BIOCHEMICAL STUDY OF THE GUT OF GIANT AFRICAN SNAIL, *ACHATINA FULICA* (BOWDICH) Z. CARBONIC ANHYDRASE.

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Carbonic anhydrase has been detected in the digestive system of terrestrial snail, *Achatina fulica*. Maximum level of the enzyme activity was seen in stomach (24.30 M. R. Unit/50 mg of wet tissue) while the intestine did not show any activity.

Carbonic anhydrase is reported to be distributed in the various tissues of molluscan animals\(^1\)\(^-\)\(^3\). The snail *Achatina fulica* has not been studied for this enzyme, hitherto. This paper presents Carbonic anhydrase activity in the different tissues of digestive system of the giant African snail, *Achatina fulica* (Bowdich), widely distributed throughout India.

Fairly good number of animals, irrespective of their sex, were collected and brought to the laboratory. The animals were immediately transported to rearing troughs and allowed to feed on banana leaves. After ten days of rearing, a set of five animals was selected in random and put on starvation for next fifty hours, so as to clear their gut from any food material. Following this, digestive system was dissected out and different parts of the gut and associated glands immediately transferred to refrigerator. Required quantity of selective tissues viz. buccal mass, oesophagus, stomach, intestine, oesophageal glands and hepatopancreas were weighed and incised to prepare homogenate separately, in chilled distilled water. The homogenates were
processed to measure carbonic anhydrase enzyme activity, using boat method at zero degree celcius. Results are presented as the number of Meldrum-Roughton (M.R.) Units, calculated at °C, in fifty mg of wet tissue.

Table: Carbonic anhydrase activity in various tissues of digestive system of *Achatina fulica* (Enzyme activity is expressed as MRU/50 mg wet tissue).

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Name of tissue</th>
<th>Enzyme Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Buccal mass</td>
<td>5 - 7</td>
</tr>
<tr>
<td>2</td>
<td>Oesophagus</td>
<td>10 - 12</td>
</tr>
<tr>
<td>3</td>
<td>Stomach</td>
<td>24 - 30</td>
</tr>
<tr>
<td>4</td>
<td>Intestine</td>
<td>NIL</td>
</tr>
<tr>
<td>5</td>
<td>Oesophageal Gland</td>
<td>6 - 10</td>
</tr>
<tr>
<td>6</td>
<td>Hepatopancreas</td>
<td>18 - 21</td>
</tr>
</tbody>
</table>

Enzyme activity is present in all the organs except intestine. Carbonic anhydrase is presumed to increase the rate of calcium deposition through catalysis. This view is supported by earlier workers. The buccal mass shows a mild activity of enzyme which may be due to the possibility that radular organ gets its calcium supply from radular mass (buccal mass). Likewise, many molluscan sps. have been reported to have a calcium flow from mantle to shell, e.g. *Lymnea stagnalis*. Buccal mass is followed by oesophagus which is encircled by oesophageal glands. Both these organs show intermediary enzyme activity (Table). Enzyme activity is further intense in hepatopancreas. Here it is more difficult to ascertain the role of this enzyme in hepatopancreas. It is expected that acid-base equilibrium is a probable role of this enzyme in hepatopancreas. The present study supports the view of Istin and Girard who suggested that this enzyme may be located on the surface of calcium spherites. Histochemical localization of calcium in all the tissues of *Achatina fulica* showed (authors unpublished data) intense concentration of calcium spherites in stomach, oesophageal glands and hepatopancreas. All these regions showed intense activity of carbonic anhydrase.

In can be inferred that the enzyme carbonic anhydrase in different parts of gut of *Achatina* plays a role with regard to calcification. Its presence in oesophageal glands
and hepatopancreas can be explained on the basis of its calcium depositing role and this calcium performs the role of catalyst for a number of enzyme systems.

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REFERENCES