Modulation of *Macrobrachium rosenbergii* Gill (Na, K)-ATPase Activity by Spermine and Spermidine


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The gill (Na,K)-ATPase is the main active transporter involved in crustacean osmotic and ionic regulation; hyperosmotic challenge increases cell polyamine concentrations during acclimation. Here, we investigate the effect of the exogenous polyamines, spermidine and spermine, on gill (Na,K)-ATPase activity in the freshwater shrimp *Macrobrachium rosenbergii*. Gill ATPase activity was assayed spectrophotometrically at 340 nm and 25 °C using PK/LDH and PGK/GAPDH linked systems in which ATP hydrolysis was coupled to the oxidation (reduction) of NADH (NAD$^+$), respectively. Both polyamines compete for the cation sites on the ATPase molecule, and inhibition is enhanced at low cation concentrations. Spermine inhibited total (Na,K)-ATPase activity by 74%, and spermidine by 23%, the former thus being the more effective inhibitor. Enzyme modulation by K$^+$, Na$^+$, NH$_4^+$ and Mg$^{2+}$, and inhibition by ouabain, were also altered by the polyamines, considerable variation being seen in V and K values. We conclude that polyamines like spermine and spermidine may regulate (Na,K)-ATPase activity.

**Keywords:** (Na,K)-ATPase, *Macrobrachium rosenbergii*, polyamines.

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