Comparison of Osmoregulatory Response in Different salinity Acclimated Giant Grouper, Epinephelus lanceolatus

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Abstract

The giant grouper (*Epinephelus lanceolatus*) is an economically important marine fish species that is typically cultured in seawater but can tolerate a wide range of salinities, from freshwater to seawater. However, its osmoregulatory mechanisms during acclimation to varying salinity conditions remain unclear. In this study, giant groupers were exposed to different salinity treatments for two weeks to investigate their osmoregulatory responses. Using scanning electron microscopy (SEM), we observed the apical surfaces and distribution of ionocytes, identifying and quantifying different ionocyte types. Confocal microscopy further revealed the localization of these cells. Additionally, we analyzed Na, K-ATPase (NKA) activity in the gills and examined NKA protein abundance through Western blot analysis. Our findings demonstrate the effects of salinity on ionocyte morphology, density, and NKA protein expression, providing novel insights into the osmoregulatory mechanisms of giant grouper gills under different salinity conditions. This study is the first to elucidate these regulatory adaptations in *Epinephelus lanceolatus*.

Keywords: Giant grouper, NKA, ionocytes, osmoregulation, salinity

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