

# Mechanistic Study on Carbon Fixation Rate and Global Environment Remediation by Oceanic Calcareous Algae

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## Summary

Growth and carbon fixation rates of a typical calcareous alga *Cricosphaera carterae*, which plays an important role in global carbon cycle, were investigated. Nutrient uptake rates of the cells in light were higher than those in the dark. Dependence of nitrate concentration on specific growth rate was determined and formulated using a semi-continuous culture system. The specific growth rate was  $0.53 \text{ d}^{-1}$  at  $15 \text{ mg/m}^3$  of nitrogen concentration in the medium. This nitrogen concentration is the average value in surface ocean. The maximum growth rate was  $0.9 \text{ d}^{-1}$ . The ratio of inorganic carbon fixed to organic carbon fixed was about 0.1. The  $\text{CO}_2$  enriched air (715 ppm) was used for the microalgae cultivation. The growth rate and the amount of inorganic carbon fixed by a cell were little affected by the  $\text{CO}_2$  enrichment. The similar result was obtained for the cells after the acclimation culture where the  $\text{CO}_2$  concentration was gradually increased during 6 weeks. Using these results, the amount of total carbon fixation by the calcareous algae in the ocean was estimated for the global carbon balance.