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Optimizing biological carbon uptake by regulating carbonate- bicarbonate equilibrium

September 2022

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Abstract

Balancing the global carbon budget is a grand challenge and a critical research mission for sustaining life on Earth. Oceans absorb ca. 30% of global anthropogenic CO₂ emissions and dissolved CO₂ in the oceans forms carbonic acid that dissociates to generate H⁺, bicarbonate, and carbonate. By regulating the carbonate-bicarbonate equilibrium, rates of marine photosynthesis can be substantially enhanced, thereby capturing and condensing CO₂ into a readily utilizable form. The specific goal of this project was to demonstrate enhanced marine biomass production at the bench-scale towards advancing sustainable marine CO₂ removal. Our proof-of-concept experimental results are highly promising and we have filed a PNNL invention disclosure. In consideration of which, no further details are included in this document.

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