

# The Effect of Fe concentrations on a Coral Symbiont at 30°C



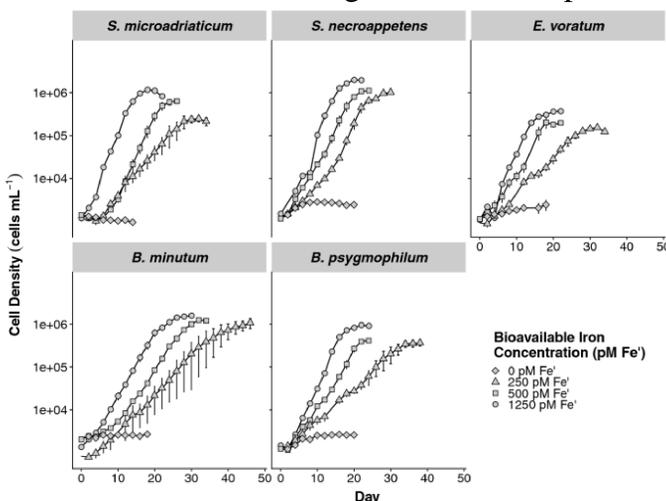
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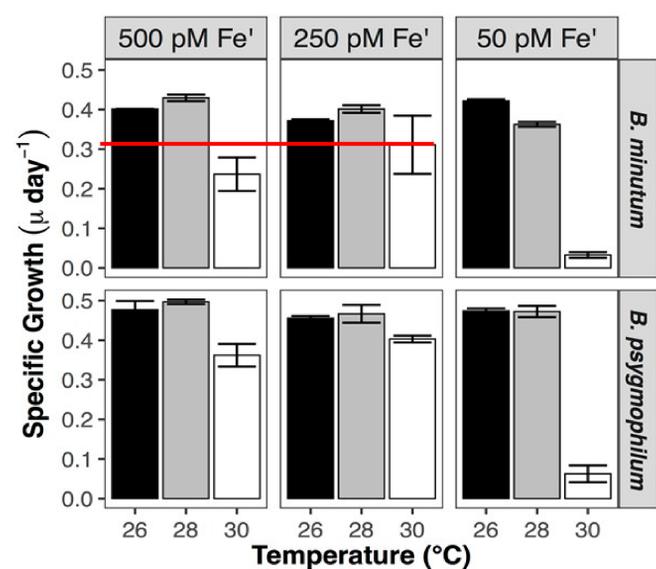


## Introduction & Motivation

*Symbiodinium*, a symbiotic microalgae resides in corals, provides its hosts energy to survive through photosynthesis. During the past 40 years, rising sea surface temperature has caused serious coral bleaching and death. Our laboratory's latest research found that increasing bioavailable Fe concentrations (Fe') significantly increase the growth rates of various *Symbiodinium* at both regular and high temperature<sup>1,2</sup>, 26°C and 30°C. In this study, I carried out experiments to validate the effect of Fe availability on the growth rate of *Brevolium minutum* at high seawater temperature (30°C).

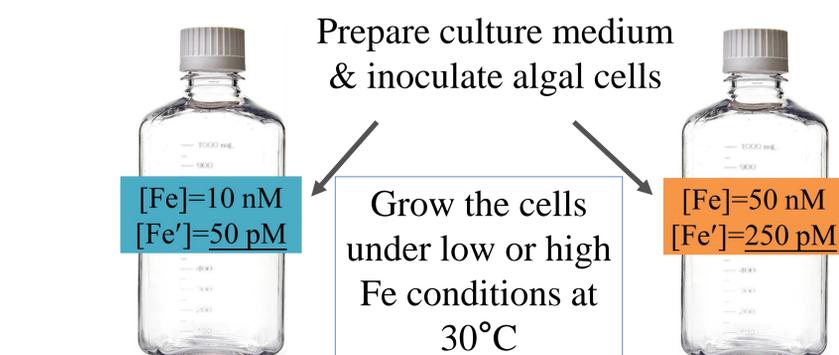


(Left) Fe is a limiting factor for the growth of various *Symbiodinium* at 26°C<sup>1</sup>.



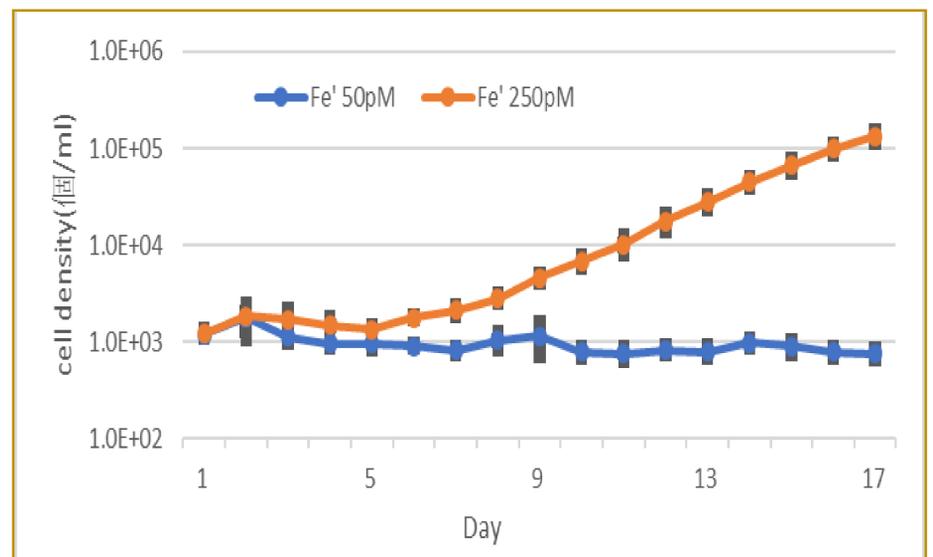
(Left) The specific growth rate observed in our lab's previous study<sup>2</sup>. For the 30°C treatment, the specific growth rates of *B.M.* of Fe' 250 pM was about 0.3 d<sup>-1</sup>. The growth rate of the low Fe treatment was also close to zero.

## Method



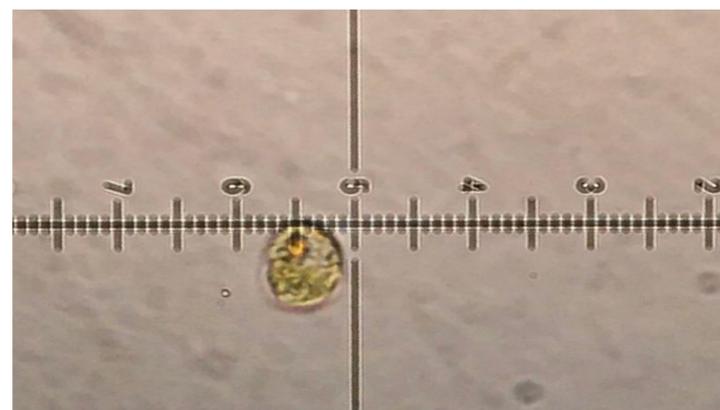
(Left) Use Beckman Coulter Multisizer to measure cell numbers and specific growth rates.

## Result & Discussion



(Upper) Growth Curve of Fe' 50 pM and 250 pM

- The growth curve of the high Fe treatment is better than the low one. The specific growth rate of the high Fe treatment is 0.35 d<sup>-1</sup>. The results are comparable to the data observed in the study before.
- After 10 days, the high Fe treatment cells went into the exponential phase.
- For the low Fe treatment, the cell number didn't grow at all.



(Upper) the microalgae, *B. minutum*, under microscope  
Units : 10 μm

## Conclusion

We have confirmed that high Fe supply is essential for the growth of *Symbiodinium* at high seawater temperature, 30°C.

## Next

Applying the same experimental condition, we have also carried a novel experiment with coral to study whether high Fe supply can relieve coral bleaching under high seawater temperature or not (Wu et al.).



## Acknowledgement

We thank Stephanie, Hsin-Ting, David, Oliver, Ya-lan and Mei for helping us and giving the advice for our experiment. ♡♡♡

## Reference

1. Reich et al. (2020) Endosymbiotic dinoflagellates pump iron: differences in iron and other trace metal needs among the Symbiodiniaceae. *Coral Reef* doi: 10.1007/s00338-020-01911-z.
2. Reich et al. (accepted) Iron availability modulates the response of endosymbiotic dinoflagellates to heat stress