TAIL’S ACID AND ALKALINE PHOSPHATASES DURING BULLFROG’S (Lithobates catesbeianus) LARVAL DEVELOPMENT


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Anurans show a distinct dichotomy among the sources of energy they use during larval growth and development, including both endotrophic and exotrophic, which allow studies of the nutritional needs in these different stages. In spite of its swimming function, during the last stages of metamorphosis, the tail releases nutrients necessary for the morphophysiological transformations of the aquatic larval stage into terrestrial adults, during which the animals do not eat and enzymes play an indispensable role in this process. Alkaline phosphatase is an important enzyme in the mobilization of phosphate required for the anabolism of biomolecules essential to life, whereas acid phosphatase is a lysosomal marker. Thus, the aim of this study was to evaluate the activity of acid and alkaline phosphatases obtained from the tail of bullfrog’s tadpoles (Lithobates catesbeianus), to provide information about the process of nutrient mobilization during development and metamorphosis. The animals were kept in aquaria at 27°C, and separated by stages of development. The tails were collected at each stage and homogenized in TRIS.HCl buffer pH 7.5, containing 2 mM MgCl₂ and 1 mM ZnCl₂, centrifuged at 10,000 g for 10 minutes at 4°C, aliquoted, frozen in liquid nitrogen and stored at -70°C. Acid and alkaline phosphatases activities were assayed using p-nitrophenylphosphate as substrate, at pH 5.0 and 10.5, respectively. Acid and alkaline phosphatases activity increased during metamorphosis, and their highest activities were 189.9 (stage 45) for acid and 39.5 U.mg⁻¹ (stage 44/2) for alkaline phosphatase. Acid phosphatase activity is probably more related to nutrient mobilization during the starvation period and tail absorption. During metamorphosis, there is no intake of exogenous phosphorus, which may induce an increase in phosphatase synthesis, suggesting that this enzyme is regulated by phosphorus levels and that the “phosphate regulon system” modulated by phosphate may be conserved in anurans.

Key words: “phosphate regulon system”; phosphomonohydrolases; tadpoles.

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