CHOLINESTERASE ACTIVITY IN THE TOTAL BRAIN TISSUE OF PORKILOCERUS FICTUS AT DIFFERENT AGES
The cholinesterase activity in the brain of *P. pictus* was studied at different ages, using the method of Elman et al. (1961) as modified by Mehrotra and Chandra (1974). Acetyl thiocholine iodide (AICl) was used as substrate. The rate of hydrolysis of AICl was determined by measuring the increase in optical density at 420 nm, using the molar extinction coefficient of the yellow anions produced as $1.36 \times 10^4$. The activity of the enzyme was calculated from newly moulted stage up to the senile stage. The enzyme activity was found to increase during early stages. During the later stages it decreased and remained constant in the senile stages. The females showed greater enzymatic activity than the males.

Properties of the enzyme showed that it is inhibited at high substrate concentration and also by eserine and organophosphorus inhibitors like suxinon, suggesting that the enzyme is a true cholinesterase.

Thus the enzyme activity at different stages is as follows:— (Table No.3).

1. In the newly moulted stage, the enzyme activity in female was 4.24 nM/mg/min. In the males it was 3.06 nM/mg/min.

2. In five days old females, the enzyme activity was found to be 5.31 nM/mg/min., while in the males of the same age, the enzyme activity was 4.59 nM/mg/min.

3. In ten days old females, the enzyme activity increased and
It was found to be 15.3\(^2\) nM/mg/min. In the males the enzyme activity was 11.0 nM/mg/min.

4. In fifteen days old adults the enzyme activity reached the peak. It was found to be 27.5 nM ACh hydrolysed/mg/min in females while in the males it was 20.22 nM/mg/min.

5. In twenty days old insects the enzyme activity again declined. In females it was 18.38 nM/mg/min, while in the males it was 12.38 nM/mg/min.

6. In twenty five days old adults the enzyme activity decreased further. In females it was 12.46 nM/mg/min, while in the males it was 10.24 nM/mg/min.

7. In thirty days old adults the enzyme activity still decreased further. In females it was 9.68 nM/mg/min, while in the males it was 7.35 nM/mg/min.

8. In forty days old insects the enzyme activity was same as in thirty days old insects. In females it was 9.68 nM/mg/min, and in the males it was 7.35 nM/mg/min.

In the later stages also the enzyme activity remained the same as it was in thirty days old insects. Thus the enzyme activity became constant in the senile stages.

Remarks:

The activity of the enzyme cholinesterase, hydrolysing
acetylcholine in the nervous tissue of *P. pictus* was studied using the method of Ellman et al. (1961) as modified by Mehrotra and Chandra (1974). For the study insects of different ages were selected from newly moulted stage to the senile. The enzyme activity was studied in the brain homogenate. It was found that the enzyme activity increased during the early stages. In the fifteen days old insects the enzyme activity was found to be the maximum. Then it started decreasing. In the thirty days old insects the enzyme activity was found to be minimum. After the thirty days old stage the enzyme activity became constant and it remained thus upto the senile stage, until the insect died.

Further studies on the effect of substrate concentration on the acetylcholinesterase activity showed that the enzyme was inhibited by its own substrate. Its activity was also inhibited on using the inhibitors eserine and sumiuron. These studies confirmed that the enzyme was indeed a true cholinesterase.
Fig. 41. Showing cholinesterase activity in the brain of *P. pictus* at different ages.
CHOLINESTERASE ACTIVITY IN THE BRAIN OF _P. PICTUS_ AT DIFFERENT AGES

![Graph showing choline esterase activity over age in days for female and male P. pictus.](image)

**Fig 41**
<table>
<thead>
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<th>S.No.</th>
<th>Age in days</th>
<th>Enzyme activity in nM/mg/min. Female</th>
<th>Enzyme activity in nM/mg/min. Male</th>
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