BIO011

Kinetic Characterization of a (Na^+,K^+)-ATPase Activity in the Freshwater Shrimp Zoeae I *Macrobrachium rosenbergii*

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Introduction: *Macrobrachium rosenbergii* is the species of freshwater shrimp more used in the commercial aquaculture. This freshwater prawn, also known as the giant Malaysian prawn, is native to the tropical Indo-Pacific region and has been introduced in several countries due to its economic interest. *M. rosenbergii* belongs to the family Palaemonidae which include the brackish and freshwater shrimps, where most species which comprise this family require brackish water to complete the early stages of their life cycle. The newly hatched larvae must reach brackish water with salinities of 10 to 14 parts per thousand (ppt) within two days or they will not survive. At this stage, they feed on zooplankton, worms and the larvae of other aquatic organisms and to reach the post-larval stage, the larvae undergo about 11 molts in approximately 35 days. During larval development many changes occur both in structure and physiology of the shrimp. The ability to survive in different salinities, until its complete establishment in freshwater, is dependent on enzymes that control and regulate the metabolism of the animal. Various enzymes are responsible for active ion transport in crustacean although their importance in osmoregulatory mechanisms differs among species. The (Na^+,K^+)-ATPase and the V(H^+)-ATPase are the two most important enzymes. **Objective:** Here, we examine the kinetic properties of the (Na^+,K^+)-ATPase in whole larvae zoeae I from *M. rosenbergii* using ATP as a substrate. **Methods:** The whole individuals were rapidly homogenized in homogenization buffer (20 mL/g wet tissue). After centrifuging the crude extract at 20,000 × g for 35 min, at 4 °C, the supernatant was placed on crushed ice, and the *pellet* was re-suspended in an equal volume of homogenization buffer. After further centrifugation as above, the two supernatants were pooled and centrifuged at 100,000 × g for 3 h, at 4 °C. The resulting *pellet* was re-suspended in the homogenization buffer (10 mL/g wet tissue). **Results:** Our results showed that the (Na^+,K^+)-ATPase hydrolyzes ATP at a rate of 207 U/mg and $K_{0.5}$=0.05 mM, obeying cooperative kinetics. Similarly, stimulation by potassium (V 226 U/mg; $K_{0.5}$=5.03 mM), magnesium (V 202 U/mg; $K_{0.5}$=0.40 mM,), sodium (V 235; $K_{0.5}$=5.39 mM) and ammonium ions (V 310; $K_{0.5}$=3.10 mM) also was cooperative. In the presence of ammonium or potassium, ouabain inhibited activity at 73% (K_i=50 µM) and 67% (K_i=150 µM), respectively. **Conclusion:** The (Na^+,K^+)-ATPase activity from larvae zoeae I was twice higher when compared with gills homogeneized from adult *M. rosenbergii* shrimp. This study reveals important findings concerning kinetic characterization of the (Na^+,K^+)-ATPase in the shrimp *M. rosenbergii.*

Key-words: *Macrobrachium rosenbergii,* (Na^+,K^+)-ATPase activity, zoeae I.

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