TITLE: PIGMENTS OF *POCILLOPORA DAMICORNIS* UNDER THERMAL STRESS, PATHOGEN AND BACTERIAL CONSORTIUM FOR ASSESSING THE HEALTH AND BLEACHING STATUS OF ENDOSYMBIONTS

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ABSTRACT

Understanding the natural variability of photosynthetic pigment ranges and distributions in healthy and stressed corals is central to assess the health and bleaching status of endosymbiotic reef-building corals. Here, we show the pigmentary characterization (chlorophylls and carotenoids) of *Pocillopora damicornis* subjected to two temperature regimes (26 and 30 °C), and evaluated its response to the presence of the thermo-dependent pathogen *Vibrio Coralliilyticus* (VC), to the addition of beneficial microorganisms for corals (BMC), to the mixture of pathogens and beneficial microorganisms (BMC+VC) and to a control (CTL) treatment. We analyzed photosynthetic pigments from coral by High Performance Liquid Chromatography (HPLC) and determined the concentrations of 18 pigments. Chlorophyll *a* (Chl *a*) encompasses the sum of biomass from symbiotic zooxanthellae and other epizoic/endolithic algae that can grow in association with corals. Therefore, Peridinin (Peri) was used as a *zooxanthellae* specific taxonomic marker that allows better differentiation of the variation of this biomass.
Maximum Likelihood Estimation (MLE) was used to model the Peri data and Akaike Information Criterion (AIC) to compare them. ΔAIC < 2 means both models are equally plausible and ΔAIC > 2 means they are different. No effects of VC, BMC and BMC +VC were observed on coral condition at 26 ºC (ΔAIC < 2 for each x CTL). Comparing treatments at different temperatures, BMC+VC, and BMC at 30 º C was not significantly different from CTL at 26 ºC (ΔAIC < 2). In addition, Peri was significantly lower in VC and was different from all other treatments (ΔAIC > 2). These results indicate that the presence of the pathogen reduces the populations of zooxanthellae when the temperature is higher, but the BMC effectively neutralizes the action of the pathogen. It also appears to protect the zooxanthellae from thermal stress, since CTL at 30 °C was significantly different (ΔAIC > 2) from CTL at 26 °C. This result confirms the thermo-dependent nature of the pathogen and the ability of BMC to keep zooxanthellae populations stable under *Vibrio coralliilyticus* infection and thermal stress.

Keywords: coral bleaching, pigment, *zooxanthellae*, *Vibrio coralliilyticus*, BMCs

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