

Biodiversity and Ecology of *Halimeda* in Thai waters and its potential as a carbon sink

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Halimeda is a green calcified macroalga, which commonly found distributed from an intertidal through subtidal areas associated with coral reefs in Thai waters and worldwide. It is well known as a reef building species and providing a white sandy beach when it died off. In Thai waters, we observed a high morphological variations as well as high diversity and abundance, we thus attempted to examine the species biodiversity using *tuf A* as well as the combinations of anatomical and morphological characteristics. In addition, because of their potential in using carbon through calcification, we then assessed their ability for carbon sequestration and calcification. There are a total of 8 species described from Thai waters with 2 undescribed species. The genetic diversity is low and Peninsular Thailand acts as a barrier for distribution; which seawater currents are likely to be a main factor driving the limitation. *Halimeda macroloba* showed greatest morphological variations and had highest abundance. For the potential as a carbon sink, we demonstrated that *H. macroloba* has a high growth rate, producing 1-2 new thallus segments/day, and it could accumulate up to 16 mg CaCO₃ daily. We also assessed rate of both photosynthesis and calcification of *H. macroloba* and *H. borneensis* using and a simple alkalinity titration; and converted them into carbon carbonate accumulation using one of our study sites as a case study. We estimated ~ 700 kg CaCO₃ deposited yearly by *Halimeda* in Tangkhen Bay, Phuket province. We discussed how *Halimeda* could contribute to carbon sequestration and carbon sink comparing to other macrophytes. We also explored how *Halimeda* responses to the climate change scenario, by testing the effects of temperature, light and pH on its photosynthesis and calcification¹

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