agents in blood are demonstrated for air breathing fishes *Anabas* and *Ophiocephalus*.

One of us (GMN) is thankful to the UGC for financial assistance.

7 July 1982


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**BLOOD VOLUME OF A FRESHWATER FIELD CRAB AS A FUNCTION OF SALINITY ADAPTATION**

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**HAEMOLYMPH** volume measurements in crustaceans were restricted only to marine amphipods and crayfish. No information on blood volume is available with reference to crabs. In this study, an attempt has been made to note the haemolymph volume in a freshwater field crab with reference to sex and salinity adaptation.

Paddy field crabs, *Oziotelphusa senex senex* were adapted to full strength artificial seawater for 3 months as described earlier. Haemolymph of the adult crabs (about 15 g size) was drawn into hypodermal syringe through arthrodermal membrane for biochemical analysis. Protein was estimated according to Lowry et al. and the total amino acid content was estimated colorimetrically. For the determination of haemolymph volume 0.5 ml containing 5 µCi of 14C-sucrose (supplied by BARC, Bombay) was injected into a crab, and after a known time, the blood was drawn, dried in a desiccator and the radioactivity of the flake was estimated using a glass flow counter (Burshane, Trombay Electronics). By this isotope dilution, the haemolymph volume of the adult crab in relation to sex and salinity was estimated.

Figure 1 demonstrates the total equilibrium time of the isotope in the circulating fluids of the crab. It is clear from this graph, that within 20 min, the equilibration is reached. In subsequent experiments this time was taken to draw blood and to estimate the radioactivity. Blood volume was significantly (*P < 0.001*) reduced in both male and female crabs on adaptation to higher salinity (table 1).

The protein content of the haemolymph increased significantly (*P < 0.001*) on adaptation to higher salinity, whereas the total amino acid content remained unaltered (table 2).

![Figure 1. Circulation time taken by 14C-sucrose to reach equilibration in blood.](image)

<table>
<thead>
<tr>
<th>Crab</th>
<th>No. of crabs used</th>
<th>ml blood/100 g body weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freshwater male</td>
<td>7</td>
<td>46.3 ± 5.95</td>
</tr>
<tr>
<td>Seawater male</td>
<td>7</td>
<td>21.2 ± 2.0</td>
</tr>
<tr>
<td>Freshwater female</td>
<td>11</td>
<td>42.1 ± 3.28</td>
</tr>
<tr>
<td>Seawater female</td>
<td>11</td>
<td>20.3 ± 5.3</td>
</tr>
</tbody>
</table>
TABLE 2

Changes in blood protein and amino acid levels in the crab, Oziotelphusa senex senex on salinity adaptation

<table>
<thead>
<tr>
<th>Blood constituents</th>
<th>No. of crabs used</th>
<th>Freshwater crabs</th>
<th>Seawater adapted crabs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protein</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td>6</td>
<td>45 ± 3.2</td>
<td>55 ± 2.7</td>
</tr>
<tr>
<td>Females</td>
<td>6</td>
<td>41 ± 5.6</td>
<td>58 ± 4.5</td>
</tr>
<tr>
<td>Amino acids</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td>11</td>
<td>3.2 ± 0.82</td>
<td>3.3 ± 0.76</td>
</tr>
<tr>
<td>Females</td>
<td>12</td>
<td>3.6 ± 0.16</td>
<td>3.8 ± 0.27</td>
</tr>
</tbody>
</table>

Blood volume in marine organisms\(^1,2\) is known to depend on many factors such as starvation\(^3\), salinity\(^2\), etc. However, the blood volume changes with reference to salinity adaptation are not known. The present results (table 1) demonstrate that salinity adaptation brings forth considerable reduction in the blood volume. A comparison with the data of marine amphipods\(^1,2\) revealed that the freshwater crabs of the present study have a higher blood volume. Perhaps, this may be due to constant osmotic load that the animal experiences in the freshwater environment. Dietetics of the crabs were altered and the crab consumed less food in higher saline media\(^9\), in contrast to the fact that starvation increases the blood volume in marine amphipod\(^2\). The present data illustrate a reduction in the volume on adaptation to higher salinity. One of the causal factors for this anomaly, must be sought in the prevalence of persistent dehydration in the tissues; when they are adapted to hyper-salinities. The existence of such a possibility is indicated by the fact that protein content increases on adaptation. Morphometric changes are known to occur in this crab as a consequence of salinity stress\(^10\). Possibly the dehydration of the tissues increased the protein levels and reduced the volume of blood which could be taken as a morphometric change of haemolymph due to salinity stress.

We thank Dr. A. Udayakumar for his help in isotope studies.

24 May 1982


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ANNOUNCEMENTS

THE CHEMICAL SOCIETY MEDAL, LONDON

The Chemical Society, London has awarded the prestigious medal for 1981 to Prof. C. N. R. Rao, Chairman of the Solid State and Structural Chemistry Unit, Indian Institute of Science, Bangalore, for his outstanding contributions in solid state chemistry.

INTERNATIONAL ATOMIC ENERGY AGENCY, VIENNA

Dr. Raja Ramanna, Director of Bhabha Atomic Research Centre and Secretary to the Department of Atomic Energy Government of India, has been appointed as a member of the Scientific Advisory Committee, to the Director-General of the International Atomic Energy Agency.