**Effect of ocean-acidification induced by climate change on some Red Sea hermatypic corals**

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**Abstract**

An increase in the atmospheric concentrations of greenhouse gases produces a positive climate forcing, which threatens the survival of coral reef ecosystems. Symbiotic relationships between scleractinian coral reefs and photosynthetic endosymbionts (Zooxanthellae) are the foundation of reef ecosystems, which are differentially impacted by ocean acidification. The aim of this study was to investigate coral reef responses to ocean acidification and discuss the possible mechanisms by which this impacts the coral reef endosymbionts. In addition, we investigate whether coral fluorescence (the spectrum of fluorescence emission) can be used to assess coral health. The seawater carbonate chemistry of the mixed layer of the oceans that is changing rapidly in response to increases in atmospheric CO2 has caused catastrophic coral bleaching events that have been devastating for coral reefs. We conducted acidification treatments on four scleractinian corals, *Acropora humilis*, *Porites lobata*, *Stylophora pistillata*, and *Galaxea fascicularis*, which we collected from the Red Sea. The treatments occurred by exposing the coral samples to CO2 doses until the PH reached 7.95 and 7.82 for 2, 4, 6, and 8 days. The response to acidified seawater is very diverse among the four species, varies depending on coral morphology and the duration of acidified exposure. The partial pressure of CO2 affected the zooxanthellae density and the chlorophyll density, especially on the eighth day at PH=7.82, resulting in the deterioration of the coral's health prior to the initiation of bleaching. In this study, chlorophyll fluorescence was used as a reference for evaluating the degree of coral bleaching. The fluorescence intensity of treated corals was positively correlated with the biology of the dinoflagellates, indicating that the spectral emission of fluorescence could be used as a physiological proxy for health in corals.

**Keywords**: Greenhouse gases, acidification, scleractinian corals, Zooxanthellae, fluorescence