

Introduction

Fish is very sensitive to changes in water due to addition of effluents and toxicants and changes occurring in the biochemical characteristics of fish provide a sensitive measure to know the wealth of fish fauna.

Material and Methods

Channa punctatus collected from three sites, i.e. Sitakund, Hiyat Nagar and Madhuban in district Sultanpur (Uttar Pradesh) of river Gomati and brought to the laboratory in plastic containers. Fishes were sacrificed and their muscles were collected, weighed and homogenized in glass homogenizer. Homogenates were centrifuged in a refrigerated centrifuge zanetzki k-24 and supernatants were collected for further experiments. The protein concentration was estimated in homogenates using bovine albumin as standard.

Result

Data obtained from present investigations are given in Tables 1-4. The results indicate a significant impact of industrial effluents on protein contents of Channa punctatus. Data given in Table 1 are for the months October to December in which maximum decrease [34.05%] was observed in the fishes collected from Madhuban site in October. During January to march maximum change was only 10.77 % in the fishes collected from Madhuban site during the month February (Table-2). During April to June maximum change was also recorded.

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from fishes collected from Madhuban (13.02%) in June (Table-3). Maximum decrease during July to September was 25.32% in fishes collected from Madhuban site in September (Table-4)

**Discussion**

Protein concentration decreased in the fishes collected from both the sites polluted by the effluents of sugar and other industries in comparison to the fishes collected from unpolluted site.

The quality of protein depends on the synthesis of rna required for protein synthesis\(^1\).

The depletion of protein in the animals during stress period is the physiological strategy played by animal to adapt itself to the changed conditions. This leads to degradative processes like proteolysis and utilization of degraded products to alter metabolic conditions\(^7\).

The change was maximum in the fishes collected from Madhuban site where effluents from sugar and other industries were mixed in water. The effect of effluents was also dependent on seasons as there was variation in reduction in protein contents of *Channa punctatus* collected in different months. Maximum changes were recorded in October while minimum in July.

**TABLE -1 :** Changes in protein contents (µg/g wet wt.) in *Channa punctatus* due to industrial effluents.

<table>
<thead>
<tr>
<th>Field/Month</th>
<th>I Field</th>
<th>II Field</th>
<th>III field</th>
</tr>
</thead>
<tbody>
<tr>
<td>October 12</td>
<td>626.66 ± 34.35</td>
<td>561.66 ± 17.38 (10.68)</td>
<td>413.33 ± 19.63 (34.05)</td>
</tr>
<tr>
<td>November 12</td>
<td>460 ± 33.99</td>
<td>456.66 ± 143.67 (0.73)</td>
<td>385 ± 8.49 (16.31)</td>
</tr>
<tr>
<td>December 12</td>
<td>620 ± 26.78</td>
<td>608.33 ± 18.01 (1.89)</td>
<td>588.33 ± 9.53 (5.11)</td>
</tr>
</tbody>
</table>

I field Sitakund (prior to mixing of industrial effluents)
II field Hiyat Nagar (after mixing of effluents from sugar and other industry)
III field Madhuban (after mixing of effluents from sugar and other industry)

Values given in parentheses are % changes due to mixing of effluents.

during stress period is the physiological strategy played by animal to adapt itself to the changed conditions. This leads to degradative processes like proteolysis and utilization of degraded products to alter metabolic conditions\(^7\).

The change was maximum in the fishes collected from Madhuban site where effluents from sugar and other industries were mixed in water. The effect of effluents was also dependent on seasons as there was variation in reduction in protein contents of *Channa punctatus* collected in different months. Maximum changes were recorded in October while minimum in July.

**TABLE -2 :** Changes in protein contents (µg/g wet wt.) in *Channa punctatus* due to industrial effluents.

<table>
<thead>
<tr>
<th>Field/Month</th>
<th>I Field</th>
<th>II Field</th>
<th>III field</th>
</tr>
</thead>
<tbody>
<tr>
<td>January 13</td>
<td>571.66 ± 12.99</td>
<td>516.66 ± 8.28 (9.63)</td>
<td>535 ± 13.13 (6.42)</td>
</tr>
<tr>
<td>February 13</td>
<td>696.66 ± 14.21</td>
<td>638.33 ± 20.59 (8.38)</td>
<td>621.66 ± 37.74 (10.77)</td>
</tr>
<tr>
<td>March 13</td>
<td>498.33 ± 8.28</td>
<td>446.67 ± 27.32 (10.37)</td>
<td>588.33 ± 9.53 (5.35)</td>
</tr>
</tbody>
</table>

I field Sitakund [prior to mixing of industrial effluents]
II field Hiyat Nagar [after mixing of effluents from sugar industry]
III field Madhuban [after mixing of effluents from sugar and other industry]

Values given in parentheses are % changes due to mixing of effluents.
### TABLE 3: Changes in protein contents (µg/g wet wt.) in *Channa punctatus* due to industrial effluents.

<table>
<thead>
<tr>
<th>Field/Month</th>
<th>I Field</th>
<th>II Field</th>
<th>III Field</th>
</tr>
</thead>
<tbody>
<tr>
<td>April 13</td>
<td>440 ± 40.07 (15.16)</td>
<td>373.33 ± 17.69 (15.16)</td>
<td>433.34 ± 7.58 (1.52)</td>
</tr>
<tr>
<td>May 13</td>
<td>471.66 ± 39.19 (14.49)</td>
<td>403.33 ± 31.12 (14.49)</td>
<td>433.33 ± 17.69 (8.13)</td>
</tr>
<tr>
<td>June 13</td>
<td>486.67 ± 41.53 (5.49)</td>
<td>460 ± 31.89 (5.49)</td>
<td>423.33 ± 16.04 (13.02)</td>
</tr>
</tbody>
</table>

I field Sitakund (prior to mixing of industrial effluents)
II field Hiyat Nagar (after mixing of effluents from sugar industry)
III field Madhuban (after mixing of effluents from sugar and other industry)

Values given in parentheses are % changes due to mixing of effluents

### TABLE 4: Changes in protein contents (µg/g wet wt.) in *Channa punctatus* due to industrial effluents.

<table>
<thead>
<tr>
<th>Field/Month</th>
<th>I Field</th>
<th>II Field</th>
<th>III Field</th>
</tr>
</thead>
<tbody>
<tr>
<td>July 13</td>
<td>528.33 ± 8.28 (5.99)</td>
<td>496.66 ± 1.39 (5.99)</td>
<td>501.66 ± 36.69 (5.05)</td>
</tr>
<tr>
<td>August 13</td>
<td>471.66 ± 7.21 (5.31)</td>
<td>446.66 ± 21.39 (5.31)</td>
<td>371.66 ± 34.98 (21.21)</td>
</tr>
<tr>
<td>September 13</td>
<td>638.33 ± 28.96 (24.28)</td>
<td>483.33 ± 5.91 (24.28)</td>
<td>479.66 ± 45.12 (25.32)</td>
</tr>
</tbody>
</table>

I field Sitakund (prior to mixing of industrial effluents)
II field Hiyat Nagar (after mixing of effluents from sugar industry)
III field Madhuban (after mixing of effluents from sugar and other industry)

Values given in parentheses are % changes due to mixing of effluents

### References


