ALKALINE PHOSPHATASE ACTIVITY IN THE OVARY OF THE CAT-FISH, CLARIAS BISTRACHUS (LINN.) DURING MATURATION

THOUGH several histochemical and biochemical reports have appeared in the past on the phosphatase activity during the embryonic development of various animals, such studies on differentiating tissues, like the ovary of fish, have relatively been few. The present communication describes the quantitative changes in the activity of a well-known non-specific phosphomonoesterase, alkaline phosphatase (Orthophosphoric monooester phosphohydrolase, EC No. 3.1.3.1) in the ovary during its growth and maturation in Clarias batrachus (Linn.).

Live specimens of C. batrachus were collected from local ponds during different seasons of the year. The fishes were dissected out and their maturity stages arbitrarily established on the basis of shape, colour, size and gonad weight. The ovaries were classified into four distinct stages, viz., recovering (stage I), maturing (stage II), mature (stage III) and spent (stage IV). The ovaries falling into these stages were removed and blotted on to a filter-paper so as to remove any adhering fluid. A weighed amount of tissue (0.1 g) was then taken, homogenized in 5 ml of ice-cold distilled water and centrifuged for 5 minutes at 3,000 r.p.m. 1 ml aliquot of the supernatant was assayed for the enzyme activity. Method of enzyme estimation was the same as described elsewhere. For each maturity stage triplicate determinations were made and the mean enzyme activity plotted in Fig. 1.

![Fig. 1](image)

As would be evident from Fig. 1, the ovarian tissue exhibited marked alkaline phosphatase activity during its development. The level of enzyme activity, however, registered marked variations from one maturity stage to another. The spent ovary (stage IV) was characterized by very low alkaline phosphatase activity. A distinct increase in the enzyme activity accompanied the earlier stages of ovarian growth, the highest value being obtained in the maturing ovaries (stage II). A fall in the alkaline phosphatase activity occurred during the mature stage (stage III) when the ovary was full of fully grown oocytes. The ovary during the recovering phase (stage I) started accumulating this enzyme again. The rise and fall in the alkaline phosphatase activity observed during maturation seem to conform well with the findings on other fishes.

The above observations indicate that the activity of alkaline phosphatase in the ovary of C. batrachus varies with the stage of its differentiation. The ovary of the fish undergoes marked cytomorphicological changes during its maturation and growth. During the maturing stages (stage II) the oocytes grow rapidly, presumably by the active synthesis and accumulation of reserves, mostly protein. It is interesting to observe that the ovary during this synthetic phase records the highest alkaline phosphatase activity, indicating the possible involvement of this enzyme in protein synthesis. Bradford has earlier emphasized that phosphatases may be a part of the enzyme system involved in the liberation of the newly synthesized protein from a complex with the nucleic acid. A drop in the activity of alkaline phosphatase observed in the mature ovary with fully grown oocytes points towards a fall in the synthesis of reserves, as the oocytes by this stage appear to complete their growth and differentiation. The lowest level of enzyme activity during the spent phase signifies that the enzyme apparently plays no significant physiological role during this stage.

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