

TITLE: DEVELOPMENT DELIVERY METHODS FOR BENEFICIAL MICROORGANISMS FOR CORAL (BMC) GROWTH

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ABSTRACT:

Corals have been suffering significant declines worldwide, as a result of global and local changes, which impacts affects a wide diversity of marine species that inhabit this ecosystem. In order to support restoration initiatives, this work aims to create an experimental system to explore coral physiology and microbial therapy to promote coral growth. The coral model used was *Pocillopora damicornis*, one of the world's leading reef formers and for which we have already selected an efficient consortium of beneficial microorganisms for corals (BMC). For that, a system composed by 16 closed tanks, with constant circulation of water and air, photoperiod of 12/12 hours were built to work with four different treatments in quadruplicates: (1) BMC + corals; (2) BMC + rotifers + corals; (3) Rotifers + corals; (4) control. The tanks system showed its efficiency in maintaining the replicates in similar and similar conditions in coral reefs, controlling pH, salinity and temperature. To improve our knowledge on different strategies for BMCs inoculation, we compare the use of saline suspended BMC with its application through feeding, by the use of BMC enriched and not enriched rotifers. The enrichment efficiency was evaluated by fluorescence microscopy and the results indicated that rotifers were able to uptake all 7 BMC strains and kept them alive for up to 6 hours (maximum time tested). For that, we will can see that corals then successfully incorporated BMC enriched rotifers, indicating that this is an efficient delivery system. In next steps several proxies will be utilized to evaluate the effect of the different treatments (feeding, enriched feeding, BMC and controls) over corals health, such as the microbiome exploration, quantification of primary productivity, respiration rate, Fv/Fm rates and microscopy, in addition to analyzing the water physical-chemical data for a six months experiment. The previously tested and published BMC consortium will be improved by the addition of new microorganisms selected by using selective urease, calcium carbonate and siderophore producers media.

Keywords: coral reef, climate change, calcification, microorganisms beneficial to corals (BMC), rotifers, *Pocillopora damicornis*

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