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Halophilicity of Freshwater Bangiacean Red Algae

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Summary

More than 95% species of macrophytic algae live in marine coastal environments, and can be regarded them as halophilic organisms. But some species of macrophytic algae live in the upper intertidal/splash zones or estuaries, where salinity and other environmental conditions periodically and drastically fluctuate. These species are highly tolerant to low salinity or dehydration. A few rare species of macrophytic algae are found in freshwater environments in high altitudes such as mountain streams or springs in limestone areas. Stable water quality or some specific components must be essential for growth and reproduction in such freshwater species. Morphological and molecular phylogenetic analyses indicate that some freshwater and marine species are very close relatives. Therefore some freshwater species are valuable for study on halophilicity of macrophytic marine algae.

In this study, we searched for the experimental organisms to reveal the halophilicity of macrophytic algae, and found that Bangiacean red algae *Bangia* are useful organisms because of their simple morphology and their fast growth. However, morphologically similar *Bangia* species are divergent in marine and freshwater habitats. In our analyses marine *Bangia* showed maximum growth rate in 50-75% seawater medium with additional nutrients, while freshwater *Bangia* showed maximum growth rate in 25% seawater medium. Furthermore, we found that some ingredients in the mineral water (high hardness) sustained favorable growth of freshwater *Bangia*. These results are suggestive to elucidate the halophilicity of macrophytic marine algae.